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A transitive perspective on the relief of psychosomatic symptoms

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A key element of successful psychotherapy for the treatment of psychosomatic disorders is that patients recognize and change the meaning of their experiences. Such changes are brought about by appropriate verbal referencing of symptoms currently experienced within a given narrative. The present theoretical paper argues that changes are not based on better, more adaptive narratives *per se*, but on the transition (or linkage) process itself that is experienced between different narratives. This view is theoretically justified in various ways: first, it is accounted for through contemporary spatiotemporal neuroscience, which aims to connect mental and structural aspects *via* a common dynamic property or, according to Northoff, the "common currency" of a brain's orientation along its embeddedness in its contextual world, i.e., body and environment. Second, it is justified through the physics concept of "spontaneous symmetry breaking," which is used analogously to "suffering from symptoms." If the sufferer is willing to experience a process of "going back," that is, moving away from the previous narrative (or aspect) by verbally relating to the felt aspects of the symptom in question (i.e., approaching its meaning), they are moving toward symmetry or an underlying dynamic alignment with their world context. Clinical predictions are derived from the theoretical arguments.

KEYWORDS

process concept, psychosomatic disorders, symmetry breaking, Jung-Pauli collaboration, spatiotemporal neuroscience, symptom prescription

Introduction

Alliance, expectations, and empathy have been denominated as common factors of therapeutic effectiveness for different psychotherapeutic contexts (Wampold and Imel, 2015). Moreover, all psychotherapeutic schools agree that transforming the meaning of experiences is essential for recovery (Frank, 1986). It has recently been suggested that joint patient–therapist interactions can produce meaningful transformation through the patient experiencing novel, adaptive narratives (Locher et al., 2019; Sensky, 2020). This has been exemplified based on three different and commonly used psychotherapeutic approaches (Locher et al., 2019), through which the patient and therapist co-construct a meaning of the patient's current reality representation, that is, their illness narrative. From this shared ground, a process of meaning transformation enables a novel narrative that is more plausible (cognitive therapy), more functional (systemic therapy), or more congruent with the patients' self-concept (person-centered therapy) (Locher et al., 2019). However, it remains unclear whether meaningful transformation signifies the approximation of an existing, non-adaptive narrative (or system of meaning) to a new, more functional, and adaptive one (metaphorically, comparable to arriving at a "better-adapted" train station), or whether the experience of the transition itself (metaphorically, the train journey itself) is crucial for relief.

To answer this question, I aim to derive arguments from empirical data, which show that it is not the achievement of adaptive concept forms, that is, "adaptive narratives" *per se* that is effective, even if these narratives elicit newer and more advantageous meanings; rather, it is the transitive (or linkage) process between the two substantive concept forms itself that is beneficial. Arguments to this end are obtained from the psychotherapist Eugene Gendlin, modern physics, and the Jung-Pauli conjecture, considering the contemporary spatiotemporal neuroscience perspective (references given below). Theoretically grounded recommendations for clinical use are derived from the presented arguments.

Evidence for the efficacy of symptom prescription in psychosomatic patients and the rationale for studying a patient treated with this method to test the argument in question

To investigate the research question concerning the primary relevance of the transition process between narratives in psychotherapy—as outlined above—three premises are required: the choice of (i) a suitable patient, (ii) an intervention at the subject level of the patient and (iii) the patient's willingness to engage in the therapy process.

I firstly focus on a case selected from a group of patients known to be unable of verbally expressing their emotional status, whilst still experiencing the somatic component related to their affective reaction (summarized in de Greck et al., 2013). These patients are respectively referred to as suffering from psychosomatic (or somatoform) disorders. Several psychotherapeutic approaches have been applied to these patients such as psychoeducational interventions, stress management procedures, cognitive-behavioral therapy, brief dynamic therapy, family therapy, group interventions (reviewed in Fava et al., 2017), psychodynamic psychotherapy (Bronstein, 2011; de Greck et al., 2013), or clinical hypnosis (Wilkinson, 1981; Tschugguel and Tschugguel, 2010; Häuser et al., 2016).

Second, I describe the treatment of such a patient by means of symptom prescription for the following reason:

By definition, a symptom is defined by the patient as a behavior that is uncontrollable, involuntary, and spontaneous (Weeks, 2013). Prescription (or reframing, decontextualization) of symptoms is a technique that has been proposed as the single common denominator of efficacy for all systems of psychotherapy (Weeks, 2013). The patient must alter his or her attitude toward a behavior if it is allowed expression during joint patient-therapist interaction. "When a client is able to change the context of the symptom, the meaning inevitably changes only because the client is able to demonstrate some control over the uncontrollable, some volition over the involuntary, and some mindfulness over the spontaneous (mindless or automatic behavior)" (Weeks, 2013).

The efficacy of symptom prescription in a narrow sense has been demonstrated by effectively influencing symptoms and their persistence in a control group study involving patients with multiple, chronic, medically unexplained physical symptoms and severe physical illness (Schwarz et al., 2016), a meta-analysis (Kern, 1993), and a control group study of socially phobic students (Akillas and Efran, 1995). Its core concept is a type of "paradoxical intervention." As early as in 1977, the "paradox" of "taking control by giving it away" was suggested as the common element of all psychotherapies (Weeks, 2013). According to Lankton and Lankton (2013), who described paradoxical treatment in Ericksonian hypnotherapy, "it symbolizes the natural wisdom of impermanence," that is, the transitive experience. The patient is asked to produce their symptom precisely, but now as part of the therapy in terms of a desirable process to gain self- and mutual control (Weeks, 2013), in the Aristotelian *sensu causa finalis*. This helps the patients to change their perspective in such a way that these changes are easier to make, referred to as "reframing" by Paul Watzlawick (Weeks, 2013). Starting from Lankton's view that ". . . the key is in the process interface between therapist and client. It's in that in-between. You can only create something at the interface" (Watson, 2013), I place further emphasis on the process interface. However, any attempts to understand what a "process interface" is immediately run into an intricate ontological enigma. The core of this enigma lies in the question of how an intervention allowing a patient the fullest expression of freedom in developing a new frame of reference (Weeks, 2013), attributes change to themself. According to Hameroff and Penrose (2014), it must be "a non-computable factor," independent from a "neurocomputational approach to volition, where algorithmic computation completely determines all thought processes, [and] appears to preclude any possibility for independent causal agency, or free will. Something else is needed."

Contemporary clinical hypnosis has been used to prove the concept as a suitable type of intervention at the patient. Hypnosis is a therapeutic procedure clinically effective in a wealth of psychosomatic conditions (reviewed in Häuser et al., 2016). It is defined as both an altered state of conscious awareness and a procedure to induce such a state (Peter, 2015; reviewed in Häuser et al., 2016). Once induced, physiological, cognitive, affective processes, and behavior are under disposition. The hypnotic trance state can be induced either by the therapist or alone (self-hypnosis) and is distinguishable from other states of consciousness (i.e., waking state, sleep, meditation) according to electroencephalography and imaging methods. The characteristic features comprise altered time perception, selective amnesia, age regression, marked inward attention, and reactions to suggestions. Contemporary clinical hypnosis is a non-authoritarian, resource- and solution-oriented method, in which the focus is on the patient's own potentials (Peter, 2015; reviewed in Häuser et al., 2016). Therefore, patients should be informed that hypnosis is not a condition that the hypnotist induces in them, since this would preclude free will. Rather, it is a condition that occurs within the patient naturally, in a proper atmosphere created by the therapist, like self-hypnosis, which occurs automatically during various everyday situations, such as driving a car (Tschugguel and Berga, 2003). To induce hypnosis, verbal, or non-verbal suggestions (e.g., visual signals given through the finger) are provided in such a way that they merely serve as a proposal (Peter, 2015; reviewed in Häuser et al., 2016), comparable to inviting the patient of entering a supermarket of possibilities, where they are now free to choose what to grab.

These three initial premises serve to test the theory of the primary relevance of transitive experience: (i) physical symptoms on the one hand vs. inability to verbalize the underlying emotional state on the other, (ii) willingness to enter a state of dispositional affect response—such as that of hypnosis—based on trustful cooperation with the therapist, and (iii) success in generating the symptom under controlled conditions with the therapist.

Gendlin's theory of process concepts

Some useful insights into the "process interface" and transitive experience have been provided by the philosopher and psychotherapist, Eugene Gendlin, who proposed a concept to overcome the traditional "hard problem of consciousness," that is, the irreconcilable dualization of the psyche and body, describing them as "imprecise, first-person involving" and "mechanistic, third-person space time-grid precise assumptions," respectively (Gendlin, 2000). To overcome the dualizing split, he introduced a third factor, the "process concept." His allegory essentially explained the following (modified from Gendlin, 1964, p. 18): if an animal were hungry, it would normally symbolize this by eating and continuing its organismic digestion process, that is, it would refer adequately to its feeling of hunger. Conversely, if it had been trained to ignore its experience of hunger (or illness), it would bite itself in the leg. This is exactly the case with human feelings of guilt, shame, or wickedness that occur "as if" they are reactions to feelings, due to our habit of not adequately referencing the underlying feelings. Gendlin concluded that the unconscious involved an incomplete process, a "convention" of "muscular and visceral blockage," excluding experiences from awareness. It must be acknowledged, however, that psychosocial stress paradigms are by their very nature human. However, the use of Gendlin's allegory includes the non-social stress paradigms that also exist in animals. They currently serve as animal models for psychoneuroimmunology understanding of the etiology of psychiatric and somatic diseases (Reber and Slattery, 2016). The "blockage" assumption matches a very early notion of the philosopher Arthur Schopenhauer, who described "body blockage" in the following terms: "the body is deceived in 'good faith' but under 'false pretenses'" (Schopenhauer, 1859/1977).

This raises the question: what can encourage the sufferer to refer to their bodily experiences to unblock implicit feelings, serving to alleviate symptoms? In the words of Fava et al. (2019), how can suffering "become the sources of positive insights" as a "prelude to desirable adaptive changes"?

Gendlin arrived at an answer: to reactivate the completion of this process, that is, unblocking, he proposed a "law of the reconstitution of the experiencing process: When certain implicitly functioning aspects of experiencing are carried forward by symbols or events, the resulting experiencing always involves other sometimes newly reconstituted aspects, which thereby come to be in process and function implicitly in that experiencing." (Gendlin, 1964). I refer to this in the later sections of the paper, following the presentation of a case.

Experiencing symptom prescription: A case

In what follows, a succinct core of symptom prescribing is illustrated using a cascade of interactions from an actual case of the author's office. The patient (P) was defamiliarized by removing her name, age, and other details of her history to retain her anonymity, the author was regularly P's therapist (denominated here as operator O) from February 2018 until November 2019; the session presented in subsequent paragraphs took place in the initial phase of therapy. The therapy consisted of a total of 22 sessions, initially monthly from February to September 2018, then twice a month from October 2018 to February 2019. There were no sessions from February to October 2019 because the patient was abroad. Between October and November 2019, eight weekly sessions took place. Then, the patient had to go abroad again. Subsequently, there have been no further sessions so far.

To understand the connection between theory and practical procedure, the theoretical concept behind the procedure is briefly presented. To this end, the core of case description is added in the light of P's previous findings through O's questions and Ps answers regarding the possible meaning of the prescribed symptoms in the form of experiences reported by the patient during her trance. Strictest attention was paid on O's part not to make any judgmental comments and only to maintain the flow of P's experience.

The relationship between P's previous insights, her present experience during trance, and O's attitude of only maintaining the flow of her experience during trance can be seen as P's key to understanding future challenging experiences in a new light, being recontextualized by means of the surprising, shared experiences in trance.

Theoretical concept of procedure

As already described by Langewitz (2011), a careful and detailed history sampling of P is necessary. In doing so, one should pay less attention to the complete recording of P's biography than to an understanding of very specific, concrete experiences, which are clearly affectively connoted by P, and which can be asked about. It is essential for O not to ascribe any generalized meanings to this experience explicitly or implicitly, but rather to ask about the concrete meaning of this situation and the actions associated with it. In other words, we inquire about the concrete beyond the empirical that might not yet be necessarily knowable to P, since she always constitutes her past from present meanings (Sartre, 1943/1956 transl. by H. E. Barnes, p. 563).

Hence, the commonality of various empirical drives of P is what Sartre denominates as the "empirical attitude (of P herself as) the expression of choice of an intelligible character," namely, her "fundamental meaning" (Sartre, 1943/1956, p. 564). This fundamental meaning can now be revealed by "deciphering the meanings of the person's being-in-the-world" (Sartre, 1943/1956, p. 564), that is, P's being-in-concrete-situations. As such, therapy's "point of departure is experience" (Sartre, 1943/1956, p. 568).

From this moment on, one must always be prepared for the fact that the symbols chosen by P can already change their meaning in P (and usually do, insofar as space and time for a possible flow of experience on the part of P are unfolded by O during preliminary conversation. Subsequently, the reader can see that the theory of experiential thoughts' transition takes root in all phases of the therapeutic process). Only the grasping of individual, momentary phenomena, no matter how minimal they may be, enables their grasping in the conceptual (e.g., "I still pay so much attention to my parents getting along! Yet, I have a family myself!"). It is exactly at this point that the implicit meaning of the symptom becomes explicit and, thus, dispensable. The possible meaning assignments of the symptom run out of further words; P begins to discover that she must no longer let herself be "driven" by her symptom. Therefore, she can now discover new degrees of freedom of action. Once P has become dispositional with respect to the assignment of meaning to her symptom, the trance experience can envelop this process of disposability with an alternative experiential context. Here, we come to hypnosis, a mutually agreed process of inner focusing that opens P's personal space and time to experience a change in the sub-modalities (i.e., quality, extent, intensity, weight, etc.) of the symptom prescribed to her, from the context of the previous conversation.

Application of concept during therapy sessions with P

The therapy session conducted with P is described here. During the initial session, P's history was taken. She grew up abroad and moved to Europe with her family over 10 years ago. She presented with a diagnosis of *"longstanding irritable bowel syndrome"* and *"suspected food allergies that have never been measurably verified,"* combined with recurrent newly emerging episodes of *tinnitus*, experienced as *"light and tingling sensations that started a few months ago,"* associated with *"fear of losing control in challenging situations."* At the end of a detailed, 2-h anamnesis, P and O concluded that the fundamental meaning of P's unconscious bodily process since her earliest childhood was to essentially act as a mediator between her polyamorous father and her mother's saintly figure to keep their marriage going. She continued her expert role in her profession as a mediator. She never learned to sense, recognize, or appreciate her own physical and personal boundaries. Her mother, who suffered several early miscarriages before P was born, was always caring, quiet, and reserved in P's memory, accepting the role assigned to her by tradition, and died of ovarian cancer a few years earlier. From then on, P's father required P to take care of him, as tradition demands of the women within the family.

Multiple times during her adolescence, P asked her mother how she put up with her father's charming behavior and received answers such as "Oh, let him." P repeatedly felt a tightness in her head, neck, and shoulders, and sometimes suffered from shortness of breath associated with now diagnosed gluten intolerance. Food always got stuck in her, combined with a feeling of fullness and the general impression that "once everything is in the cells, it does not want to come out any time soon." As a child, she often felt the need to hide in her father's wardrobe, a small, dark room where she could "hear" the "sound of silence," completely undisturbed. The allergies kept changing, with an allergy to food turned into an allergy to pollen, and stress aggravating the symptoms. Toward the end of the initial session, P was informed about hypnotic trance and its corresponding phenomena and was casually asked if she wanted to experience it for a few more minutes before coming back. She was very happy to do so, with O's appropriate invitation already being delivered slowly. During this brief 10-min trance, she was invited to experience autonomic ideomotor limb movements (twitches and arm raises) of early childhood that were familiar to her body from her memory, with the accompanying comment of "being perceived by everyone else as an autonomous human being with boundaries." In other words, a reference to her childhood ability of setting *autonomous behavior*, and thus her *dignity of "being human"* and not a "heteronomous function of other people's needs," was implicitly emphasized. In the next session, which took place about 7 weeks after the first one, P reported that she was already feeling better. She cried that her father always presented her as a "decorated little horse." During this recollection, she felt pressure in her throat and a feeling of "thickening of breath" coupled with the account of her dreams, in which she could neither speak nor scream and her voice could not "get out" of her gullet. With the instruction to continue from this topic the next time, symptoms currently arising in the context of her memories disappeared. In the next session, she reported that when she was overwhelmed at work, during which she would function like a robot, and she would always have a similar dream at night. The physical overload caused by exceeding her stress limit often triggered violent anger and abdominal pain in her; she looked in the toilet mirror at work and said to herself, "that is not you!" Thus, she was asked by O whether she would like to "remember this sort of gut feeling" that she just talked about during trance "to make new discoveries from there." With her consent obtained, she was told that she is not alone with her feelings, is in a safe environment, and O can be trusted. When P was in a trance with her eyes closed, O triggered a memory by asking P what she wants to start remembering first (i.e., using Ericksonian trance-inducing double binding; Erickson and Rossi, 1975). "Is it a picture, a sound, a feeling, a smell, or a taste?" (i.e., requesting sub-modalities to trigger the memory). She did not have to answer; it was just a matter of finding out how it made her feel, and when she was ready to rehearse, she could confirm this to O by, for example, moving her left index finger (ideomotor activity as evidence of intrinsic activity). Once she moved her finger, O asked, "What is it now?"; P responded, "pressure in the belly." Then, O replied, "Please try to make the feeling stronger, let time slow down until it almost stops. Your space becomes wide, wider, and wider, so that you can see very far, very comfortably into the inner vastness. (Transitive state of *"slowing down of time and expansion of space"*) [Pause for several seconds] What happens now?" P said, "It has moved upward, suddenly in the throat" [P is choking now]. O replied, "Please hold on, take your time, I am with you, and you are safe, wait and see what comes, slowly but surely." P stopped choking and sat in amazement. O asked, "What is it now?" P said, "I see a tall woman with long black hair, a white face, her hair fluttering in the air, floating above the ground." [P was crying at this moment]. O responded, "Take your time, that is right, it is good to let it all come, more and more, just let it come, let it get stronger and stronger" [pause, no further speaking]. As soon as O saw her body relaxing, he invited her to dehypnotize with the instruction, "Remember any experience that your subconscious mind wants you to remember now after you wake up. And once you are fully awake, please stretch your whole body so that you feel as relaxed, fresh, and strong again as if you had slept well all night" [pause]. After waking up, P said, "Crazy, that was intense!" O asked, "What do you mean, pleasant or unpleasant, or unclassifiable, but just intense?" P replied, "Violent, yes, enormous, strange" [pause, as P was still completely preoccupied with her feelings]. O said, "Your body will surprise you now every other day, almost imperceptibly, [pause] as if your perspective on all events changes, especially on all challenges [pause] that you have experienced again and again in the past, with—little—changed perspective [pause]. At the same time, your perspective has changed by 0.347 or 0.591 degrees [a metaphor for arbitrarily low numbers that gift-wrap the mediated notion of minute and therefore initially imperceptible changes], and a little more each day [pause]." As soon as P began to smile (which is often the case after such a procedure), O asked, "What are you going to do today?" This question typically induced amnesia to distract P from the previous trance, bring her completely out of trance, and make her feel like everything is done for today, that she can now go about her daily activities with peace of mind. The next session was scheduled 4 weeks later because, in O's experience, reflections on the perceived changes need some configuration time to emerge fully. At the next meeting a month later, P reported that a lot had happened. Enormous anger, but also strength, emerged in her. She had outbursts of anger in many situations, but also had corresponding feelings of guilt. She must now learn to be careful with the boundaries she feels, so as not to hurt anyone. She was also suddenly able to distinguish mendacity and feigned kindness from genuine kindness, which gave her considerable symptom relief. Stomach pain and sleeping problems (which she initially only mentioned in passing) were no longer an issue, and her tinnitus had improved by around 40%. In further sessions, her constantly new discoveries in dealing with herself and topics such as her father's death that had taken place in the meantime, were taken up. These investigations were conducted during trance or conventional exploration, and were integrated into P's current horizon of experience, according to her directly conveyed images or feelings that accompanied these themes. Ultimately—according to the last meeting in November 2019—P found that any food, "even foods high in histamine, such as eggplant or radishes," was tolerable. Her breathing also improved, allowing her to breathe much deeper. She effortlessly distanced herself from her family problems and could now concentrate much better on her further plans. Stressful statements that she had learned in her childhood, such as "Nothing is free in life, my child" or "You have to pay for everything in life, be it freedom, happiness or ultimately even with life," were now regarded as attitudes or points of view that did not belong to her and had very limited meaning. In accordance with the previous considerations, this brief example shows that the sufferer P experiences herself in a position where she can find verbal symbolizations and events related to her suffering. This has previously been described based on typical cases of somatoform "chronic pelvic pain disorder" (Tschugguel and Hunter, 2008; Tschugguel, 2018).

At what point in the contention between P and O does the transitive state unfold? Since the transitive state is a purely subjective quality, the sequences of the process from which O selects a particular one for the following description are purely subjective, that is, they do not necessarily coincide spatiotemporally with those that P experiences. O can never know when and where P experiences transitions. This spatiotemporal non-correspondence of events is the essence of P and O's joint engagement. It is precisely because of this empirical indeterminacy that the sufficient condition of pure quality is given, that is, therapeutic impulse in its narrowest sense. In the case described here, O experienced a transitive state after having pronounced *"slowing down of time and expansion of space"* in that O has perceived atmospherically between himself and P a change.

This transitive state sequence, *"slowing down of time and expansion of space,"* is explained in the following from perspectives of physics, philosophy, and neuroscience.

Inferring a theory from the case based on physics, philosophy, and neuroscience

Symmetry breaking

A very useful concept is that of symmetry and symmetry breaking by physicist Wolfgang Pauli, which has already been used by Atmanspacher and Primas (2006) to fundamentally investigate the relationship between mind and matter from a physical point of view. According to them, "symmetry" is one of the "empirically inaccessible," presuppositionless "first principles of physics," and is "defined as invariance under a certain set of transformations." They give an example: "The laws of physics treat all directions of space as equivalent, but in daily life there is a crucial difference between horizontal and vertical directions." Analogously, "symmetries" (corresponding to the principle of equivalence of all directions in space) "are never empirically attainable; they can only be theoretically derived [based on] phenomena that exist due to broken symmetries" (corresponding to the concrete, empirical observations of horizontal and vertical directions in the space of our daily life). The fact that observed phenomena generally do not have the symmetries of the laws governing them was clearly recognized by Pierre Curie (1894): "Asymmetry is what creates a phenomenon." In a perfectly symmetrical situation, there are no distinctions, so reality does not appear in structured form" (Atmanspacher and Primas, 2006, p. 3). Accordingly, Pauli further mentions, "It would be most satisfactory if physics and psyche could be conceived as complementary aspects of one and the same reality, which, (in itself), "is not directly accessible." Analogous to Pauli's concept of complementarity of mental and physical phenomena is the blocking of principally unobservable, unblocked, theoretically healthy physical interactions and experiences into empirically observable, asymmetrical, pathological aspects of mental (e.g., *"fear of losing control"*) and physical issues (e.g., *"irritable bowel syndrome"*). This analogy follows the physical concept of "symmetry breaking" from a theoretically possible, healthy state of symmetry (*autonomous behavior*, *dignity of "being human"*) into pathological, observable and, hence, asymmetrical aspects of psyche (*"fear of losing control"*) and body (*"irritable bowel syndrome"*). Subsequent predictions about these henceforth denoted observable aspects (phenomena) are deductible. On the one hand, these are subjectively experienced bodily sensations, in the form of symptoms. On the other hand, they occur together with measurable, structurally observable variables (e.g., patterns of functional magnetic resonance imaging signaling, electroencephalogram, or changes in heart rate, blood pressure, skin conductance; whatever the clinical circumstances in question are). These symptoms only become obsolete once the sufferer begins to appropriately reference them verbally as "vehicle(s) of meaning" (according to Langer, 1978, p. 52, quoted by Atmanspacher and Primas, 2006) (as illustrated in the case above). However, how this obsolescence occurs requires further theoretical elaboration.

According to which hypothetical principle could symptoms become obsolete if they are referenced verbally by the sufferer, i.e., symbolized?

The Jung-Pauli collaboration and contemporary spatiotemporal neuroscience

The "Jung-Pauli collaboration" is a paradigm, which is very useful in explaining such psychophysical correspondence effects: ". . . [Wolfgang] Pauli and [Carl Gustav] Jung proposed the idea of psychophysical correspondences ('synchronicities') between psychological and physical subdomains of an underlying hypothetical background reality" (Atmanspacher and Fach, 2005, p. 202). In a letter to Jung, Pauli originally wrote (translated from German by the author):

"Whether one speaks of the 'participation of natural things in ideas' or of a 'behavior of the metaphysical, that is, of things that are in themselves real,' the relationship between sensory perception and idea remains a consequence of the fact that both the soul of those who know as well as the objects recognized in perception are subject to an objectively conceived order. Any partial knowledge of this order in nature leads to the formulation of statements that on the one hand concern the world of phenomena and on the other hand also use general logical concepts in an idealizing way. The process of understanding nature, as well as the happiness a person feels in understanding, that is, when he becomes aware of new knowledge, seems to be based on the meeting of already existing internal images of the human psyche with external objects and their behavior. As is well known, this conception of natural knowledge goes back to Plato and is also very clearly represented by Kepler" (Pauli, 1948/1992).

In summary, Pauli assumed that an underlying, however undefinable, and unapproachable, ontic background realm that) grounds all aspects (*"fear of losing control," "irritable bowel syndrome"*) of being a human. This ontic background realm corresponds to the Kantian "thing (or object)-in-itself." According to Kant,

"Space and time are its [i.e., the object's] pure forms, sensation in general, its matter. We can cognize only the former *a priori*, i.e., prior to all actual perception, and they are therefore called pure intuition; the latter, however, is that in our cognition that is responsible for it being called *a posteriori* cognition, i.e., empirical intuition. The former adheres to our sensibility necessarily, whatever sort of sensations we may have;" (*"slowing down of time and expansion of space"*) "the latter can be very different." (*"Fear of losing control," "irritable bowel syndrome"*) "Even if we could bring this intuition of ours to the highest degree of distinctness, we would not thereby come any closer to the constitution of objects in themselves. For in any case, we would still completely cognize only our own way of intuiting, that is, our sensibility, and this always only under the conditions originally depending on the subject, space, and time; what the objects may be in themselves would still never be known through the most enlightened cognition of their appearance, which is alone given to us" (Kant, 1787/1998).

However, are we really compelled to describe this background realm as ontic, that is, empirically inaccessible, since Kant himself claims some outer given "sensation," which affects our intuition to form any object? Attempts to shed light on it have been put forward by Karl Friston (2010), who conceived "the brain as a generative model of the world it inhabits," due to the brain's capacity to minimize its energy consumption by minimizing errors in predicting sensory information. According to Friston, by tracing internal mental and external neural spheres back to the same underlying constitutional process, dualism is not even a possibility, let alone a reality (as described in Northoff, 2014). That is, the patient is offered a way to autonomous behavior and thus to her dignity of "being human." In this sense, the notion of an empirically inaccessible background realm dissolves. This view corresponds to the work of Georg Northoff who, from evidence of spontaneous (or baseline, inactive, background, non-task induced) spatiotemporal dynamics of brain activity without any brain function, as seen, for example, in anesthesia, suggested that baseline, spontaneous, spatiotemporally orchestrated brain activity is the neural predisposition of all stimulus- or task-induced activity (Northoff, 2012, 2014; Han et al., 2013; Northoff et al., 2020) (*"slowing down of time and expansion of space"*). This view is summarized as follows:

"Information processing is no longer regarded as [the] primary purpose of the brain's activity, as it is replaced by the brain's capacity to transform and integrate different temporal and spatial scales of brain, body, and environment. One example of that is consciousness that may consist in exactly that, the transformation of different temporo-spatial relations into mental features—this is well compatible with the leading theories of consciousness like the Global Neuronal Workspace Theory, the Integrated Information Theory, and especially the Temporo-Spatial Theory of Consciousness" (Northoff et al., 2020).

Consistent with this argument, Northoff concluded that, according to the paradigm of spatiotemporal neuroscience, the mind-brain relationship is less important than the world-brain relationship, owing to the dynamic spatiotemporal alignment of the brain "along" the world (Northoff, 2012), that is, its sociocultural context (Han et al., 2013). Northoff explained this view in his early 2012 paper:

"…The brain shows neural activity generated by itself, independently of the stimulus it encounters. This spontaneous or intrinsic activity is described in operational terms as resting-state activity. What neuroscientists observe as stimulus-induced activity is a mixture of both the brain's intrinsic activity and the neural activity changes related to the stimulus. Consciousness and self are consequently assumed to be predisposed by the brain's intrinsic activity (i.e., resting state activity) and become manifest during the resting state's modulation by extrinsic stimuli from body and environment" (Northoff, 2012, p. 357).

This contemporary view of brain function (Northoff, 2012, 2018; Singer, 2013; Han et al., 2013; Northoff et al., 2020), has been denominated the "Kantian brain" (Fazelpour and Thompson, 2015). However, contradicting Kant's view, which is based on the idea of the stimulus as an empirically unattainable "thing-in-itself," Northoff emphasized the embeddedness of the brain in its sociocultural and body context. By such conceptual replacement of the "ontic domain," as previously described in the Jung-Pauli conjecture, with an "empirically accessible" one, that is, an *a posteriori* connection of brain and psyche (Northoff, 2018) by means of the "sociocultural (or world) and body context" as a "common currency" (that is, the patient is offered a way to autonomous behavior and thus to her dignity of "being human."), Northoff established spatiotemporal neuroscience as a scientific paradigm. In accordance with the latter perspective of the resting-state alignment of the brain along its world and body context, contents of suffering can symbolize the sufferer's inability to dynamically (or flexibly) align to their changing, sociocultural world and body context. Verbally designated symbols of the sufferer's experience, for example, *"fear of losing control*" and *"irritable bowel syndrome,"* as seen in the present case description, may thence be understood as structurally representable subdomains; they may be considered "aspects" of such dysfunctionality within a given world and body context, for example, "having learned to act as a mediator between her parents to keep their marriage going without feeling, recognizing, or appreciating her own physical and personal boundaries."

How is the term "aspect" used here?

Since a person's suffering consists of contributions from various aspects (*e.g., "irritable bowel syndrome, suspected food allergies that have never been measurably verified,* combined with *recurrent newly emerging episodes of tinnitus"* on the one hand, and *"fear of losing control in challenging situations"* on the other hand) of their experience of illness (Sensky, 2020), I will now explain what I imply by "aspect" in this regard. William James described the thought passage (or linkage phase) between stable mental representations, that is, contents of consciousness (designated by him as "substantive states," e.g., inner images of symbols), as the "transitive state" (e.g., *"slowing down of time and expansion of space*"):

"Transitive states [are] places of flight [of] the transitive parts of the stream of thought. It then appears that the main end of our thinking is [always] the attainment of some other subjective part than the one from which we have just been dislodged. It is very difficult, introspectively, to see the transitive parts as what they really are. If they are but flights to a conclusion, stopping them to look at them before the conclusion is reached is really annihilating them. Whilst if we wait till the conclusion be reached, it so exceeds them in vigor and stability that it quite eclipses and swallows them up in its glare. Let anyone try to cut a thought across in the middle and get a look at its section, and he will see how difficult the introspective observation of the transitive acts is. The results of this introspective difficulty are baleful. If to hold fast and observe the transitive parts of thought's stream be so hard, then the great blunder to which all schools are liable must be the failure to register them, and the undue emphasizing of the more substantive parts of the stream" (James, 1890, p. 243), quoted in Atmanspacher and Fach, 2019.

This can be illustrated, for example, with the following metaphorical picture: If you cut a piece of marble in half and only look at the cut surface, observing that "the cut surface looks like this or like that," you may have just thought of the image of the cut surface from the third person perspective. You have no way of indicating what pattern the colors and lines might follow inside the depth of the stone. In contrast to this latter stance, the cut surface is not an end in itself; it is just a means for further departure. Seeing its patterns and enormous variety of strange arrangements of colors and lines, of which it is impossible to determine the intricate ways in which they continue into the depth of the stone, its surface can be called "the appearance of one end of the cut surface (of the piece of marble or other objects)." An important point here is admitting that by merely observing the surface, you are not able to grasp its inner pattern to recognize the object structures in it. However, instead of merely stating the surface as a sober observer, you can look at it, from the stance of the introspective observer, according to James, just as you do with dream images, hypnotic phenomena, meditative states, psychedelic, drug-induced experiences (e.g., lysergic acid diethylamide, psilocybin), psychoses, and mystical experiences. First and foremost, the process described here takes place in modern and contemporary art; the mind and body can be connected by the human being and all aspects can disclose together and become visible at the same time, from cubism to abstractionism, in painting and sculpture. You can ask yourself what feelings looking at it evoke in you. Thus, you allow this aspect to be experienced as something dynamic, elusive, or intangible (e.g., *"slowing down of time and expansion of space*").

However, the difference between viewing a sculpture, painting, cut-marble surface, etc. and the therapy process is the following: The experience of viewing art does not necessarily include the personal context (depending on the viewer's engagement), so it may be perceived as "stochastic." In contrast, the latter should take place within the context of the symptom. In other words, the symbol of the symptom acts as a unifying bracket that undermines the separation into stochastic events and initiates the therapeutically effective transitive state.

By returning to the clinical context, we make this process of departing start from an "aspect" possible by asking what is currently happening while simultaneously noticing subtle changes in the patient's posture and/or minimal gestures. In this way, we encounter the instability of the patient's current process (*"slowing down of time and expansion of space*"), which is very similar to Gendlin's "Thinking at the Edge" (Krycka, 2006). Experience of this has been shown to trigger the process of escaping from a "stuck-state." A quote from Gendlin from a conversation with Krycka best describes the phenomenon:

"Real thinking is rooted, emerging from 'there' in me. It's an exciting, windy place where all the concepts are all trying to let energize something 'there'—that's the edge and we like it! We like to think. It's just that we learned it backwards" (Personal communication of Gendlin with Krycka, May 1, 2005, quoted in Krycka, 2006).

From a neural perspective, Northoff has identified the resting-state activity of cortical midline structures as constructing the "transitive parts" and ultimately the stream of consciousness in inner time-consciousness, enabling "mental time travel" (Northoff, 2014). In their recent conceptual analysis, Northoff and Scalabrini (2021) suggested an elaborate perspective on how to utilize interactively shared space and timescales by introducing the psychotherapeutic concept of "Spatiotemporal Psychotherapy."

"Timing, spatialness, and temporal dynamic within the interaction of client and therapist will be the key in such psychotherapeutic regulatory approach . . . [The] therapists [are suggested] to work using these spatiotemporal coordinates beyond the contents and the narratives of the patients. The shared time and space between therapist and client might here be seen as an operating commonly shared interpersonal spatiotemporal field, which makes possible the re-organization and transformation of the client's intra-personal nested hierarchy of self through its spatiotemporal manifestation within her/his brain" (Northoff and Scalabrini, 2021).

Their description of working "beyond the contents and narratives" is like the "escape" process triggered by experiencing the felt meaning of the symptom, exemplified here by hypnotic trance (*time distortion in hypnosis,* according to Peter, 2015, reviewed in Häuser et al., 2016).

Deductions from theory for clinical predictions

Depending on the clinical problem and careful recording of the patient's history to review the symptom-inducing context, one can start with the physical or mental aspect. For example, the therapist can invite the patient to remember recently experienced pain, asking where in the body these feelings are located. Once the feeling has been stimulated, one can ask what it is and what happens; an answer is not imperative, because once the process is underway, it does not mean that it is important to understand it now, but only to maintain the current experience. Through asking, the therapist shows that experience-making, rather than knowing, is the crucial point here. You allow the feeling more and more space and suggest that subjective time slows down so that the corresponding experience can be expressed in its full temper and energy, the thoughts corresponding with local pain emerge and, simultaneously, depart, namely transitive momentum. In other words, the shared, referenced experience of the transitive momentum enables the patient to go further, toward the "Curie" symmetry of the person's alignment to their sociocultural and body context. If successful, such utilization of the transitive (or introspective) momentum, induced here from the physical aspect, concomitantly correlates with the activation of its counterpart in the psychic aspect, through the emergence of an inner, mental image or thought content, or simply with the liberation from previous, unwanted emotions. Relief from departing pain ensues. That is, the patient is offered a way to autonomous behavior and thus to her dignity of "being human." Note that only the core process of symptom relief is described here again to see the transitive process's imminent relevance. Once again, I will stress here the importance of a good starting base, that is, careful history-taking to jointly decipher the fundamental meaning of patient's various empirical bodily processes.

Conversely, you can start from the mental subdomain, such as the feeling of a form of fear. By prescribing this feeling and letting it be fully experienced, it can be denoted by its perceived meaning. In other words, the corresponding transitive (or introspective) domain is activated to mediate, for example, nausea, gag reflex, or pain in the head, stomach, or elsewhere. Anything that appears here has the sole purpose of providing experiences to refer to them. Although such experiences might be temporarily discomforting, there is an implicit sense of control over them. This changes the patient's body posture and mood as an expression of altered bodily intero- and proprioceptive input into the brain (*mental time travel*, according to Northoff, 2014).

The proposed method, regardless of whether it is initiated by either physical or psychological subdomain, assumes that the patient is willing to accept the risk of gaining insights that may initially appear unpleasant.

Figuratively speaking, the patient may experience relief from suffering when ready to board the train that is leaving the station. Such a movement enables alignment to the current sociocultural and bodily context, that is, to attain the transitive process toward the experienced state within the given context; only then is freedom of action regained in this context. In this way, Aristotle's saying *vita motu constat* (life consists of movement), quoted by Schopenhauer (1851/1977), is literally confirmed.

Discussion

In summary, the purpose of this paper is to clarify whether symptom relief in psychosomatic patients is achieved by arriving at a new narrative or by the transition process itself, which lies between the old and new narrative. It has been shown here that symptom relief through verbal symbolization of bodily experiences during joint patient-therapist interaction follows symmetry acquisition, which is only theoretically attainable in its full dimension; it is the embedding of the patient in their sociocultural and body context, initially allegorized by the patient's changed bodily experiences in the presence of the therapist. Structurally, this is consistent with findings in spatiotemporal neuroscience showing that the transitive parts of consciousness are constructed by the resting-state activity of cortical midline structures, thereby enabling "mental time travel" (Northoff, 2014) or "interpersonal attunement in time and alignment in space" (Northoff and Scalabrini, 2021). However, approaching substantive states, new aspects, or narratives produced as conceptual substrates of therapeutic change cannot be considered the critical element of therapy. Rather, these are viewed merely as phenomena from which further transitive (or introspective) states continually emanate, namely as functions of dynamic alignment of the patient's experience with their ever-changing sociocultural and physical context. Thus, taking Degenaar (1979) as a starting point, who quoted Marx as saying that "man is a network of social relationships," we can specify that man is a *dynamic* network of *constantly changing* social relationships. Implications for future research are compelling. What is the relevance of transitive states vs. substantive states for psychosomatic research and how does this change the approach to therapy or the dynamics of the therapist-patient relationship?

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patient provided her written informed consent to participate in this study.

Author contributions

WT wrote the article and approved the submitted version.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Effect of solution-focused approach on anxiety and depression in patients with rheumatoid arthritis: A quasi-experimental study

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Introduction: Anxiety and depression are common psychological problems in rheumatoid arthritis (RA) patients. However, few effective nursing intervention models have been designed specifically to improve anxiety and depression in RA patients. Solution-focused approach (SFA) is an effective intervention method for psychosocial issues. There have been no studies involving SFA yet in RA patients. This study investigated the effects of SFA-based nursing intervention on anxiety and depression in RA patients.

Methods: A quasi-experimental study using a convenience sampling of RA patients was conducted. The 48 RA patients were divided into the control group ($n = 24$) and the experimental group ($n = 24$). The control group received routine nursing intervention, while the experimental group received SFA-based nursing intervention. The scores on the self-rating anxiety scale (SAS), self-rating depression scale (SDS), arthritis self-efficacy scale-8 (ASES-8), and questionnaire on patient satisfaction with nursing care were collected before and after nursing interventions.

Results: *Between-Group Comparison*: Before the nursing intervention, there was no statistically significant difference in the SDS, SAS, and ASES-8 scores between the two groups ($p > 0.05$). However, after the nursing intervention, the SDS and SAS scores of the experimental group were statistically significantly lower than those of the control group ($p < 0.05$). In contrast, the ASES-8 score of the experimental group was statistically significantly higher than that of the control group ($p < 0.05$). In addition, patient satisfaction with nursing care of the experimental group was better than that of the control group ($p > 0.05$). *Within-Group Comparison*: There was no statistically significant difference in the SDS, SAS, and ASES-8 scores in the control group before and after routine nursing intervention ($p > 0.05$). However, in the experimental group, the SDS and SAS scores before SFA-based nursing intervention were statistically significantly higher than those after SFA nursing intervention ($p < 0.05$), and the ASES-8 score before SFA-based nursing intervention was considerably lower than that after SFA nursing intervention ($p < 0.05$).

Discussion: SFA-based nursing intervention can effectively improve anxiety, depression, and arthritis self-efficacy of RA patients. This study broadens clinical psychological nursing intervention models for RA patients. SFA may be an effective nursing model for various psychosocial problems in the current medical context.

KEYWORDS

rheumatoid arthritis, solution-focused approach, anxiety, depression, arthritis self-efficacy

Introduction

Rheumatoid arthritis

Rheumatoid arthritis (RA) is a chronic inflammatory condition that mainly affects the joints (Gautam et al., 2020). RA has a variety of systemic manifestations, including arthritis pain, fatigue, morning stiffness, anemia, and weight loss (Favalli, 2020). Some common comorbidities include osteoporosis, cardiovascular disease, diabetes, infection, malignancies, depression, sleep disturbances, and other mental disorders (Tournadre et al., 2019). The prevalence of RA is 0.5–1% in European and North-American populations. The RA incidence in women is three times higher than in men, but this ratio decreases with age at onset (Intriago et al., 2019). The demography of RA in the western world is changing. More than 50% of RA patients are over 65 years old at diagnosis (Eriksson et al., 2013). The etiology of RA is still unclear. RA medications (non-steroidal anti-inflammatory drugs, corticosteroids, disease-modifiers, and biologic agents) are not curative (Lin et al., 2020). The long-term treatment and adverse reactions may lead to many psychological problems, which reduce treatment compliance, curative effects, and quality of life in RA patients (Berner et al., 2018).

Incidence of anxiety and depression in RA patients

Anxiety and depression are the most common emotional problems found in RA patients. The incidence rate is much higher than that of the general population and is inconsistent in different areas (Hitchon et al., 2020). Isik et al. reported that the total prevalence of anxiety, depression, and mixed anxiety-depressive disorder was 70.8% in the RA patient group and 7.3% in the control group of the general population (Isik et al., 2007). Of RA patients, 41.5% were found to have depression, 13.4% anxiety, and 15.9% mixed anxiety-depressive disorder (Isik et al., 2007). Hitchon et al. found that the prevalence of current depression in RA patients was 11.3%, generalized anxiety disorder was 7.3%, and any anxiety disorder was 19.3% (Hitchon et al., 2020). Katchamart reported that 12.5 and 14.5% of RA patients had some degree of depression and anxiety, respectively, in the Siriraj Rheumatoid Arthritis Registry or the Thai Army Rheumatoid Arthritis Cohort (Katchamart et al., 2020). Kwiatkowska et al. also confirmed that the incidence of depression in RA patients is two to three times that of individuals without RA (Kwiatkowska et al., 2019). Longitudinal studies suggest cumulative risk for depression and intermittent recurrence over time (Wolfe and Michaud, 2009).

Anxiety and depression are often difficult to identify in RA patients. They are generally reluctant to discuss their anxiety and depression with family members and medical personnel because they fear it will harm their image (Machin et al., 2020). Some patients do not even carry out relevant examinations and consider negative emotions to be normal responses to chronic diseases. Furthermore, diagnosing depression in patients with RA is a complicated process. There is an overlap in the symptoms of depression and RA (for example, fatigue, weight loss, insomnia, and lack of appetite), so the depression frequently goes unrecognized.

Reasons for anxiety and depression in RA patients

It is necessary to fully understand the possible reasons for anxiety and depression in RA patients. Some reasons include joint deformities, impaired joint function, inability to work, and personal economic losses (Fiest et al., 2017). Depression is associated with increased pain (Vergne-Salle et al., 2020), reduced health-related quality of life (Zhang et al., 2020), increased levels of physical disability (Carpenter et al., 2020), and increased health care costs in RA patients (Joyce et al., 2009). Severe pain, frequent treatment, and low income would also aggravate the state of anxiety and depression in RA patients (Espinoza et al., 2021). The association between pain and RA depression has remained statistically significant even after the degree of disease activity has been controlled (Margaretten et al., 2011). It is often not difficult to identify depression and anxiety secondary to rheumatoid arthritis, and the extent of depression and anxiety is often positively related to the disease condition.

Adverse outcomes of anxiety and depression in RA patients

Anxiety and depression in RA patients can lead to undesirable consequences, including increased pathological activity, poor tolerance for joint pain, decreased physical function, and low adherence to therapy (Machin et al., 2020). RA impacts work capacity in the Indian population. Manual jobs and the absence of medical insurance predict leaving the labor force before the official retirement age (Alleva et al., 2018). RA patients with depression had a greater relative risk of utilization of emergency services, RA-related hospitalizations, days spent in the hospital, and RA-related surgeries than RA patients without depression (Li et al., 2019). RA patients with depression had more days of short-term disability than patients without depression (Li et al., 2019). Anxiety and depression can cause sleep disturbances in RA patients (Silva et al., 2020). In RA patients, depression also interacts with the way patients cope with their physical illness and how they interact with their rheumatologist (Dickens and Creed, 2001). The simultaneous presence of anxiety and depression may lead to suicide and aggravate the prognosis of RA patients (Beşirli et al., 2020).

Solution-focused approach

Nursing intervention is a critical approach to managing negative emotions. However, few effective nursing intervention models have been designed specifically to improve anxiety and depression in RA patients (Machin et al., 2017). Most interventions have been based on RA patients' education. Educational interventions have had limited effectiveness in changing behavior (Song et al., 2020). Therefore, it is necessary to develop evidence-based, pragmatic, patient-centered interventions to help reduce negative emotions in RA patients.

Solution-focused approach is initially established as a new way of counseling by Steve de Shazer, Insoo Kim-Berg, and other colleagues in the 1980s (de Shazer and Berg, 1997). SFA is a strengths-based, resource-based, and goal-directed therapy model. SFA guides individuals to set goals and solve problems with exceptionally positive experiences. SFA can fully explore the potential of individuals by driving individuals to formulate scientific and feasible plans. SFA can also stimulate their initiative and enhance their ability to manage themselves correctly to solve the current problems.

It has been demonstrated that SFA is effective in the psychological intervention of many nursing jobs, such as psychological distress of young adolescent patients with cancer (Zhang et al., 2021), the mental health of pregnant women (Ramezani et al., 2017), and intimacy of children with disabilities (Baldwin et al., 2013). Generally, SFA includes five key steps: ① describing problems; ② constructing goals; ③ exploring exceptions; ④ giving feedback; and ⑤ evaluating progress. SFA can effectively mobilize enthusiasm, improve self-management efficiency, and reduce negative emotions in individuals (Ma et al., 2021).

There are few effective nursing models for RA patients with anxiety and depression. SFA is an effective intervention method for psychosocial issues in the current medical environment (Zhang et al., 2021). Therefore, we hope to explore new and more effective nursing models to help address the psychological problems of RA patients. However, SFA has not yet been applied to RA. Hence, the study aims to explore the effects of SFA-based nursing intervention on RA patients' anxiety, depression, and self-efficacy.

Materials and methods

Participants and groupings

This study was a quasi-experimental study using a convenience sampling of RA patients. The inclusion criteria include as follows: (1) Meeting the 2010 ACR/EULAR criteria for RA (Kay and Upchurch, 2012); (2) Ages between 18 and 75 years old; (3) Self-rating anxiety scale (SAS) score ≥ 50 points and Self-rating depression scale (SDS) score ≥ 53 points. The exclusion criteria: (1) RA patients were combined with other chronic serious diseases, such as heart, brain, and kidney diseases; (2) The hospital stay was less than 7 days. The 48 RA patients were divided into the control group ($n = 24$) and the experimental group ($n = 24$) enrolled from February 2019 to July 2019. The control group received routine nursing intervention, while the experimental group received SFA-based nursing intervention.

Nursing interventions

The control group

Routine nursing interventions for RA patients were performed. The main details include as follows: ① Keep bed rest during acute stages; ② Attention should be paid to keeping warm, moisture-proof, and cold-proof; ③ Carry out routine health education about daily joint function exercises; ④ Strengthen dietary nutrition; ⑤ Calcium supplementation, and more sun exposure; ⑥ Guide patients to take medicine; and ⑦ Pay attention to limb activity and psychological changes.

The experimental group

Solution-focused approach-based nursing intervention was performed by the nursing team consisting of four nurses, one psychologist, and one attending physician. The experimental group received four times of SFA-based nursing interventions on the second day after admission, 1 week after admission, discharge day, and 2 weeks after discharge. The duration of each intervention was around 30–60 min. Intervention forms include: ① During hospitalization: face-to-face communication in the ward; and ② After discharge: follow-up by phone, WeChat, and door-to-door follow-up. Researchers should discuss with patients about follow-up methods in advance before discharge. Telephone communication intervention is the first choice; WeChat and door-to-door follow-up methods are optional.

Steps of SFA-based nursing intervention

① **Describe problems:** The patient's current issues with their impact on the patient's quality of life should be clarified. For example, when a patient has recently had frequent joint pain or morning stiffness, the researcher can ask: "How long has your joint pain or morning stiffness been, how severe it is, and whether it seriously affects your quality of life?"

② **Construct goals:** The patient should be encouraged that their future life quality will be improved if the current problem is solved. Researchers try to make patients feel good in advance, assuming the problem is solved. Then researchers discuss with patients how to establish practical goals and specific solutions. For example, "Assuming that your morning stiffness and joint pain are already healed, will you feel that life is much better than now?" or "To what extent do you hope to improve?"

③ **Explore exceptions:** The exceptional cases and experiences in which the above problems have been perfectly resolved in patients' lives are explored through communications. Under these circumstances, the patient's efforts to resolve current issues should be used as a reference in the subsequent recovery. For example, "Did you have joint pain, or when did morning stiffness improves; if so, what efforts did you make under those conditions?" If there were no exceptionally positive experiences, researchers would discuss with patients and construct new solutions.

④ **Positive feedback:** The problems, goals, and related exceptions are positively summarized in the above three steps to establish feasible solutions and enhance the patient's self-confidence. For example, "Your main problems are joint pain and morning stiffness. You want to be fully relieved from the disease and have a better life. You can then refer to the previous exception as the solution." At this stage, scaled questions can be used to build more specific and clear goals. For example, "If you use 0–10 points to represent your morning stiffness, 0 points to represent the most severe morning stiffness you have experienced, and 10 points to represent the lightest morning stiffness, you can rate how many points you hope to achieve in the future." If the goals were not achieved ideally, researchers would adjust the SFA-based nursing intervention plan. If the constructed goals were not achieved well, researchers would then get back to the third step to explore exceptionally positive experiences.

⑤ **Evaluate progress:** The goals achieved by the patient through previous efforts should be positively evaluated, enhancing the patient's self-confidence to solve their problems gradually. For example, "You have done a good job so far, and you have made great progress in improving your morning stiffness score. Congratulations on your fantastic work!" If patients had achieved their goals, researchers would then go back to the second step to construct new higher goals until patients achieved satisfactory outcomes.

All the above steps of SFA-based nursing on anxiety and depression in RA patients were summarized in Figure 1.

Evaluation tools

Self-rating anxiety scale

The anxiety self-rating scale (SAS) was compiled by William W.K. Zung in 1971 (Zung, 1971) and is mainly used to assess the anxiety degree of patients. There are 20 questions, of which 15 questions are forward scoring, and five questions are reverse scoring (items 5, 9, 13, 17, and 19). Each question has four scoring levels: ① No or very little time; ② a small part of the time; ③ a considerable amount of time; ④ most or all of the time. For positive scoring questions, ①, ②, ③, and ④ mean 1, 2, 3, and 4 points, respectively. For reverse scoring questions, ①, ②, ③, and ④ mean 4, 3, 2, and 1 points, respectively. The total score of the 20 items will be calculated and then multiplied by the coefficient of 1.25. The SAS scores can be further divided into three levels: mild anxiety: 50–59 points; moderate anxiety: 60–69 points; and severe anxiety: >69 points. Cronbach's coefficient of SAS is 0.875 (Zung, 1971).

Self-rating depression scale

The self-rating depression scale (SDS) was compiled by William W.K. Zung in 1967 (Zung, 1967). It is mainly used to assess the depression degree of patients. Ten questions are forward scoring, and 10 questions are reverse scoring. The 20 questions can be divided into four categories: two questions for psycho-emotional symptoms, eight questions for somatic disorders, two questions for psychomotor disorders, and eight questions for depressive psychological disorders. Each question has four scoring levels: ① none or very little time; ② a small part of the time; ③ a considerable amount of time; and ④ most or all of the time. Each question has four scoring levels: ① No or very little time; ② a small part of the time; ③ a considerable amount of time; and ④ most or all of the time. For positive scoring questions, ①, ②, ③, and ④ mean 1, 2, 3, and 4 points, respectively. For reverse scoring questions, ①, ②, ③, and ④ mean 4, 3, 2, and 1 points, respectively. The total score of the 20 items will be calculated and then multiplied by the coefficient of 1.25. The SDS scores can be further divided into three levels: mild depression: 53–62 points; moderate depression: 63–72 points; and severe depression: >72 points. Cronbach's coefficient of SAS is 0.796 (Zung, 1967).

Arthritis self-efficacy scale-8

The arthritis self-efficacy scale-8 (ASES-8), including eight items, was developed based on the arthritis self-efficacy scale by

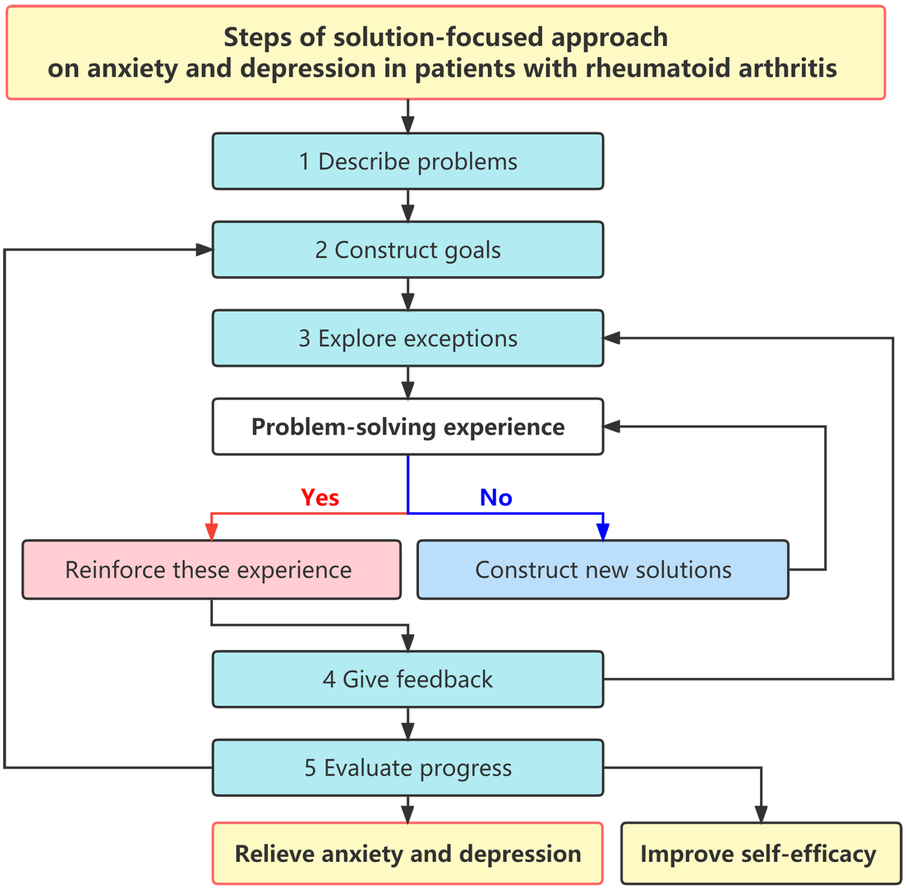

FIGURE 1
Steps of solution-focused approach on anxiety and depression in patients with rheumatoid arthritis.

Lorig in 1989 (Lorig et al., 1989). ASES-8 was used to evaluate the self-efficacy of RA patients. Scoring on each item ranges from 1 to 10, meaning "very un-confident" to "very confident." The overall score is the average of all eight items. The higher the score, the higher the patient's sense of self-efficacy. Cronbach's coefficient of ASES-8 is 0.0.942 (Lorig et al., 1989).

Questionnaire on patient satisfaction with nursing care

The questionnaire on patient satisfaction with nursing care at our hospital adopted a 100-point scale. Very satisfied: total score ≥ 80 points; satisfied: total score 60–79 points; dissatisfied: total score < 60 points. Calculation of patient satisfaction with nursing care: (very satisfied + satisfied) patients/the total number of patients. Cronbach's coefficient is 0.873.

Data collection

The responsible investigator collected all relevant clinical data and questionnaire records for each patient. The purpose of the study was explained to patients. The patient signed the informed consent. When the patient filled in the questionnaire, if there was any doubt, the researcher gave an objective explanation until the patient understood it clearly. If the patient's cultural skills were poor, the researcher filled in the questionnaire. Each patient completed the questionnaire independently. The questionnaires were collected on the spot and carefully checked. The time points and content of estimation were summarized in Figure 2: ① The patient characteristics questionnaire was conducted on the second day of admission. ②The SAS score, SDS score, ASES-8, and questionnaire on patient satisfaction with nursing care were carried out on the second day after admission, on the seventh day after admission, on discharge, and 2 weeks after discharge.

Data analysis

All data from the research subjects, including the patient characteristics questionnaire, SAS score, SDS score, ASES-8, and questionnaire on patient satisfaction with nursing care, were analyzed by Graphpad Prism 9.0.0. The λ^2 test and the Mann–Whitney U test were used to compare the patient characteristics. Paired t-tests and two independent sample t-tests were used to compare the scores of the two groups. $p < 0.05$ indicates statistical differences.

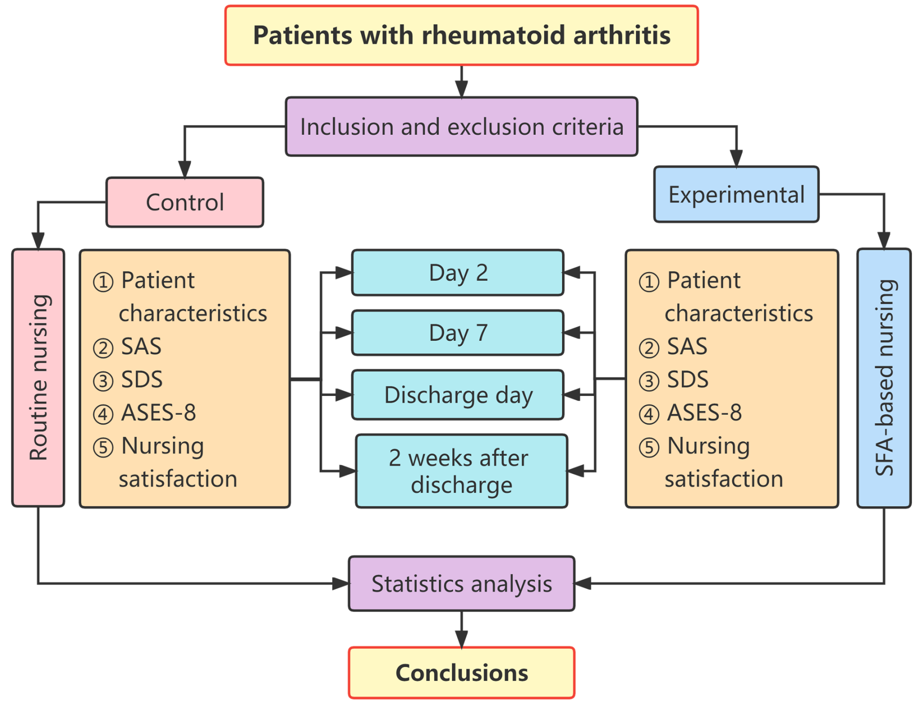

FIGURE 2
The timepoints and content of evaluation.

Results

Between-group comparison of patient characteristics

Table 1 presents the patients' demographics and clinical characteristics. The demographic characteristics, such as age, gender, educational level, average monthly income, residence, marital status, social support, payment method, and occupation of the two groups, were analyzed. The majority of patients are female with ages greater than 40 years old and low monthly income. There were no statistically significant differences in demographic characteristics between the control and experimental groups ($p > 0.05$). Moreover, no statistically significant difference was found in the RA condition characteristics, such as disease duration, morning stiffness time, or joint function. Therefore, the two groups of patients were comparable.

Between-group comparison of SAS, SDS, and ASES-8 before and after nursing intervention

Before the nursing intervention, there was no statistically significant difference in the SAS scores between the experimental group (55.633 ± 1.188) and the control group (56.136 ± 1.036; $p > 0.05$). The SDS scores between the experimental group (59.461 ± 0.940) and the control group (59.255 ± 0.969; $p > 0.05$) showed no statistically significant difference. There was no statistically significant difference in the ASES-8 scores between the experimental group (6.463 ± 0.108) and the control group (6.425 ± 0.179; $p > 0.05$; Table 2).

After the last nursing intervention, the SAS score of the experimental group (47.081 ± 1.339) was statistically significantly lower than that of the control group (55.586 ± 1.060; $p < 0.05$); The experimental group (49.922 ± 0.981) has statistically significantly lower SDS score than the control group (58.815 ± 1.014; $p < 0.05$). The SDS score of the experimental group (7.267 ± 0.090) was statistically significantly higher than that of the control group (6.488 ± 0.182; $p < 0.05$; Table 2).

Within-group comparison of SAS, SDS, and ASES-8 scores before and after intervention

In the control group, there was no statistically significant difference in the SAS score before routine nursing intervention (56.136 ± 1.036) and after routine nursing intervention (55.586 ± 1.060; $p > 0.05$). The SDS scores before routine nursing intervention (59.256 ± 0.969; the first time) and after routine nursing intervention (58.815 ± 1.014; the last time) showed no statistically significant difference ($p > 0.05$). In the control group, there was no statistically significant difference in the ASES-8 score before routine nursing intervention (6.425 ± 0.179; the first time)

TABLE 1 Between-group comparison of patient characteristics.

Factors		Control	Experimental	λ^2/U	p
Age (years)	20 ~ 40	9	11	0.342	0.558
	≥ 41	15	13		
Gender	Male	8	9	0.091	0.762
	Female	16	15		
Educational level	≤ High school	13	16	0.784	0.376
	≥ College	11	8		
Monthly income (yuan)	≤ 5,000	16	15	0.091	0.763
	> 5,000	8	9		
Residence	Rural	11	12	0.083	0.773
	Town	13	12		
Marital status	Married	18	19	0.117	0.731
	Other	6	5		
Social support	Living alone	6	4	0.505	0.477
	Home	18	20		
Payment methods	At own expense	4	5	0.136	0.712
	Medical insurance	20	19		
Profession	On-the-job	18	19	0.118	0.731
	Other	6	5		
Disease duration	1–10 years	13	14	0.085	0.771
	>10 years	11	10		
Morning stiffness time	≤15 min	10	11	0.367	0.713
	16–59 min	9	9		
	≥ 60 min	5	4		
Joint function	Class I	4	3	0.143	0.886
	Class II	10	12		
	Class III	7	7		
	Level IV	3	2		

TABLE 2 Between-group comparison of SAS, SDS, and ASES-8 scores before and after nursing interventions (points, $\bar{x} \pm s$).

	Items	Control	Experimental	t	p
Before intervention	**SAS**	56.136 ± 1.036	55.633 ± 1.188	1.566	0.124
	SDS	59.255 ± 0.969	59.461 ± 0.940	0.748	0.459
	ASES-8	6.425 ± 0.179	6.463 ± 0.108	0.891	0.378
After intervention	**SAS**	55.586 ± 1.060	47.081 ± 1.339	24.4	<0.001
	SDS	58.815 ± 1.014	49.922 ± 0.981	30.88	<0.001
	ASES-8	6.488 ± 0.182	7.267 ± 0.090	18.8	<0.001

TABLE 3 Within-group comparison of SAS, SDS, and ASES-8 scores before and after nursing intervention (points, $\bar{x} \pm s$).

	Items	Before intervention	After intervention	t	p
Control	**SAS**	56.136 ± 1.036	55.587 ± 1.060	1.815	0.076
	SDS	59.255 ± 0.969	58.815 ± 1.014	1.54	0.13
	ASES-8	6.425 ± 0.179	6.488 ± 0.182	1.209	0.232
Experimental	**SAS**	55.633 ± 1.188	47.083 ± 1.339	23.4	<0.001
	SDS	59.461 ± 0.940	49.922 ± 0.981	34.4	<0.001
	ASES-8	6.463 ± 0.108	7.267 ± 0.090	28.02	<0.001

and after routine nursing intervention (6.488 ± 0.182; the last time; $p > 0.05$; Table 3).

In the experimental group, the SAS score before SFA-based nursing intervention (55.633 ± 1.188; the first time) was statistically significantly higher than that after SFA-based nursing intervention (47.081 ± 1.339; the last time; $p < 0.05$). The SDS score before SFA-based nursing intervention (59.461 ± 0.940; the first time) was statistically significantly higher than that after SFA-based nursing intervention (49.922 ± 0.981; the last time; $p < 0.05$). The ASES-8 score before SFA-based nursing intervention (6.463 ± 0.108; the first time) was statistically significantly lower than that after SFA-based nursing intervention (7.267 ± 0.090; the last time; $p < 0.05$; Table 3).

Between-group comparison of patient satisfaction with nursing care

Patient satisfaction with nursing care of the experimental group (96%) was better than that (92%) of the control group. However, there was no statistically significant difference between them ($p > 0.05$; Table 4).

TABLE 4 Between-group comparison of patient satisfaction with nursing care(%).

Groups	Very satisfied	Satisfied	Dissatisfied	Satisfaction (%)	*U*	*p*
Control	7	14	3	92	1.396	0.163
Experimental	12	10	2	96		

Discussion

Rheumatoid arthritis patients often experience anxiety and depression. The average SAS and SDS scores of all participants in our study were less than 60, indicating that anxiety and depression in RA patients were mainly mild. The results showed that SFA-based nursing intervention could statistically significantly improve the anxiety, depression, and arthritis self-efficacy of RA patients in the experimental group. In contrast, routine nursing intervention could not effectively improve those indicators of RA patients in the control group.

SFA could improve negative emotions

Solution-focused approach has a more significant advantage than the traditional psychological nursing model regarding patient psychological intervention (Wright et al., 2014). It fully mobilizes the patient's enthusiasm so that the patient can be proactive and confident in solving their problem. SFA has been demonstrated to be an effective intervention in mental disorders and clinical nursing research as follows.

The application of SFA in mental disorder researches

Solution-focused approach has been widely used in many settings, including family services, mental health, child care, public health services, and psychotherapy centers. SFA could address Autism Spectrum Disorder (ASD)-related concerns within the family and be generalizable to reduce the additional stress of care coordination between parents and various ASD specialists (Parker et al., 2020). Nurses in the adolescent mental health field can use SFA to improve self-efficacy and self-esteem in adolescents with attention-deficit/hyperactivity disorder (Karakaya and Özgür, 2019). Socially withdrawn children can benefit from a group SFA intervention and reach their goals, probably through sharing their feelings, experiences, and support. SFA may be suitable for school nurses working with children with special needs. SFA groups are a recommended measure for use in school health services (Kvarme et al., 2010). SFA can give an occupational healthcare staff valuable tools to positively influence their relationships with patients (Mishima et al., 2005). Lee et al. evaluated SFA effects on domestic violence offenders and found a statistically significant increase in their self-esteem based on self-reports (King and Batagol, 2010). Schott et al. found that SFA complements the principles of psychiatric rehabilitation and is a recovery intervention for empowering persons with severe mental illness (Schott and Conyers, 2003).

The application of SFA in clinical nursing research

There have been several clinical nursing studies with SFA applications recently. SFA resulted in a statistically significant reduction in the psychological distress and improvement in the hope of adolescent and young adult patients with cancer (Zhang et al., 2021). Ramezani et al. found that the integration of SFA and cognitive-behavioral counseling programs in prenatal care can effectively improve the mental health of pregnant women (Ramezani et al., 2017). Short-term SFA interview technique intervention may affect overweight and obese individuals' nutrition and exercise behaviors. This intervention can reduce the risk of obesity-related diseases, minimizing repeated hospital admissions (Akgul Gundogdu et al., 2018). Nurses displayed moderate anxiety, and SFA thinking skills enable them to quickly organize and manage care processes in extraordinary circumstances such as pandemics (Selçuk Tosun et al., 2021). SFA could offer a promising method for implementing a strengths-based, relational, and goal-oriented intervention approach to working with families and children with disabilities (Baldwin et al., 2013). SFA may be a helpful approach to the training of communication skills. It provides a structured and easily understood toolkit that is harmonious with nursing values of empowerment (Bowles et al., 2001).

SFA could improve anxiety and depression in RA patients in this study

This study confirms the effect and value of SFA in improving anxiety and depression in RA patients. Compared with routine nursing, the SFA-based intervention could better stimulate patients' self-confidence and lay a foundation for the long-term solution of psychological problems. Our results are consistent with the above research conclusions.

SFA could improve self-efficacy in RA patients

Self-efficacy is a psychosocial variable that has been defined as the individual's confidence to perform a specific task. Self-efficacy is considered the central motor of developing human motivation, psychosocial well-being, and personal achievement. Higher levels of SE are associated with more willingness to take risks and a sense of accomplishment (Picha and Howell, 2018).

Self-efficacy seems essential in managing RA. Unpredictable courses of RA could make patients feel their condition is uncontrollable and decrease their self-efficacy in handling it (Carrick and Randle-Phillips, 2018). Self-efficacy contributes to self-management behavior and promotes psychological adjustment to chronic illness (Yang et al., 2021). There is an association between higher self-efficacy and greater goal achievement, positive affect, acceptance of the disease, problem-solving coping, physical function, physical activity participation, and quality of life in RA patients (Hosseini Moghadam et al., 2018). A recent systematic review of the role of self-efficacy in patients with RA similarly noted an association between high self-efficacy and positive affect, physical function, and ability to participate in social roles and activities (de Ridder et al., 2008). Therefore, improving the self-efficacy of RA patients is necessary.

Several studies have shown that SFA has the effect of increasing self-efficacy. Midwifery care based on SFA provided by online synchronous video conferencing during the COVID-19 pandemic is an effective and safe method to reduce the fear of childbirth in women and increase their self-efficacy (Kaya and Guler, 2022). Learning and developing communication skills fundamental to SFA thinking increases nursing students' confidence in individuals and improves their self-efficacy(Akgül-Gündoğdu and Selçuk-Tosun, 2021). SFA nursing can alleviate leukemia chemotherapy patients' negative emotions and cancer-related fatigue, improve their coping styles, and increase their self-efficacy and quality of life (Wang et al., 2021). Simm et al. introduced that SFA helps the clinician tap into patient expertise and develop detailed descriptions of the patient's preferred future, enhancing self-efficacy and empowerment (Simm et al., 2014). This study also found that SFA-based nursing intervention could improve the self-efficacy of RA patients.

SFA enhances patient satisfaction with nursing care in RA patients in this study

Solution-focused approach-based nursing intervention could enhance the communication and relationships between patients and nurses. SFA is a feasible and effective method for nursing advanced schistosomiasis patients. It improves patient satisfaction with nursing care and the trustiness of the patients with the health care providers (Hong-Mei et al., 2016). This study also found that SFA could improve patient satisfaction with nursing care in RA patients.

Limitations

It is worth stressing a few limitations of the study. First, this is a single-center clinical trial, limiting the generalizability of the findings. The application of SFA in clinical practice needs to be more widely used, and the SFA should be gradually improved through more practice. Second, the sample size used in this study is relatively small, limiting a more reliable analysis and conclusion of SFA. Future research should consider such investigation when a larger sample size becomes available. Third, the follow-up time of the patients in this study was relatively short without longer-term follow-up due to infeasibility and limited resources. Future research should consider 3-, 6-, and 12-month follow-up time points to clarify the long-term effect of SFA further.

In this study, we measured each measure separately at four different time points, which led to the seemingly feasible possibility of a multi-group ANOVA analysis. However, we only used *t*-tests instead of ANOVA analysis for the following reasons. The changes in the second and third estimation scores serve as the adjustment basis for the individualized SFA intervention plan, but do not serve as the final indicator for evaluating the SFA effect. We only compared two sets of data at a time: the first measurement (before the intervention) and the fourth measurement (the last, after the intervention), which allows complete estimation of the overall SFA effect. Therefore, no ANOVA analysis was performed.

There are a few side effects during implementing SFA. First, nurses must accept the goals set by patients themselves, even if they think they are unrealistic. Second, it is always the patient, not the nurse, that is praised, and this may detract from the nurse's motivation when treating the patient. Third, helping others is in the nature of many people. However, SFA primarily emphasizes that patients themselves seek solutions to current problems, and nurses must resist the urge to offer their own "good ideas."

Some limitations of self-administered assessments exist in assessing anxiety and depression when using our SAS and SDS scales. ① Honesty: Patients may be more inclined to provide socially acceptable answers than they actually are, thereby lowering their anxiety and depression scores. ② Introspective ability: Patients may not be able to accurately assess their anxiety and depression, and are prone to exaggeration or reduction of their emotional state. ③ Numerical scales: Our self-rating anxiety and depression scales are numerical and may cause patients to give extreme or moderate assessments of various issues.

Conclusion

The combined effects of RA with anxiety and depression will seriously affect the life quality of RA patients. SFA-based nursing could statistically significantly improve anxiety, depression, and arthritis self-efficacy. This study broadens clinical psychological nursing intervention models for RA patients. Further, SFA may be an appropriate clinical approach for nursing professionals in various clinical settings to monitor health-related behaviors and support effective care coordination that transcends disciplinary distinctions.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding authors.

Ethics statement

The studies involving human participants were reviewed and approved by Huanggang Central Hospital of Yangtze University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

CZ and XW contributed equally to the research design, statistical analysis, and writing of the manuscript. YY, HX, EL, HK, and MY contributed to communication with patients and collection of questionnaires. XZ and ZZ contributed to the project administration and supervision. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Therapists' experiences of remote working during the COVID-19 pandemic

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Objectives: To explore the experiences of therapists who delivered remote psychological therapy during the COVID-19 pandemic.

Design: This was a qualitative, phenomenological study. Interpretative Phenomenological Analysis elicited themes from semi-structured interviews.

Methods: A purposive sample of eight therapists was recruited from breast cancer services in the United Kingdom.

Results: Analysis identified three superordinate themes. Participants spoke about how their experience of remote working changed over time from an initial crisis response to a new status quo. They adapted to the specific practical and personal challenges of remote working and struggled to connect with clients as the use of technology fundamentally changed the experience of therapy.

Conclusion: Consideration should be given to the impact of remote working on therapists and the quality of their practise. Adjustments to ways of working can help to maximize the advantages of remote working while minimizing potential issues.

KEYWORDS

COVID-19, remote therapy, cancer, interpretative phenomenological analysis, qualitative

Introduction

The COVID-19 pandemic has put tremendous pressure on health care services and challenged them to work flexibly to meet patient needs (Mahase, 2021). Safety measures such as social distancing rules and concerns about cross-infection has made face to face meetings between psychological therapists and service users less common. In response, psychological therapy services began offering an increased proportion of therapy sessions remotely, *via* telephone or video call. This unusual situation represents a novel opportunity to learn more about the experience of conducting therapy remotely, during a public health crisis, from the perspective of therapists.

Psychological therapy can be defined as talking to a therapist about one's experience and how these can influence wellbeing. Remote therapy involves meeting with a therapist *via* telephone or video rather than face to face. Remote therapy has potential benefits for service users and service providers, with many NHS psychology services offering 1–1 psychological therapy. Removing barriers to in-person attendance can help to meet the NHS's long-standing commitment to address inequality of access to health care (Buck and Jabbal, 2014). Issues such as physical health conditions, reliance on public transport, and insufficient access to childcare disproportionately affect people from lower socio-economic status groups (Buck and Jabbal, 2014; Sakellariou and Rotarou, 2017), who are in turn more likely to experience elevated levels of psychological distress (Leung et al., 2016; Lam et al., 2019). Remote therapy also offers economic benefits to service providers by reducing the need for physical clinic space and the associated costs, as well as reducing the number of missed appointments (Vijayaraghavan et al., 2015; Shaw et al., 2017, 2018).

Despite these benefits, therapists' attitudes toward remote working are often negative (Humer et al., 2020). Therapists can feel under-skilled due to a lack of specific training and standardized ways of working and have doubts about the efficacy of remote therapy (Bee et al., 2016; Turner et al., 2018; Knott et al., 2020; McBeath et al., 2020). Two key concerns were a lack of confidence in managing risk (Fisher et al., 2020) and feeling particularly fatigued during remote therapy (Cantone et al., 2021; Mancinelli et al., 2021).

Evidence regarding efficacy and relationship building in remote therapy is generally more positive than the perception of therapists. Intervention studies show no evidence of inferior efficacy (Watson et al., 2017; Norwood et al., 2018; Castro et al., 2020), or poorer quality of relationships (Irvine et al., 2020) when comparing remote and face to face therapy.

A recent review outlined the need for increased understanding of the breadth of factors that underpin therapists' attitudes toward remote therapy considering this apparent incongruity (Irvine et al., 2020). This paper aims to contribute to this area by using Interpretative Phenomenological Analysis (IPA) to develop an in depth, ideographic understanding of the experience of delivering remote therapy. It also aims to explore the specific context of delivering remote therapy during a public health crisis. As an inductive method, IPA is particularly well placed for exploring a novel experience such as this (Brocki and Wearden, 2006).

Materials and methods

Design

This is a qualitative study which analyzed eight semi-structured interviews using IPA. Ethical approval was granted by the University Research Ethics Committee at the researchers' institution (Ethics number: 8080).

Sampling and recruitment

To achieve sufficient sample homogeneity for IPA, participants were purposively sampled based on their experience of delivering one to one remote psychological therapy to patients using breast cancer services during the COVID-19 pandemic. Eight participants were recruited as this number was thought to be small enough to allow sufficient depth of engagement with the data to generate rich interpretation of individual accounts, while providing sufficient breadth of experiences to allow themes to be generated across the sample (Smith et al., 2009).

Information packs outlining the study were sent to online Clinical Psychology social media groups and shared on Twitter. In addition, 40 breast cancer psychology services in the United Kingdom were approached *via* email or phone. Recruitment began in October 2020 and remained open until January 2021. Eligible therapists were invited to contact researchers to declare their interest. They were given the opportunity to ask questions about the study, and times were arranged for interviews. Due to COVID-19 restrictions on face to face meetings and geographical distance, participants were offered a choice between telephone and video call interviews: all opted for telephone. All participants read the participant information sheet and provided written consent prior to interview.

Participant characteristics are presented in Table 1. Participants were given pseudonyms to protect their anonymity and identifying information in the transcripts was removed.

Data collection

Semi-structured interviews ranging from 52 to 60 min were conducted by AM. Interviews were audio recorded and transcribed verbatim. A semi-structured interview schedule (Table 2) was developed according to guidance from Smith et al. (2009). This allowed participants to discuss the topics which were most salient to them, therefore minimizing the influence of researcher presuppositions, while ensuring sufficient similarity in content to facilitate comparison between interviews.

Open questions were used to encourage participants to lead the conversation, and prompts were used as necessary to encourage in-depth reflection (Pietkiewicz and Smith, 2014). The choice of broad topic areas was influenced by existing research and informal conversations with therapists working remotely in similar settings. The length of schedule was chosen to provide enough content for an in-depth, approximately 60 min interview where participants could answer in full detail and to their satisfaction. Following interviews, a debrief was offered to participants. Audio recordings of interviews were deleted following transcription and a key connecting pseudonyms with participants was stored securely and separately from transcriptions.

The interviews took place between 13/11/2020 and 27/01/2021. During this time the UK was in and out of national lockdown.

TABLE 1 Participants characteristics.

Participant	Gender	Age	Ethnicity	Job title	Full time/ part time	Number of years experience	Service
Alice	Female	31	White British	Macmillan psychologist	Full time	Less than a year (5 months)	Cancer psychology
Bethan	Female	63	White British	Psychotherapist	Part time	3 years in role (9 years as a therapist)	Psycho-oncology
Megan	Female	50	White British	Macmillan lead psychologist	Full time	10–12 years (18 months in psych oncology)	Cancer psychology
Sara	Female	37	White British	Clinical psychologist	Part time	5 years in psycho-oncology	Health psychology and staff support
Erin	Female	49	White British	Lead clinical psychologist	Part time	33 years (3 years psycho-oncology)	Cancer psycho-oncology team
Anna	Female	39	White British	Macmillan counselor	Part time	6 years	Clinical health psychology
Gwen	Female	41	White British	Principal clinical psychologist	Part time	13 years (8 years psycho-oncology)	Oncology
Jack	Male	40	White British	Consultant clinical psychologist	Full time	26 years (20 years in psych-oncology)	Community based physical health psychology service

All names changed to preserve anonymity.

Data analysis

Analysis of transcripts was informed by the work of Smith et al. (2009) and based upon an interpretivist epistemology (Gray, 2021). The analysis team (CD, an Assistant Psychologist and researcher working in psycho-oncology; AM, a Clinical Psychologist and researcher working in psycho-oncology; YO, a Trainee Clinical Psychologist) took part in an inductive, hermeneutic and iterative cycle of analysis. This involved line by line analysis of transcripts, identifying emergent themes from within individual accounts, and developing a wider structure of superordinate and subordinate themes across accounts. Instances of convergence and divergence between accounts were accounted for in the thematic structure. After the initial analytic cycle was concluded, individual accounts were re-analyzed in the context of the wider interpretative structure, ensuring a consistent connection between conceptual analysis and the initial data. At each stage of this process, analysis team meetings took place and interpretations were shared and discussed. Different potential themes were deliberated on, with the final thematic structure representing an interpretation shared by the analysis team as a whole. This process was repeated until the team agreed that they had created a legitimate, resonant interpretation of participants' experiences which was grounded in the data.

To ensure rigor, the interpretivist foundation of IPA and the personal bias of the researchers were articulated consistently during the analytic process through reflective group discussions (De Witt and Ploeg, 2006). Researchers kept a personal reflective diary (Vicary et al., 2017), and a detailed audit trail of their analysis (Whitehead, 2004) to facilitate transparency. Members of the wider research team (PF, a Clinical Psychologist and researcher working in psycho-oncology; and LHS, a Health Psychologist and researcher working in psycho-oncology) audited a sample of analysis, including initial annotation of transcripts and final theme generation, for coherence and trustworthiness.

Results

Three superordinate themes emerged from the data: (1) Coping with COVID: from crisis to a new way of working; (2) Is remote working real therapy?: adjusting to novel barriers in therapeutic practise; (3) Making connections through technology: the impact of technology on the therapeutic dynamic. Superordinate and subordinate themes are presented in Table 3.

Superordinate theme 1

Coping with COVID: From crisis to a new way of working

All participants spoke about their experience of being faced with the upheaval of the COVID-19 pandemic and the impact, both personally and professionally. Over time they would adapt to this initial shock and find ways of providing the best service they could in trying conditions. As adjustment occurred, participants began to look forward to what a new status quo might be like.

TABLE 2 Interview schedule.

Topic area 1: Background in remote therapy

Can you tell me about what experience you have had of delivering remote therapy?

Prompts: How many engagements, sessions? Related to which issues? Using which models? Can you describe your physical environment?

Topic area 2: Adjustments and decision making

Can you talk about the impact that working remotely has had on the way you conduct therapy, if at all?

Prompts: And why/how did you make these decisions? What impact do you think this has on clients? Have your opinions/adjustments changed over time?

Topic area 3: Experience of delivering remote therapy

Can you talk about what it has been like for you to deliver remote therapy?

Prompts: Have you felt able to work to your normal standards of quality? Has anything been helpful or unhelpful in this regard? Have you been working from home and if so what has that experience been like? What would have been helpful to prepare you for this experience/for the future?

General prompts:

- What was that experience like?
- How did that make you feel?/How did you manage?
- Why do you think that happened?
- Can you talk a bit more about that please?
- Can you give some examples?
- And for you specifically? (if participant answers in general sense)
- Has this experience changed over time? How?
- How do you hope this will be in the future?
- Have I understood this correctly? (reflect topic back using their own words)
- In light of what you have just said, can we please revisit a previous question?

TABLE 3 Super-ordinate themes and corresponding sub-ordinate themes.

Coping with COVID: From crisis to a new way of working	Is remote working real therapy?: Adjusting to novel barriers in therapeutic practice	Making connections through technology: The impact of technology on the therapeutic dynamic
An emergency response	Is this still the job I love?	The alienating effect of technology
Isolation and a sense of loss	A lack of confidence in the approach	The ineffable effect of sharing space
Adaptation over time and looking to the future with trepidation	Navigating a new landscape	The dynamics of remote therapy

An emergency response

Erin described the experience of the early days of the COVID-19 response in vivid, kinetic terms as “a whirlwind” and “utter chaos.” In doing so she captured the mood of panic among participants and the sense that they were caught in something akin to a natural disaster. She articulated the common experience of feeling part of an emergency response where practical demands took priority over all else: “I did not really have time to reflect to be honest, it was just a matter of getting on with it and trying to get things up and running as quickly as possible.”

All participants experienced a great deal of uncertainty about how psychological services would continue during this time and organizing services while managing the personal impact of the pandemic was a major challenge:

> It was a big unknown (…) as psychologists we don’t tend to work this way and so I really didn’t know, and the idea, the prospect of doing remote appointments, erm, felt very, very strange you know? [I] kind of had that attitude, "how would this work? You need to be in a room with the person" (…) All I knew at the time for my own, my own sanity, I needed to be at home to be able to, kind of, help manage my own stress levels to then do my job, erm, and again at the time it was very much crisis management. [Sara]

Five participants told us that a lack of support from employers meant that they were put in the difficult position of having to provide their own resources for remote therapy: proper equipment and suitable space to conduct emotionally challenging work were at a premium.[1,2,3] This forced some participants to make tough decisions and compromises about their own emotional wellbeing and even their physical safety:

> Our department didn’t provide any resources or any of that and actively said that if we didn’t feel we had the resources to work remotely from home that we would have to come into the hospital, erm, but that meant coming into an office that actually didn’t meet the socially distanced guidelines, so it was a bit of a rock and hard place decision for people. [Gwen]

Isolation and a sense of loss

Six participants spoke about the emotional impact of being physically isolated from their place of work and their colleagues. Alice spoke melancholically about the sense of loss and disruption she experienced as a result of distancing restrictions. As with other participants, she was upset not only by how restrictions affected her personally, but also how they diminished her ability to provide her clients with the high standard of service to which she aspired:

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[1] (...)indicates words have been omitted to enhance fluency.

[2] [ ] indicates where words have been replaced to provide additional context.

[3] A line break indicates a separate quote from the same participant occurring elsewhere in the transcript.

> [I'm] frustrated that I'm unable to, kind of, maybe deliver therapy in a way that I really would like to able to, I really miss the contact (…) it's all become, yeah, remote and much more distanced (…) [I feel] sadness and loss for what I thought this year would look like and developing my skills.
>
> I guess it's just feeling much more isolated in the profession in terms of meetings or being able to quickly pop next door to talk to a nurse (…) or being able to do joint sessions where we can kind of bring together your, erm, skills to best help the patient. [Alice]

The loss of informal contact with colleagues was something participants also felt deeply:

> We see a lot less of each other than we did before so if you have a difficult, you know, patient you know or sometimes, you know, you just have that 5 minute kettle debrief or something which, you know, can make a difference, you know? (…) It adds to your sense of isolation (…) feeling less supported because there's less access to colleagues. [Megan]

Four participants spoke about measures they took to ameliorate the impact of isolation. Most agreed that video meetings did not replace the experience of in-person interaction with colleagues. Anna spoke with glee about her weekly, face to face coffee meetings, emphasizing that even a small amount of personal contact had a large, positive impact on her sense of isolation:

> There's one day a week where I see one of my colleagues (…) [We] grab a coffee, albeit socially distanced, and we just catch up for ten minutes or so and that actually, is really lovely [laughs] and last time I saw her we both agreed that it's the highlight of our working week! Just to have a nice cup of coffee, which we both like, and also just say, "hello!", face to face. [Anna]

Adaptation over time and looking to the future with trepidation

Over time, participants began to adjust to their strange new circumstances. The initial sense of anxiety alleviated as they became more familiar with the practical and emotional demands of remote working. Bethan captured a common early fear among participants of now being 'rubbish' at her job:

> I just thought, "I'm going to feel completely incompetent, um, and I won't be able to do the thing I know I can do as a therapist because I'll be so deskilled by being rubbish with the technology", but actually that didn't materialise (…) That was my initial reaction but I have to say it was quite short lived actually. [Bethan]

Most participants commented on the importance of choice in their experience of remote working. Being forced to work from home could leave them feeling trapped with emotionally challenging material after the workday had ended. Megan spoke about how control over ones working pattern helped to mitigate this feeling. She urged caution about the importance of maintaining healthy work-life boundaries when looking to a post-pandemic future:

> [If] you're making an active choice to, you know, work from home because, erm, that serves your purpose then that's fine. If you're having to do that because you have no choice, then I think, then your home becomes work then doesn't it? And so then you don't then have that separation and it's much more difficult to, to kind of look after yourself and not take things home cos you literally are doing those things at home. [Megan]

Despite a degree of trepidation, most participants spoke with a sense of optimism about the positive impact the newfound flexibility of remote working could have for both themselves and their clients. Alice told us how these changes to her role had been unexpected, but ultimately welcome. She was enthusiastic about the freedom afforded to her by remote working and the impact this had on her quality of life:

> The flexibility that it gives us as psychologist to be able to work from home, I never thought I'd see the day! But you know, it does introduce a bit more flexibility to what our role can look like (…) For some patients they really like having the option to have a remote session and especially if they're working or have, sort of, childcare commitments (…) Having one day a week where you can work from home just allows a bit more flexibility (...) I've been pretty grateful for that actually and probably its allowing me to do a bit more of things without having the commute that day, and yeah, just get up and do some yoga [laughs]. [Alice]

Superordinate theme 2

Is remote working real therapy?: Adjusting to novel barriers in therapeutic practise

All participants spoke about difficulty in adapting their usual ways of working to the novel circumstances of remote therapy. This change represented a challenge to their professional identities, their perception of how they as a therapist *should* deliver therapy, as well as their confidence in their abilities and in the techniques and approaches they had previously relied on. Participants' responses to this challenge varied as, faced with a lack of previous experience or professional guidance, they drew on their personal values and resourcefulness.

Is this still the job I love?

Six participants spoke about the negative impact remote working had on their job satisfaction and how they tried to meet this challenge with a sense of pragmatism:

> I don't find it quite as satisfying (…) I found that a bit, umm, demotivating at times and it's been harder to, normally I'd go off to work with a spring in my step and I really enjoy what I do and its, just felt undefinably unsatisfying (…) It's become clear that that's something that's here for a long time rather than just a short term response to a crisis, that's affected my motivation and made me feel a bit a bit flat and lacking in energy about it sometimes.
>
> The pragmatic side of me is trying to just be at peace with, at the moment, this is the best we can offer. [Bethan]

Despite this dissatisfaction, these participants took heart from the fact that they were doing their best in a difficult situation, and in doing so identified their professional role as one of helping people using whatever means available. Jack spoke in decisive terms about how the concepts of duty and flexibility were central to his identity as a psychologist:

> Not offering a service is not an option (…) [You] owe it to, you know, a patient and you owe it to your other colleagues in the NHS to do your bit (…) You apply the basic principles, you think, "well if this person is prepared to talk to me by video, or more usually phone, umm, I should be prepared to talk to them and we'll work it out together." [Jack]

Two participants described their experience of remote working as an unsatisfactory substitute for face to face therapy. The separation they felt from clients diminished the quality of the therapy and this was detrimental to their sense of professional identity, leaving them feeling that the nature of their role had fundamentally changed. Megan said, 'I feel like I work in a call center these days', describing the work as 'soul destroying' and questioning if what she was offering was 'really psychological therapy' or something else entirely.

Gwen felt similarly and spoke passionately about her discontent:

> I absolutely hate it! To be absolutely frank on that, I hate it (…) I feel a real disconnect with patients that I'm seeing using this modality. I don't feel like I know people in the same way.
>
> In terms of me and what I'm happy with and what I know I can offer, I don't, I don't feel like patients are getting the same quality of input. [Gwen]

She concluded, 'If that's going to be the case this will not be a job that I'll want to do'.

A lack of confidence in the approach

The unfamiliarity of remote working led participants to avoid certain exercises, techniques or interventions which they felt could otherwise have been helpful for their clients. Alice was typical in feeling anxious about managing clients' distress when working remotely:

> I've struggled with doing more experiential exercises so things like, ermm, behavioural experiments or (…) breathing exercises in, sort of, panic, more panic focused interventions, and I have had that with a few breast cancer patients where it's very difficult to create the safety, ermm, needed to do those experiments (…) I've probably found myself maybe avoiding them more or not doing the exercise that I think probably are what might create the change for people, ermm, so that's yeah that's been frustrating. I have found actually with a few patients that they have become very distressed during the session over video and it's just been really difficult to manage that … in ways that normally I felt would have worked, ermm, more effectively. [Alice]

Most participants spoke about feeling as though some of their therapeutic tools had been compromised by working remotely and expressed concern about how this might impact on the quality of their work. Gwen felt that she had lost a fundamental part of her skillset as a therapist:

> I'm missing the use of the rest of my body, that I would say that in my practice I'm probably quite a physical clinician in a way that I'll demonstrate quite a lot of things. So if I'm kind of looking at a particular ACT concept with somebody I might [get] people to hold the folder and pushing against it then you know seeing what it feels like to sit with that resistance and I think these things really stick with people you know? [Gwen]

Technical issues were another reason for anxiety among participants and were an obstacle to providing the quality of service they aspired to. Sara was emphatic in her language and tone when describing the anxiety that accompanied the unpredictable performance of the technology upon which she was now wholly reliant. She captured the sense of panic and frustration participants felt when factors outside their control contributed to the distress of clients and reduced the quality of their work:

> [Its] very stressful, very, very stressful, again when you think about wanting to provide that containing safe and secure environment for somebody. If you've got somebody glitching, or maybe you think that you're glitching, it it just doesn't feel you can give that you know that containment or have that connection with somebody. (…) so that is very, very difficult. [Sara]

Regardless of their therapeutic orientation or sense of professional identity, participants were unanimous in their agreement that remote working was not as good as face to face. The following statement from Jack was particularly resonant given his unequivocal defense of a pragmatic professional identity. Although he remained fully committed to this, he was clear about his belief in the superiority of face to face working:

> In the end of the day, umm, we all know even a phone call or a video link is a denuded form of conversation, it's not the same as being in the room with someone, it's not gold standard. [Jack]

Navigating a new landscape

Participants' attempts to meet the new challenges of remote working led to significant changes in how they delivered therapy. They found themselves drawing on their personal ingenuity and adaptability in light of a lack of established guidance or training. One of the major obstacles participants faced was a loss of visual information, particularly during telephone work:

> [I'm] having to think and maybe adapt a bit too especially when it's over the phone. So more verbal acknowledgement of the difficulty they're experiencing and lot of normalisation, ermm, but yeah I think I really feel the loss of being able to show that in your own expression of body language and, ermm, that's something of the real downside to, to working remotely for me. [Alice]

Sara was representative of participants in talking about the feeling of a loss of the collaborative aspects of face to face therapy. Like others, her desire to provide the most helpful service possible led to her making adjustments to her approach. She did this by directing more of her efforts to work outside of therapy sessions:

> [Previously] I might have started to write something and then maybe encourage somebody, you know, handed the paper over (...) like you're making a list of something with somebody you might do that together (…) I kind of used that approach slightly less which is a bit of a shame really because people, people have perhaps less to take away (...) I'll probably put more effort into [the assessment letter] because that, and the ending letter as well, because that's almost the, the thing when they don't have these other things. [Sara]

Half of participants reflected on the advantages of remote working. Jack gave the example of the additional information that he could gather about his clients, particularly during video sessions. He felt that seeing a client in their personal context could help him learn about them and form a therapeutic relationship:

> You do potentially get to see the inside of people's houses, umm, so that gives you extra clues (…) you're looking to see what have they got on their walls you know, what are their interests? [Jack]

Superordinate theme 3

Making connections through technology: The impact of technology on the therapeutic dynamic

All participants identified a personal connection with their clients as being a key aspect of high quality therapeutic work. They described how the use of technology had a profound impact on this connection and how its influence on the therapeutic dynamic fundamentally changed their experience of therapy.

The alienating effect of technology

Over half of participants spoke about their sense of technology acting like a barrier and impeding their ability to feel fully immersed in the experience of therapy. Particularly with regards to video, participants described the impression that they were watching therapy take place with a peculiar sense of distance. Bethan contrasted this sense of witnessing therapy from the 3rd person perspective with being truly present in the moment, alongside the client in person. She felt this was detrimental to her personally and to the therapy as a whole:

> In a face to face situation I could just sit with someone and, just the presence, umm, they understand that you're sharing or empathising or witnessing their distress, but there's something about witnessing it on a screen that's profoundly uncomfortable for me and makes me wonder what its like for the patient, umm, because it can almost feel voyeuristic in that moment. It's a very odd feeling. [Bethan]

Participants described how they felt they had to struggle to overcome the obstacle of technology, and despite their exertions found themselves unable to replace the immediacy and immersion of face to face therapy. Erin provided an evocative metaphorical comparison between the lack of depth of a two-dimensional image and relating to another human being through the lens of technology:

> It feels always a bit like swimming in water so that everything's a little bit clouded (…) the screen feels like a tangible barrier that you're always having to work hard to overcome (…) You're always having to strain a little bit to make sure you really do hear what they're saying and to look really hard at them to pick up everything that you can feel and even when someone is, that's a really good connection and I don't, I don't

> think it's ever crystal clear. Somehow there's still the loss of depth.
>
> You see a smaller snapshot of people, ermm, a flat, you get a flatter view of them (…) there is a missing dimension. [Erin]

The ineffable effect of sharing space

All participants spoke about the powerful impact sharing the same physical space had on facilitating connections with their clients. All participants struggled to articulate this experience, which is particularly striking given the many years of experience they have in reflective practise as a core competency of the psychological therapy professions. Anna was representative of several participants in calling on abstract concepts like 'energy' to capture her felt sense of connection, and defining the experience of 'being' with a client as involving a resonant, personal encounter, sharing a physical space and time:

> I don't know if I can put it into words, but I think there's just something about the energy I guess of being in a room with someone and being, person right there, in that space, in that time with that person. [Anna]

Gwen contemplated the impact of rituals on their experience of therapeutic connection. For her, connection was partly a metaphysical, emergent property of the communal behaviors that therapists and their clients engaged in, in their special space. She was clear that, as far as her experience was concerned, this was a 'real' thing that defied straight forward, empirical definition or explanation:

> I think it starts before you're even in the room. I think there's something about going out to a waiting room and calling for somebody you know and shaking their hand (...) and accompanying that person through into the room together (...) and when you close the door you're kind of creating a little box in a way (…) All those sort of rituals that are part of it and also just setting the scene (…) to make sure that somebody feels like cared for (…) it feels to me like that's part of feeling that the person's there and that they're real (…) I don't know if I can actually give any more specific detail as to why I feel that sense of disconnect, I just know that I do. [Gwen]

Despite the ineffable nature of this experience, participants agreed that sharing space made it "easier to feel a kind of connection… it feels more, kind of, human" [Megan].

The dynamics of remote therapy

Five participants spoke about how, as technology makes therapy more accessible, it also requires less commitment from clients and this had an impact on the interpersonal dynamics of therapy. Less commitment led to less of a sense of collaboration and left participants frustrated, feeling as if they were directing sessions more than they would have previously. They expressed concerns that this meant not empowering clients to find their own solutions or take responsibility for their wellbeing. For Megan the barrier of entry of attending therapy in person also represented an investment for clients, leading them to be more actively engaged in the process:

> [Its more difficult to] have a therapy session with them rather than it just becoming just kind of information giving session (…) I think they're less, they've had to do less to be present in the session, so actually are they consenting to [therapy] or what do they think they're consenting to? Which actually, by getting on a bus and coming to a hospital and sitting in the session involves them making an active commitment for that process which, ermm, kind of impacts the general dynamic I think of appointments but particularly for psychology.
>
> Patients don't remember that you're supposed to call them, ermm, and so (…) they'll be on the bus or their in the bath, I've had quite a few people in the bath during my sessions! (…) When patients come to a hospital appointment they, kind of, prepare themselves for what the appointment is about and why, and they, they make a bit of a commitment and investment to it. [Megan]

Three participants voiced concerns about their own ability to be fully committed to therapy when working remotely. Erin spoke with a sense of guilt and self-reproach about times when she failed to be emotionally present during remote work as a direct consequence of the real and metaphorical distance between her and her clients:

> Sometimes when you're sitting on the phone and you know that you haven't got the visible presence of someone (…) I have on the very, very odd occasion checked an email in the middle of a session which is awful, and I hate to admit that, but I guess there is a possibility for that when someone can't see you erm and, that's appalling really isn't it? (…) When you're virtual it's easier to slightly zone out a bit I suppose and there's something that's less present about everything. [Erin]

Despite these additional challenges, some participants were also keen to talk about how the additional emotional distance created by remote working had sometimes had a positive effect on their experience of therapeutic dynamics:

> A couple of young people who weren't really engaging well when I'd seen them face to face seemed to engage much better remotely through video appointments (…) She found it less confrontational that, because she didn't have to come to a big hospital and sit in a room with, you know, a professional

> person. That she was in the comfort of her own home and, ermm, kind of felt like a sense of slight removal from the situation that she was able to share more. [Gwen]

Gwen was enthusiastic about the idea that remote therapy offers more flexibility for clients and therapists and can therefore ultimately be a positive thing if other issues can be attended to.

Discussion

This study sought to develop an understanding of the experience of therapists delivering remote therapy within the specific context of the COVID-19 pandemic. Participants' experiences coalesced into three themes: (1) Coping with COVID: from crisis to a new way of working, (2) Is remote working real therapy?: adjusting to novel barriers in therapeutic practise and (3) Making connections through technology: the impact of technology on the therapeutic dynamic.

All participants spoke about how technology acted as a barrier to communication and the loss of visual information, especially during telephone therapy, was identified as one key factor. They felt disarmed without the direct feedback from facial expressions of clients and less able to communicate empathy through their own non-verbal cues. This experience is consistent with previous research on remote therapy (Fisher et al., 2020; James et al., 2022) and remote communication in general: more visual information means more options for the "expression and reception of affiliate cues and the effortless processing of these cues" (Sadikaj and Moskowitz, 2018).

The more surprising insight from this current study is that video therapy was sometimes experienced as even more alienating and unnatural than telephone therapy, despite the presence of visual cues. This experience was particularly hard for participants to articulate and explain. Approaches to psychology which do not rely on introspection such as Evolutionary psychology, and specifically Media Compensation Theory (MCT) (Hantula et al., 2011), are well suited to help explain this counter intuitive finding.

As a product of evolutionary adaptation, social communication functions optimally within a particular set of situational parameters. These include the communicator's expectation of certain informational cues. The "cue removal principle" suggests that, where expected cues are removed, communication is experienced as more effortful, unnatural and disorientating than communication where those same cues are absent, but where this is in line with expectations.

In the case of remote therapy, speaking on a telephone is similar in functional terms to talking to someone who is out of your line of sight, which has been part of the environment of evolutionary adaptation. We do not expect to be able to see someone's facial expressions or read their body language and so our mental focus can be singular and disorientation is minimized.

Conversely, seeing someone on a video screen without some of the additional cues which we expect from face to face communication such as body language and smell, can be experienced as alienating and 'unnatural', as was the case for participants. It is not just the presence of additional information in the form of visual cues which is relevant to the experience of delivering remote therapy, but also the absence of expected information.

Construal Level Theory (CLT), a theory of social psychology, is another approach which can help to explain some fundamental aspects of the experience of remote therapy which may be outside of conscious awareness. CLT proposes that different types of psychological distance (e.g., space or time) are interrelated in that they represent different ways in which the object of interest is separated from the central reference point of the self. Psychological distance of any sort is circumvented by mental abstraction: the more distant an object, the more abstract it becomes and the more removed from direct experience (Trope and Liberman, 2010; for a review of supporting research see Trope and Liberman (2010). Construal-level theory of psychological distance).

This theory can help to explain why participants found making emotional connections with physically distant clients to be particularly challenging. The psychological distance entailed by being in different rooms necessitates mental abstraction of the client, which then impacts on other aspects of the relationship such as the ability to feel emotionally connected with them in the 'here and now'. This common goal of participants, and therapists more generally, is in some sense fundamentally opposed to the abstraction required to engage with a physically, and therefore psychologically remote client.

The additional mental demands entailed by the lack of visual information, the removal of expected cues and the need for abstraction also help to explain why participants, and other research studies (Cantone et al., 2021; Mancinelli et al., 2021), found remote therapy even more effortful than face to face therapy.

Participants' accounts show that, while technology is able to circumvent barriers to engagement, it can also act as a barrier itself. Increasing therapists' awareness of these issues can help to manage expectations and minimize the self-criticism that participants engaged in as a result of feeling unable to meet their usual standards of making connections, feeling grounded, stamina *et cetera*. It should also be expected that clients will experience the same issues and therefore a shared awareness and allowance for this should be part of the initial set up of therapy. Awareness of these evolutionary and social mechanisms can help to explain the gap between therapist's pessimistic outlook on remote working and the more encouraging evidence of its efficacy (Irvine et al., 2020), and specific measures such as specific additional focus on grounding of therapist and client can help to remediate it.

Perhaps the most divisive issue in this study was the impact of remote working on professional identity. A model of social work theory, 'Person-environment fit', explains that working in a given environment will feel more or less satisfying depending on the personal values of the professional (Carpenter and Platt, 1997). This model therefore predicts variation within groups of professionals, as was the case with participants; six found they were able to reconcile their professional identity with remote working, while Megan and Gwen were not.

The ones who were able to achieve reconciliation identified primarily with the caring elements of their profession. They had a sense that a good professional is one who does their best to help with whatever means available, and therapy is a part of this. This set of values was flexible enough to be satisfactorily expressed even within the context of remote working and crisis response. Megan and Gwen saw being an excellent therapist as the core of their professional identity. When the environment made meeting their personal standards impossible, they experienced intense dissatisfaction and considered leaving the profession. The development of professional identity is typically a long-term process which occurs over years of training, supervision and experience (Alves and Gazzola, 2011). At the time of interviews, participants were reeling from the shock of their role changing effectively overnight.

High attrition rates of health care staff continue to be a major issue in the NHS (Palmer and Rolewicz, 2022). In order to promote job satisfaction and staff retention, it is important that organizations are flexible and create environments which allow professionals with different values to work in ways which are consistent with their professional identities. Participants were clear that personal choice of which modalities they used was crucial. In the latest annual NHS staff survey (NHS, 2022) just over half of respondents felt they had choice and were involved in decision making related to their work, down from the previous year. Increasing choice and involvement in decision making should therefore be a priority for organizations.

Implications for practice

Participants spoke about advantages of remote working which they hoped would be maintained after the crisis response was over. They valued highly the flexibility afforded to them by remote working. Less pressure on room space meant that they had more choice in terms of which clients they saw and when. Less commuting time and being able to work from home more often meant a more positive work-life balance. NHS staff survey respondents agree that flexible and remote working have been two of the main areas of their roles which have worked well since the COVID-19 pandemic and want them to be continued (NHS, 2022). Focusing on supporting staff wellbeing through facilitating flexible and remote working is also consistent with the NHS's Long Term Plan (NHS, 2019), two of the core points of which are 'Doing things differently' and 'Backing our workforce'.

Participants speculated that for clients too, the ability to engage in therapy from home could be beneficial for various practical and clinical reasons, for example not having to continually return to a place of trauma such as a hospital, or take as much time off work, improving access to those who are palliative (Moscelli et al., 2018; Guzman et al., 2020). Participants also spoke about some disadvantages including concerns about a potential lack of engagement from clients due to reduced commitment required to attend sessions (Stefan et al., 2021). Other issues include a lack of confidentiality at home for clients and maintaining an agenda of avoidance for clients with anxiety issues (Boldrini et al., 2020).

Given that remote modalities have their own distinct advantages and disadvantages, the decision of which modality should be offered to clients should be based on collaborative, person centered formulation (Mind, 2021) and revisited during the engagement. Therapists should be given some choice as part of their job plan as to how they meet the need for different therapy options. An online survey of 335 therapists also found this to be a popular demand (McBeath et al., 2020) and it is consistent with the findings of a recent mixed methods study of remote therapy during the pandemic (James et al., 2022).

Participants also asked for additional, remote-specific therapy training, the same therapist survey as above also found this to be a popular demand (McBeath et al., 2020). As well as core skills training, it is likely that specific therapy models will adapt to meet the specific demands of remote working. At the time of interviews EMDR was not yet widely considered to be suitable for remote working but this has changed due to subsequent research and practise (Tarquinio et al., 2021). Training will not only raise therapist confidence but teach useful, remote-specific skills.

Participants appreciated opportunities for reflective practise and peer support in the workplace to help mitigate isolation and allow them to process their own experiences (Billings et al., 2021). They were adamant that some degree of face to face contact with colleagues was vital. These opportunities should be provided as part of good practise at any health service which employs a mixed model of remote and face to face contact.

Limitations

This study has a potential self-selection bias due to using a volunteer sample. Although participants offered a range of experience and perspectives, only a small proportion of people who heard about the study offered to take part. Interviews and analysis capture a specific experience which is intrinsically connected to a particular time point of the COVID-19 pandemic. Participants spoke about how their experience of delivering remote therapy changed over time due to various factors and therefore it is reasonable to assume that this change would continue as their personal and social context shifted around them. Our single-interview design cannot capture the depth and breadth of longitudinal changes. An alternate design employing multiple interviews could potentially shed some light on this aspect. Given this is an IPA study this experience is irreducible from this context and generalizations should be made cautiously and with this in mind.

Future research

Participants wondered what the experience of remote therapy would be like for clients. A similar study design should be repeated with therapy clients with experience of both remote and face to face therapy. All participants in this study worked in breast cancer psychology services. This means that most clients had experience of this one specific physical health condition and were presumably predominantly female. Future research could explore the experiences of therapists working with different client groups. Given the meaningful differences between remote modalities, an in-depth comparison of the experience of video and telephone therapy could be insightful. Although this study chose to focus on professional identity, given the ideographic emphasis of IPA there are likely to be meaningful interactions between other aspects of identity and experiences of remote working. Future studies could consider other approaches to identity.

Conclusion

This study provides an in depth exploration of the experience of delivering remote therapy during the COVID-19 pandemic. A range of challenges were identified by participants including working with the barrier of technology, having to come to terms with delivering what they at times perceived to be a lower quality of service and feeling isolated from their peers. Participants demonstrated flexibility and resolve in overcoming these challenges and spoke with a sense of optimism about future ways of working which harnessed the advantages of remote therapy. It is incumbent on organizations to create professional environments which realize these advances, through providing training, resources and flexible job plans, while minimizing the impact of disadvantages identified by participants.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

This study involved human participants and was reviewed by the University of Liverpool Ethics Committee. The participants provided their written informed consent to participate in this study.

Author contributions

AM, CD, and YO were responsible for the recruitment, qualitative analysis and write up. LH-S and PF were responsible for the analysis audit. All authors contributed to the conception and design of the research study, manuscript revision, read, and approved the submitted version.

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Conflict of interest

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The mediating effect of cognitive and emotional processing on PTSD and depression symptoms reduction in women victims of IPV

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Intimate partner violence (IPV) is a serious social, physical and mental health issue. Women victims of IPV can develop short- and long-term consequences such as depression and post-traumatic stress disorder (PTSD). Where trauma has been incurred, standard psychotherapies may usefully be complemented by interventions based on expressive writing (EW). Numerous studies have explored the mechanisms underpinning improvement after writing, focusing on the cognitive and emotional processing of traumatic experiences. The aims of this study were to evaluate changes in PTSD and depression symptoms following EW and to examine the mediating effect of emotional and cognitive processing on symptom reduction in subjects who engaged in EW. Seventy-seven abused women (mean age=41.43, SD=10.75) were randomly assigned to a three-session expressive writing condition (n=43) or a neutral writing condition (n=34). Psychological distress (PTSD and depression) was assessed both before and after the writing sessions. Linguistic inquiry word count software was used to analyze the women's narratives in relation to emotional processing (positive and negative emotions) and cognitive processing (insight and causal attributions). The mediation model indicated that the reduction in depression was fully mediated by negative emotion processing and partially mediated by cognitive processing, while the reduction in PTSD was partially mediated by negative emotion processing and fully mediated by cognitive processing. No effect of positive emotion processing was found. The clinical implications are discussed.

KEYWORDS

depression, PTSD, expressive writing, intimate partner violence, cognitive processing, emotional processing, making sense

Introduction

Intimate partner violence (IPV) is a serious public health problem that affects millions of women, and is associated with severe physical and psychological health outcomes (Koopman et al., 2005). The World Health Organization (2010, p. 11) defines IPV as "*behaviour within an intimate relationship that causes physical, sexual or psychological harm,* *including acts of physical aggression, sexual coercion, psychological abuse and controlling behaviours*". IPV may be inflicted by current or former partners, who are male in 90% of cases (Holmes et al., 2007). Official data (ISTAT, 2015) suggests that in Italy about 2,800,000 women (aged 16–70 years) have suffered one or more episodes of sexual or physical violence at the hands of a partner or cohabitant (Troisi, 2018). IPV victims report physical and mental health problems such as chronic pain, sleep disorders, poor overall health, depression, PTSD, anxiety, substance abuse, suicidality and self-harm (Dillon et al., 2013; Mazza et al., 2021). Given the incidence and severity of IPV-related consequences, clinicians and researchers seek to provide victims of IPV with valid psychological interventions. However, the victims are not quick to seek psychological support, likely because they primarily need safety intervention. Where trauma has been incurred, standard psychotherapies may usefully be complemented by expressive writing (EW) interventions (Pennebaker, 1997). Multiple authors have documented the benefits of writing about stressful and traumatic experiences over multiple sessions of up to 20 min. EW is associated with reduced physical pain, doctor visits, health problems, depression and distress (Pennebaker and Francis, 1996; Smyth et al., 1999). It has been applied with survivors of traumatic events including childhood sexual abuse (Foà et al., 1995; Meston et al., 2013), rape (Kearns et al., 2010) and the Holocaust (Pennebaker et al., 1989), and more recently with the general population (Negri et al., 2020), women undergoing assisted reproductive treatment (Renzi et al., 2019, 2020) and frontline healthcare workers during the COVID-19 emergency (Procaccia et al., 2021). EW studies have also been conducted with IPV survivors, but with conflicting outcomes to date: some found that depression and PTSD improved after writing (Koopman et al., 2005), while other follow-up studies found that women in an EW group were more distressed after 5 weeks than were control subjects (Gidron et al., 1996; Smyth et al., 2001). Some research suggests that subjects whose psychological distress is more severe prior to engaging in EW benefit more from it. Still other studies found that outcomes did not vary as a function of baseline values (Koopman et al., 1999). Hence, more systematic empirical research is required to establish whether writing can help to resolve trauma, in whom, and *via* what mechanisms.

Numerous studies have used linguistic inquiry word count (LIWC; Pennebaker and Francis, 1996) to explore the relationship between health improvements and linguistic markers of cognitive and emotional processing in trauma narratives. Greater cognitive shifts in writing are correlated with bigger health improvements (Warner et al., 2005). Cognitive changes from the first to the last writing sessions are inferred from increased usage of words such as "*why*" "*reason*" "*realize*" and "*understand*," which reflect more "causal" and "insightful" thinking (Pennebaker, 2000). Thus, changing narrative structures flag deeper reflection about the meanings and causal nature of events, demonstrating that repeated narrative construction fosters cognitive processing. Some authors have also examined the role of emotional processing in trauma narratives (Pennebaker and Francis, 1996). Increased expression of positive emotion (reflected in the use of words such as "*happiness*" and "*joy*") and moderate use of negative emotional lexicon ("*sad*," "*guilt*" and "*angry*") are linked with greater improvements in physical health (Pennebaker et al., 1997). However, few studies have examined the narratives of IPV survivors (Southern, 2013). Thus, the aims of this study were to: (a) evaluate whether expressive writing helps mitigate PTSD and depression in female victims of IPV; (b) explore the mediating effect of cognitive and emotional processing on changes in symptomatology. We hypothesized that women who took part in EW sessions would display a greater reduction in symptoms than a control group who completed a neutral writing task (H1); and that cognitive and emotional processing would mediate the effect of baseline values on reductions in symptoms (H2).

Materials and methods

Participants

Participants were recruited through services for abused women settled in Northern and Central Italy. Inclusion criteria included: having been a victim of IPV; being over 18 years of age; displaying adequate proficiency in written and spoken Italian; currently living in safe conditions (separated from the abusive partner for at least 30 days; not cohabiting with the partner for at least 6 months). Seventy-eight women joined the study. Their mean age was 41.43 years (SD = 10.75); the majority were Italian, with a medium-high level of education and in employment. Most had been married or stabling cohabiting and had children; they were victims of chronic and multiple forms of abuse. Participants displayed strong PTSD symptoms as measured using the LASC cut-off values (see King et al., 1995, p. 14); half were moderately or severely depressed (see Table 1). Data were collected between January and August 2022.

Procedure

In the pre-writing phase, participants received an envelope containing a briefing about the study, consent forms, a socio-demographic questionnaire, and all the other research questionnaires (Time 1). The briefing warned of the risks associated with the study, including distress from recalling traumatic experiences. The participants were aware that they could withdraw at any time. They completed the questionnaires individually at home and then received another envelope containing instructions for the writing task. Following the standard narrative research protocol developed by Pennebaker and Francis (1996), the women were randomly assigned to either the "expressive writing" group, and told to write about their traumatic experiences with a focus on

TABLE 1 Demographics.

Total number	**77**	
Age (years)		
Mean (SD)	41.43 (10.75)	
Min–max	19	59
Nationality		
Italian	56	72.7%
Not Italian	21	27.3%
Education		
Middle school license	35	45.5%
Degree	20	26.0%
Post-graduate degree	22	28.5%
Occupational status		
Employed	58	75.3%
Unemployed	19	24.7%
Marital status		
Married or cohabiting	61	79.22%
Stable partner	16	20.78%
Children		
Children	59	76.6%
No children	18	23.4%
Year of victimization		
<1 year	11	14.28%
>1 year	66	85.72%
Type of victimization		
Psychological abuse	77	100%
Physical abuse	63	81.80%
Sexual abuse	56	72.72%
More than one type of abuse	70	90.90%
PTSD		
Mean (SD)	28.14 (14.52)	
Min–max	0	60.00
Depression		
Minimal range	20	26.0%
Mild depression	17	22.1%
Moderate depression	15	19.5%
Severe depression	25	32.5%

exploring their deepest emotions and feelings about them (EW, $n = 44$); or to a "neutral writing" group, with instructions to write about their traumatic experiences but focusing only on facts and events (NW, $n = 34$). Beginning 3 days later, the participants were invited to write for up to 20 min per day on three consecutive days in their own homes. One week later, they were invited to complete the study questionnaires for the second time (Time 2). The study complied with the Ethics Code of Italian Psychologists and was approved by the Ethics Committee of eCampus University. All participants provided written informed consent. Participants' personal information was handled in compliance with the General Data Protection Regulation (GDPR) and EU Regulation 2016/679.

Measures

Demographic characteristics: We recorded participants' age, ethnic background, level of education, number of children, marital/relationship status, number of years of victimization, and type of abuse (sexual abuse, physical abuse, psychological abuse).

The Beck Depression Inventory (BDI-II; Beck et al., 1996; Italian validation by Ghisi et al., 2006): Depressive symptoms were assessed using the BDI-II, a 21-item tool that covers the cognitive, affective, motivational and behavioral components of depression. Each item is rated on a four-point scale from 0 (never) to 3 (always). The total score (maximum 63 points) is the sum of the scores for the individual items. Based on the Italian validation study, a cut-off score of ≥12 was used to establish whether depression was present. Scores from 13 to 19 indicate mild depression; from 20 to 28, moderate depression; and from 29 to 63, severe depression. Cronbach's α coefficient has ranged from 0.80 to 0.87 in normative or clinical samples (Beck et al., 1996). In this study, the α coefficient was 0.85 at Time 1 and 0.84 at Time 2.

Los Angeles Symptom Checklist (LASC; King et al., 1995). The LASC is a 43-item self-report instrument. It provides a measure of global distress due to trauma exposure, severity of overall PTSD symptomology, and severity of individual PTSD symptoms (re-experiencing, avoidance/numbing, and hyperarousal). Previous studies found high internal consistency with α coefficients ranging from 0.88 to 0.95 (King et al., 1995). In this study, the α coefficients were 0.91.

Linguistic analysis

The narratives elicited during the three writing sessions were transcribed to analyze cognitive and emotional processing patterns linked to health improvements. The Linguistic Inquiry Word Count application (LIWC; Pennebaker et al., 2001, Italian vocabulary by Agosti and Rellini, 2007; Boyd et al., 2022) was used to assess language patterns and frequencies. The LIWC program calculates the frequency of words in a text. It recognizes approximately 2,000 words and codes them under a set of linguistic categories (such as pronouns, past, present and future tense, negative and positive emotion words, insight words, …). It calculates the total number of words in a text and computes the ratios of the different linguistic categories to overall corpus. In this study, we concentrated our analysis on words that reflected cognitive processing in terms of causal reasoning (e.g., *reason*, *because*, *thus*) and insight (e.g., *realize*, *see*, *understand*) and emotional processing in terms of positive emotion (e.g., *happy*, *joy*, *elation*) and negative emotion (e.g., *sad*, *mad*, *guilt*, *angry*).

Statistical analyses

The descriptive analysis entailed computing participants' baseline scores for PTSD and depression. There were no significant differences between the EW and NW groups at baseline.

Regarding the first research question, repeated-measure ANOVAs were run to test the effects of the EW intervention on the study outcomes as compared to the effects of the NW. All the ANOVA models included a within-subject factor (pre-scores and post-scores), a between-subjects factor (EW vs. NW), and their interaction. Statistically significant outcomes were further probed *via* plot analysis.

Regarding the second research question, focusing only on the EW group, delta values (Δ) were computed for the differences between global pre-test and post-test scores for PTSD and depression, as well as for language-related variables. Delta values for cognitive and emotional processing were computed by subtracting the score for the first writing session from the score for the third writing session. Next, hierarchical multiple regression analysis was conducted as recommended by Baron and Kenny (1986). A mediational model would be deemed valid if four conditions were satisfied: the first and the second concern the effect of the predictor (1- depression baseline value for the first model, PTSD baseline value for the second model) on the dependent variables (Δ depression for the first model, Δ PTSD for the second model) and (2) on the mediator variables (positive emotion and negative emotion processing and cognitive processing). The third (3) required a significant relationship between the dependent variables and the mediator variable after controlling for the specific effects of the predictor. When these conditions were satisfied, the first and the third regressions were compared to check the effect of the predictor on the dependent variable. The mediational model was accepted if (4) the effect of the predictor on the outcome was null (fully mediated) or lower (partially mediated) in the regression where the mediator was included.

All statistical analyses were conducted using SPSS 21.

Results

The EW effects

Statistically significant interaction effects were found for depression and PTSD symptoms. The plot analysis showed that: (1) depression symptoms decreased significatively in the EW group only (depression $F=0.551$, $p=0.46$; depression × writing condition $F=6.133$, $p=0.03$); (2) PTSD symptoms decreased in both groups but more in the EW condition (PTSD $F=10.745$, $p=0.02$; PTSD × writing condition: $F=10.145$, $p=0.02$; see Table 2).

TABLE 2 Repeated-measure ANOVAs.

	Sum of square	df	Mean square	*F*	*p*
Depression	3,178	1	3,178	0.551	0.463
Depression*depression effect	5,842	1	5,842	0.645	0.383
Depression*writing condition	34,873	1	34,873	6,133	0.038
PTSD	15,678	1	15,678	10,745	0.024
PTSD*PTSD effect	6,779	1	6,779	1,231	0.272
PTSD*writing condition	13,567	1	13,567	10,145	0.022

Mediational models

Multiple regression analyses were performed in the EW group on theΔ values for depression, PTSD, positive emotion processing, negative emotion processing, and cognitive processing.

Concerning depression, the baseline score predicted reduced depression in the post-writing condition, with greater improvement displayed by those with more severe symptoms at time 1 ($\beta=-0.342^*$; $R_2=0.117$, $p=0.02$). A higher level of positive emotion processing was predicted by higher baseline depression ($\beta=0.370^*$; $R_2=0.118$, $p=0.02$), but there was no mediational effect on reduced depression following writing. Higher baseline depression predicted less improvement in negative emotion processing ($\beta=-0.305^*$; $R_2=0.123$, $p=0.02$), with negative emotion processing fully mediating changes in depression scores ($\beta=-0.342^*$ vs. $\beta=-0.065$). Higher baseline depression also predicted a lesser improvement in cognitive processing ($\beta=0.380^*$; $R_2=0.143$, $p=0.02$), and cognitive processing partially mediated the effect of baseline values on changes in scores at time 2 ($\beta=-0.342^*$ vs. $\beta=-0.312^*$; see Figure 1).

Concerning PTSD, a different pattern of functioning was identified. Reduced PTSD post- writing was predicted by baseline score, with the most significant improvement displayed by those with the most severe symptoms at time 1 ($\beta=-0.363^*$; $R_2=0.147$, $p=0.02$). Higher baseline PTSD predicted greater improvement in positive emotion processing ($\beta=-0.345^*$, $R_2=0.164$, $p=0.02$), but no mediational effect of positive emotion processing was found. Higher baseline PTSD predicted poor outcomes for negative emotion processing ($\beta=0.323^*$, $R_2=0.134$, $p=0.02$), and the effect of the baseline score was partially mediated by negative emotion processing ($\beta=-0.363^*$ vs. $\beta=-0.313^*$). Finally, higher PTSD scores pre-writing predicted poor cognitive processing ($\beta=0.365^*$, $R_2=0.184$, $p=0.02$), yet cognitive processing fully mediated the effects of baseline values on reducing PTSD after writing ($\beta=-0.363^*$ vs. $\beta=-0.061$; see Figure 2).

Discussion

Our results confirm that expressive writing about traumatic experiences reduces depression and PTSD symptoms in female IPV victims. Consistently with previous studies (Pico-Alfonso et al., 2006; Ellsberg et al., 2008), women with histories of IPV reported significant depression and PTSD symptoms before engaging in EW, implying a need for intervention among this population. Our outcomes suggest that expressive narrative techniques improve health: women who wrote about their traumatic experiences while focusing on their emotion and

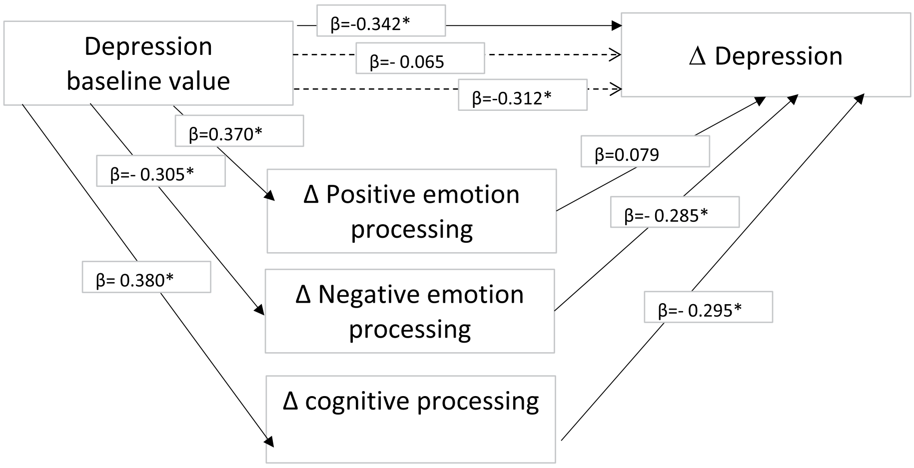

FIGURE 1
Mediational model for depression.

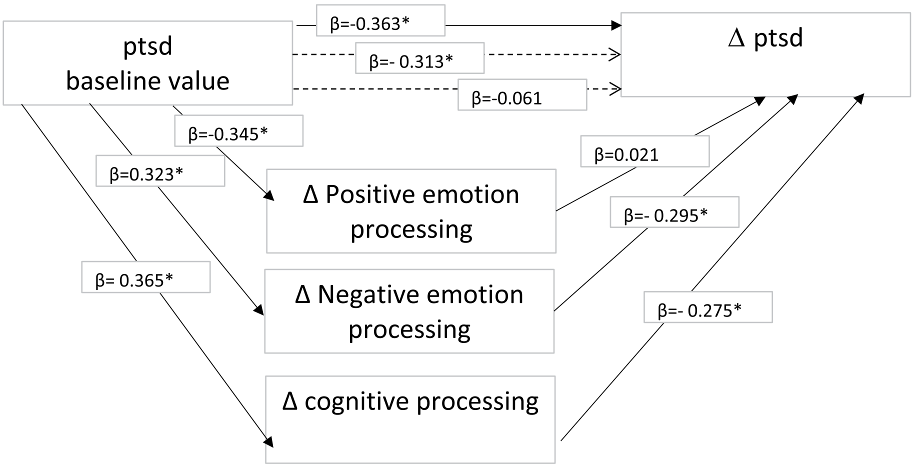

FIGURE 2
Mediational model for PTSD.

thoughts enjoyed greater reductions in depressive and PTSD symptoms than their peers in the control group (Foà et al., 1995; Brown and Heimberg, 2001). Nevertheless, even the women in the control group who wrote about their traumatic experiences in exclusively factual terms displayed reduced PTSD following writing. Although intrusion has been reported to increase as a result of writing (Smyth et al., 2001), we hypothesize that being "forced" to think about traumatic experiences may reduce avoidance, which is associated with enhanced health. This happens among the EW group subjects because they are invited to write about their emotions and thoughts, but also in the neutral writing group because even writing factually fulfils an abreactive function. This explanation is in keeping with the Exposure Model and the use of exposure therapy for PTSD. Theoretically, being "forced" to confront negative experiences helps to overcome them, leading to health gains (for a review, see Foà et al., 2013). Regarding the specific mechanisms that may explain the beneficial effect of writing, our data confirmed a main effect of cognitive processing on improvements in depression and PTSD symptoms, in keeping with Cognitive Processing Theory. Change in the cognitive structure of narratives reflects an increase in cognitive processing. The repeated narration of trauma fosters reflection about its meaning, enhancing the subject's sense of coherence and psychological well-being (Pennebaker and Seagal, 1999; Veronese et al., 2013; Castiglioni and Gaj, 2020). Cognitive processing helps traumatic memories to become ordinary memories, defusing their emotional intensity. This diminishes intrusive thoughts, enhances emotion regulation, and reduces arousal caused by stressful thoughts and memories (Davidson et al., 2002). The link between increased causal attributions and psychological improvements is also consistent with Ehlers and Clark's (2000) finding that the ability to contextualize and process autobiographical memories promotes mental health in traumatized people. We may assume that producing narratives prompts reorganization of traumatic memories, enhancing the subject's capacity to make sense of it. Meaning making mitigates the feelings of powerlessness and fragmentation experienced by IPV victims, who lost their sense of efficacy and control following the abuse.

We identified a different pathway for emotional processing. Specifically, stronger depression and PTSD before writing were associated with poor negative emotion processing. Nevertheless, success in decreasing negative emotionality protected subjects against the persistence of symptoms, especially depression, for which we found a full mediating effect (Sloan et al., 2007; Hoyt and Yeater, 2011). Differently to past research, which associated greater use of positive lexicon and moderate negative emotionality with health improvements (Pennebaker et al., 1997), we identified no mediating effect for positive emotion processing. This outcome may be interpreted in light of Holmes et al. (2007) who suggested that emotional processing in IPV survivors could be different than in other populations. More frequent expression of positive emotions may reflect decreased ability to actively cope with trauma, contributing to stress-related health problems. More frequent expression of positive emotion may thus mask defense mechanisms of avoidance and denial, as is typical in cases of interpersonal violence. Battered women often try to cope by playing down the seriousness of the abuse or underestimating its impact on themselves. They split negative affect from positive affect, exaggerating the latter (Bondura, 2016). In keeping with previous findings (e.g., Alpers et al., 2005), a strength of the present study is its use of automated text analysis with female victims of IPV, which should prompt broader research programs with clinical populations. Our work confirms the importance of viewing specific cognitive and emotional processes as predictive of health gains. It extends our understanding of how expressive writing interventions work and how to make them more efficacious. EW can be of value as a low-cost method that can also inform subsequent psychotherapy. Nevertheless, our study features methodological limitations. First, the small sample size reduces the generalizability of our results. Second, our sample comprised relatively highly educated participants (most had completed high school). Presumably, writing tasks are easier for the better educated, who may therefore receive greater benefit from it than less educated subjects. Also, PTSD and depression were assessed using self-report instruments, which may be undermined by respondent bias and inaccurate recall. Also, the sample was limited to women who had separated from their abusive partner and we do not know if the results would hold for women who remain in a violent relationship. Another limitation is the lack of a follow-up phase designed to test the long-term effects of writing. Finally, this study did not explore whether narrative benefits vary as a function of the specific subtypes of violent abuse suffered.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by E Campus University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

RP and MC together wrote the conclusions, specifically RP took care of the methodological part and MC took care of the initial part of the introduction. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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How to address the body after breast cancer? A proposal for a psychological intervention focused on body compassion

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breast cancer, self, body image, injured self, body compassion

1. Introduction

Breast cancer is one of the most frequent cancers among women worldwide and strongly affects Quality of Life (Ferlay et al., 2015; Andreis et al., 2018). On a physical level, oncological treatments and interventions (e.g., surgery, chemotherapy, radiotherapy, and hormonal therapy) greatly impact the body (Serletti et al., 2011). Body image (BI) is conceptualized as an "internal representation of one's own outer appearance" (Thompson et al., 1999, p. 4). Specifically, BI does not refer only to the appearance on an aesthetical level but also to the mental representation of the body and its related emotions (Lewis-Smith et al., 2018; Sebri et al., 2020). Undesirable appearance-related side effects of breast cancer such as the loss of one or both breasts, hair loss, and scarring after surgical intervention have relevant psychological effects on BI and related wellbeing (Falbjork et al., 2013; Fioretti et al., 2017). Current research has highlighted the impact of surgical procedures (i.e., mastectomy with/without breast reconstruction and breast-conserving surgery) on BI (Collins et al., 2011; Chen et al., 2012). A systematic-review by Martins Faria et al. (2021) evidenced that mastectomy impairs BI strongly, in both the short and long-term. Particularly, radical breast removal decreases BI satisfaction in comparison to less radical procedures, such as breast- conserving surgery. In this regard, breast removal leaves a permanent and negative mark on the perception of the own body even after a cure. Similarly, Zhou et al. (2020) stated that many women experience BI disturbance after surgery due to the less body satisfaction. Accordingly, women with a history of breast cancer may perceive their body as a source of danger and fear. Interoceptive sensations, once ignored, suddenly become salient, with the risk of promoting the fear of cancer recurrence (Harris et al., 2017). This may be seen a behavioral level as women may perform "checking behaviors" such as excessive breast self-examinations daily (McGinty et al., 2016). To address these findings, the purpose of this contribution is to describe a proposal for a new psychological intervention focused on body compassion, which would promote compassion and BI to improve quality of life in women with a history of breast cancer.

2. Body, sexuality, and intimate relationships after cancer

Because of breast cancer treatment sexuality and intimate relationships can become difficult (Bishop, 2015), impacting the couple's life. Changes in the body and in the evaluation of women femininity allows for a perception of sexual unattractiveness (Sebri et al., 2021b). Moreover, oncological treatments can lead to the fear of losing fertility, which may impact monogamous relationships. Women rely on their partner to perform crucial roles of providing emotional support, managing finance, and making decisions, which can lead to high levels of distress (Akpor et al., 2022). Despite this, the partner is essential in the promotion the survivor's wellbeing, which serves to support the couple throughout the cancer journey. Literature shows the relevance of supporting marital adjustment to avoid excessive distress and anxiety (Suo et al., 2022) and strongly reduce negative BI (Akpor et al., 2022). BI impairments can also affect social relationships. Specifically, a negative BI may lead women to constantly scrutinize their body with the fear of being different from cultural stereotypes through the development of negative emotions (Sherman et al., 2018; Triberti et al., 2019). In line with the Self Discrepancy Theory by Higgins (1987), the higher the discrepancy between "whom they perceive to be" and "whom they would like to be," the higher psychopathological outcomes and emotional issues could be observed. In this regard, impairments in emotional regulation can be observed in young women with a history of breast cancer especially (Miyashita et al., 2015). After oncological treatments, the risk of incurring premature menopause and consequently to the risk of infertility can change the perception of body and femininity, in particular for young women (Camp-Sorrell, 2009). Moreover, young women could experience the difficulty in managing their fear of not seeing their child/children grow up (Miyashita et al., 2015).

Starting from the background, women with a history of breast cancer tend to reframe their identity as that of a or "woman at risk," leading to rethinking future expectations and taking health management into account (Gibson et al., 2015; McGannon et al., 2016; Moskalewicz et al., 2022). In this way, women need to deal with a renovated overall self, which is described as a system of cognitive and affective schemas that affects life-meanings and decisions (Christoff et al., 2011; Sui and Humphreys, 2015; Sebri et al., 2021c). Women tend to show a new self-representation, called *Injured Self,* an illness-schema rich with emotions and autobiographical memories related to the oncological journey, which is particularly relevant to create images of the self (Sebri et al., 2020). Thus, it is essential to integrate Injured Self and its related illness-memories into the overall self, by linking current self-representations, beliefs, and aims consistently to avoid self-fragmentation and promote wellbeing (Conway, 2005; Sebri et al., 2020).

Breast cancer patients and survivors need to integrate various self-schemas into a coherent one. For this aim, the episodic memory system provides input to the working self and includes some knowledge in autobiographical memory influenced by goal-relevance (Conway, 2005). This way, the working self is particularly important to create appropriate images of the Self following the self-coherence request (Markus and Nurius, 1986). During memory construction, the working self is indeed the moderator between the demands of memory (that corresponds to reality and actual experiences) and coherence (memory that should be consistent with one's current self-images, beliefs, and aims) (Conway et al., 2004).

The construction of a positive BI depends on the individual experience of the illness and on the possibility of addressing bodily issues and their related emotion to promote a new positive perception of the body after cancer. A recent meta-analysis showed the efficacy of novel and mixed-method psychological interventions (e.g., physical exercises, art therapy, and web-based interventions) to avoid self-fragmentation and promoting a positive BI, personal strength, and cognitive abilities (e.g., decision making and attention; Sebri et al., 2021a). The majority of the psychological interventions were focused on cognitive-behavioral/existential, interpersonal, psychosocial, supportive, emotionally expressive, and educational approaches (Blanco et al., 2014; Savioni et al., 2022). Additionally, recent studies highlighted the relevance of psychological interventions based on mindfulness and self-compassion intervention thanks to the promotion of kindness and lack of self-judgment, which are relevant to promote wellbeing in women with a history of breast cancer (Neff, 2003; Chang et al., 2021; Mifsud et al., 2021). Specifically, mindfulness-based stress reduction (MBSR) intervention allows women to have kindness and care toward the body specifically (Matchim et al., 2011).

3. The role of body compassion on injured self

Self-compassion is defined as the kindness toward the self and it is characterized by lack of self-judgment, acknowledging past trauma, and consideration of suffering as part of the human condition (Lazarus, 1991; Neff, 2003; Jazaieri et al., 2014). Kirby (2017) embodied this definition through their Compassion Cultivation Training. This program focused on promoting compassion toward others, in order to highlight positive outcomes, decrease suffering, and improve life satisfaction. When self-compassion is referred to the physical self on a cognitive, emotional, and behavioral level, it can be defined as body compassion (Altman et al., 2020). In other words, psychological interventions focused on body compassion have the goal of promoting attitudes of kindness and care with a specific focus on the body (Strauss et al., 2016; Van Niekerk

TABLE 1 Sessions of the body compassion intervention on BI.

The body compassion contents	Consequences on BI	Therapeutic aims in oncology
SESSION 1 Set the mind to the possibility of loving the body after cancer. Explore the individual's motivation to act and alleviate suffering related to the own BI	Women are introduced to the idea of loving their body, shifting from the perception of an "ill body" to a new and renovated one after cancer	Introduce the possibility of a lovely body to increase behaviors of positive and active adherence to treatments as a personal choice
SESSION 2 Explain and develop mindfulness skills by recognizing suffering and uncomfortable feelings related to the body	BI can now be associated with the feeling of relaxation. Participants may think of their bodies by experiencing positive emotions, not only fear of cancer recurrence	Rethink to the future in terms of new possibilities and challenges sustained by a body that can be able to manage fatigue and daily distress
SESSION 3 Gain awareness and compassion toward the own body after cancer through embracing our shared common humanity	The body compassion program could sustain the idea of human frailty by promoting the acceptance of a body that needs care and treatments	- Gain awareness and acceptance of physical limits - Promote independence and acceptance of personal limitations, sustained by others' help
SESSION 4 Practice loving-kindness meditation sessions conducted by a psycho-oncologist with expertise in mindfulness-stress based reduction intervention	The overall change in BI can be now led to the mental representations of a new body, which can be not only a source of fear but cared	Promote introspection and awareness for inner feelings to increase emotional regulation

et al., 2021). In accordance with it, a study by Matos et al. (2022) evidenced that the negative correlation between body compassion and emotional issues allows for the promotion of a positive BI.

In the breast cancer field, body compassion interventions can be relevant to promote positive emotions and attitudes toward the body after cancer (Sebri et al., 2022). Despite the efficacy of self-compassion interventions to promote BI (González-Hernández et al., 2021), there is a lack of understanding surrounding the efficacy of specific programs related to body compassion in women with a history of breast cancer. The purpose of this new psychological intervention based on body compassion and BI could be relevant to have a renovated perception of the body after cancer, focusing on attitudes of compassion toward the body and promoting wellbeing.

4. A body compassion intervention on BI: Contents and therapeutic aims

Based on the existing literature (e.g., Strauss et al., 2016; Kirby, 2017), we structured a new Body Compassion Intervention on Body Image to promote a positive BI in women with a history of breast cancer. According to Table 1, this psychological intervention will consist of four group sessions focused on recognizing negative emotions, accepting uncomfortable feelings, and promoting BI in women after cancer treatment. Specifically:

- **Session 1:** In the first session, the psycho-oncologist will introduce participants in taking care of the body after cancer with attitudes based on kindness and acceptance of their inner feelings. This aspect will help women to perceive their body not only as a source of danger and fear, but also as an ally. In fact, the intervention will introduce the possibility of a new and renovated body after cancer, with an integration of a new cancer-related self-representation, the **Injured Self,** in an overall and coherent self (Sebri et al., 2020). Furthermore, participants will be asked to share their motivations for participating in the group and their personal goals in a collaborative way (Durosini and Aschieri, 2021). Expected therapeutic aims will be a greater oncological adherence to treatments. Literature shows the relevance of patients' active role in their treatment and care (Castellano-Tejedor et al., 2015; Kondylakis et al., 2017).
- **Session 2:** In the second session, the psycho-oncologist will explain and introduce the mindfulness technique as an available tool in the psychological program to promote body awareness and general wellbeing. In particular, mindfulness-based stress reduction will improve participants' skills to recognize individuals' suffering and uncomfortable feelings related to the body, which generally increases the fear of cancer recurrence and emotional issues (AhmadiQaragezlou et al., 2020; Park et al., 2020). Specifically, women will be invited to be careful about their stressful sensation. Then, the psycho-oncologist will propose some strategies to manage distress and negative emotions, as suggested by the mindfulness-stress based reduction technique. Women will be invited to repeat the strategies indicated daily, especially when experiencing distress. This session will aim to associate BI and, in particular, each part of the body affected by cancer with positive feelings and emotions, decreasing negative sensations and feelings. Expected results will be the new possibility of thinking of the future and having positive expectations, adopting adaptive coping styles useful to face the Aisease (Zhang et al., 2010; Koch-Gallenkamp et al., 2016). This way, perceiving the body as a "helper" during

everyday life challenges will help them to structure goal setting and future objectives (Sebri et al., 2022). After cancer, women may tend to perceive their body without physical energy and be unable to deal with daily challenges. This psychological intervention will aim to promote a positive perception of the body, which can sustain and manage everyday issues;
- **Session 3:** The third session will be focused on promoting bodily awareness by stressing the contact with the body and its sensations. In particular, women with a history of breast cancer will be more able to be aware of their inner sensations by reducing emotional arousal and promoting self-emotion regulation (Herwig et al., 2010). Moreover, the psycho-oncologist will introduce a discussion about common characteristics and shortcomings of humanity and recognize, elaborate, and accept the own body with its physical limits and difficulties. Breast cancer and its treatments change routines, relationships, and the lack of independence (Jacobs et al., 2018). In this session, the relevance of taking care will be highlighted. Therapeutic aims will focus on identifying and avoiding behaviors that cause stress. Participants will be accompanied in recognizing their needs and desire, without shame and fear of their inner sensations;
- **Session 4:** The last session will be focused on the practice of loving-kindness meditations conducted by the psycho-oncologist. The overall aim of this session will be focused on integrating the Injured Self into the overall Self by stressing bodily contact and its related emotions and, as a consequence, the acceptance of this new body after breast cancer (Sebri et al., 2020, 2022). Therapeutic aims will be based on reaching emotional regulation by promoting awareness of inner feelings and regaining control over them (Sebri et al., 2022).

We recommended that this psychological program be conducted by a psycho-oncologist with an expertise in mindfulness-based stress reduction for oncological women (Kabat- Zinn, 1997; Segal et al., 2014).

5. Conclusion

Breast cancer may affect body perception deeply, with notable consequences on women with a history of breast cancer' quality of life (Lewis-Smith et al., 2018). The body after cancer is sometimes perceived as in constant need of support (Li et al., 2015; Rahmaningrum et al., 2020). Interoceptive and physical sensations lead to fear of cancer recurrence, negative emotions, and an illness-self schema (i.e., Injured Self; Sebri et al., 2020). All these aspects lead women to decrease their prospective thinking and goal setting, which are necessary for pursuing one's own personal future (Blanco et al., 2014). Promoting self-compassion in breast cancer patients is of paramount importance to promote kindness toward self and the body and to help the management of negative emotions. The present manuscript structured a new psychological intervention focused on body compassion that could help women to manage their emotional issues and promote a positive BI (Fafouti et al., 2010).

Limitations of the present contribution could be the generalization of this specific psychological program to other cancer populations due to the specific focus on breast cancer and its characteristics, which are strictly connected to femininity and body satisfaction. Future studies are required to better understand BI in people who received different oncological diagnoses and different interventions (e.g., mastectomy) to implement personalized interventions on women' needs. Future studies should still explore the other characteristics associated with chronic illness-related alterations to the overall self and the appropriate psychological interventions. It is also possible that body compassion has to be adapted to other chronic pathological conditions, focusing on the specificities of any disease. At the same time, future research should explore the efficacy of body compassion interventions with the integration of other activities, such as physical exercises, as sustained by literature (Beadle, 2020). For example, randomized control trials, longitudinal studies, and case studies are needed to support the present psychological program and assess its efficacy. It is needed to progress scientific investigation by capturing the causes, characteristics, and consequences of BI and Injured Self to tailor psychological interventions to women with a history of breast cancer' needs.

Author contributions

VS conceived the ideas presented in the article and wrote the first draft. ID contributed with discussion on the ideas presented and edited the manuscript. GP contributed with important intellectual contents and supervised the whole process. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Personality traits and transition to psychosis one year after the first assessment

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Introduction: Several studies have identified ultra-high-risk criteria that may characterize an at-risk mental state and predict the transition of psychotic evolution. Personality traits may play a crucial role in this process.

Aims: The current study aims to: (a) explore the evolution of an initial diagnosis over 12months; (b) assess differences in social and occupational functioning; (c) identify common (trans-diagnostic) personality traits of psychotic risk.

Methods: The sample includes 97 (44 males and 53 females) young adults. They completed an assessment that consists of socio-demographic data, the Social and Occupational Functioning Scale, the Early Recognition Inventory-retrospective assessment onset of schizophrenia, and the Personality Inventory for DSM-5 (PID-5). According to the tests' assessment, the sample was divided into three different groups: Ultra-High Risk (UHR), At-Risk, and Not at risk. One year after the first evaluation, psychiatrists administered the QuickSCID-5 to verify the diagnostic trajectories of the sample.

Results: Overall, the most prevalent category diagnoses were anxiety/depression, personality disorders, and psychosis. Specifically, the most common diagnosis in the UHR group was psychosis. Moreover, in the UHR group, the social and occupational functioning score was the lowest. In terms of differences in PID-5 personality traits, the At-risk and UHR groups scored highest in detachment and disinhibition. No statistically significant differences were found between the groups for negative affectivity, antagonism, and psychoticism traits.

Conclusion: Results obtained by the current study should be considered an attempt to better understand the diagnostic trajectories and trans-diagnostic personality traits in a group of young help-seekers, specifically in UHR. Findings highlight both the importance of diagnosis and personality traits evaluation to customize a specific intervention based on the level of psychotic risk. Clinical suggestions are reported.

KEYWORDS

at-risk mental states, ultra high risk, psychosis, personality traits, PID-5, social and occupational functioning, detachment and disinhibition

1. Introduction

Different psychotic manifestations can be read according to a developmental perspective; indeed, in the natural history of the psychological disease, it is frequently observed the presence of different phases, prodromal, acute, and chronic (Yung et al., 2003). The prodromal phase has an average duration of between 1 and 5 years and is often associated with high psychosocial impairment and disability (Loebel et al., 1992; Beiser et al., 1993; Häfner et al., 1993). Prodromal states are characterized by non-specific symptoms of different nature, including restlessness, concentration, social and cognitive difficulties, fear, low self-esteem, social withdrawal, poor school or work performance, worsening quality of life, anxiety, sleep disorders, personality, and mood changes, and attenuated psychotic symptoms (Yung et al., 2007). Some studies have shown that very often the decrease in cognitive performance and impairment of social functioning anticipate the actual onset of the disease by up to several years; these dysfunctions act as both maintenance factors and transition markers (Tarbox et al., 2014; Nelson et al., 2021). Whereas the acute phase corresponds to the psychotic onset, the chronic one is characterized by the continuative presence of positive, and negative, cognitive symptoms and functional disabilities (Yung et al., 2003).

The original At-Risk Mental State (ARMS) construct – also referred to as the Clinical High-Risk State for psychosis (CHR-P) – was introduced in 1996 to identify young people at increased risk of having a first psychotic episode and thus developing an overt psychotic disorder (Yung et al., 2005; Fusar-Poli, 2017). A strategy has been adopted to identify young people with ARMS. This strategy is based on identifying risk factors for psychotic disorders, i.e., trait factors (genetic, schizotypal personality disorder, or a family history of psychosis), state factors (such as mental distress and deterioration in functioning), specific symptomatology presenting prior to onset and age between 15 and 25 years (Nelson, 2014).

Ultra-High Risk (UHR) persons present with ARMS and a decline or persistently low social and occupational functioning (Nelson, 2014). The UHR criteria allow three groups to be identified in turn: the vulnerable group – schizotypal disorder and/or first-degree relative with a psychotic disorder, Attenuated Psychotic Symptoms (APS) – the presence of brief, limited, and intermittent psychotic symptoms, Brief Limited Intermittent Psychotic Symptoms (BLIPS) – positive psychotic symptoms that did not last more than a week and disappeared without treatment. Young people who meet the UHR criteria have subthreshold symptoms for a psychotic episode, however, not all of them will necessarily have a transition to psychosis. We speak of a first psychotic episode when symptoms go from subthreshold to full-blown (both in intensity and frequency) (Nelson, 2014).

The concept of At-Risk Mental State becomes crucial in clinical practice, especially from a preventive perspective (Lin et al., 2012). Recognizing in advance certain signs that could lead to the development of a psychotic pathology, allows early intervention to reduce the likelihood of its onset and the related social consequences (Wölwer, 2018). Literature shows the transition rate to full-blow psychosis – among high-risk patients – is between 35 and 41% (Yung et al., 2003, 2004; Radua et al., 2018; Oliver et al., 2020).

The early intervention treatment aims to prevent the psychotic onset, when possible, and reduce the damage when primary prevention is no longer applicable. Whether the patient is already in the care of the service, it is possible to reduce the DUP (Duration of Untreated Psychosis) and improve the prognosis regarding general functioning. (Pelizza et al., 2022) showed that a psychotherapeutic and/or psychoeducational intervention, during the risk phase, significantly reduces the probability of onset in the following 12 months. Notwithstanding, the intention to create a stage model is somewhat limited by the lack of knowledge of the factors that modulate the level of risk in these individuals.

Symptoms represent an epiphenomenon of an underlying etiopathology. The identification of associated states and outcomes is entirely symptom-based. Indeed, the general pattern underlying the development of psychosis involves the culmination of genetic and environmental factors that may increase (risk factors) or decrease (protective factors) the likelihood of developing psychosis, as well as the interplay between them (Insel, 2010; Radua et al., 2018). In this regard, one strand of scientific research is trying to identify, personality traits that can predict both the level of risk and the likelihood of developing the disorder (Drvaric et al., 2018; Meliante et al., 2021). Fusar-Poli et al. (2014) found anxiety and depression play a central role in psychotic transition whereas, empirical findings on the role of personality are still controversial, and scarcely comprehensive. A recent meta-analysis (Boldrini et al., 2019) showed that 39.4% of high-risk patients have comorbidity with personality disorders and the most common diagnoses in this clinical population are schizotypal and borderline.

Existing studies indicate that schizotypy assessed in “at risk” individuals can be considered a predictor of transition from CHR-P to psychosis. This approach, however, is burdened by biases stemming from a possible overlap between current psychopathology and schizotypal features (Kotlicka-Antczak et al., 2019). The schizotypy construct reflects a phenotypic expression of vulnerability to schizophrenia and it can be conceived as part of a normal personality, which may nevertheless form a background for the development of psychotic illness (Claridge and Beech, 1995). Today, schizophrenia is in fact considered a neurodevelopmental disorder (McMillan et al., 2009; Murray et al., 2022). Clinically, the pathological process may progress to full-blown illness through the development of subtle abnormalities in cognitive and social functioning and a distinct pre-psychotic phase, currently known as clinical high-risk psychosis (Fusar-Poli, 2017). However, following a meta-analysis of the material in the literature, Debbané et al. (2015) concluded that the positive dimension of schizotypy presents little clinically significant predictive value for the transition from CHR-P to psychosis. Physical anhedonia appeared the most predictive indicator of conversion while other studies show no link between the baseline level of schizotypy and transition (Debbané et al., 2015).

Specifically, with borderline personality disorder, there is an overlap in deficits in interpersonal relationships and detachment, while with the latter there is vulnerability to disinhibition, negative affectivity, emotional dysregulation, anxiety, and depression (Smith et al., 2009; Woods et al., 2009; Debbané et al., 2015). Instead, other studies have focused on identifying the most prevalent personality traits in high-risk patients. Studies based on Personality Inventory for DSM-5 (PID-5; Fossati et al., 2013) highlighted an additional element to distinguish high-risk patients which are detachment, disinhibition, negative affectivity, and psychoticism (Drvaric et al., 2018; Shi et al., 2018; Meliante et al., 2021). Drvaric et al. (2018) have shown that patients at higher risk for psychosis score higher on two of the five AMPD trait domains – negative affectivity and detachment – than patients at lower risk. Furthermore, the authors argue that maladaptive AMPD personality traits may be a potential risk factor for conversion to psychosis. Meliante et al. (2021) have highlighted that higher scores in detachment and psychoticism may distinguish people who are more vulnerable to psychosis or who already have manifest psychosis from those who do not have a psychotic predisposition.

For this reason, the current study has three main aims: (a) exploring the evolution of the initial diagnosis over 12 months among patients recruited and assigned to three groups (Not at risk, At risk, Ultra High Risk) (b) assessing differences in social and occupational functioning between the groups (c) identifying common (trans-diagnostic) personality traits of psychotic risk groups.

2. Materials and methods

2.1. Participants

Of an initial sample of 110 individuals who in 2019 referred to the Youth Mental Health Service for Early Intervention at Niguarda Hospital in Milan (Italy), 97 participants were included in the study. They were 44 males and 53 females with an average age of 20.5 years (SD = 2.17).

The following exclusion criteria were applied: (a) incomplete personality assessment, (b) diagnosis of intellectual disability or autism, (c) psychotic onset, and (d) dropouts after 1 year from the first consultation.

Participants completed the routine Programma 2000 assessment which is a youth mental health early intervention service implemented at Niguarda Hospital in Milan, Italy. The metropolitan area served by the program includes about 350,000 inhabitants. The project integrates the management of chronic psychotic disorders with prevention services that promote health and recovery. Patients access this service through spontaneous help-seeking or institution-mediated pathways (e.g., primary care, district mental health services, school counseling, and emergency rooms). Programma 2000 offers an individualized and customizable intervention package that includes cognitive-behavioral psychotherapy, psychoeducational and motivational sessions, family support, and therapeutic group activities (e.g., anxiety management, assertive and problem-solving training, etc., etc.).

2.2. Procedures

All the study participants gave their informed consent after being properly informed. The study has been authorized by the Niguarda Hospital in Milan's Ethical Committee (Protocol 305–19,052,021) and complies with the 1964 Declaration of Helsinki's Principles and any later amendments (World Medical Association, 2013).

The assessment proposed in Programma2000 is a key element in tailoring the intervention package. It consists of socio-demographic data, the Social and Occupational Functioning Assessment, the Early Recognition Inventory-retrospective assessment onset of schizophrenia, and the Personality Inventory for DSM-5. One year after the first assessment, psychiatrists administered the QuickSCID-5 to assess the diagnostic trajectories of the patients taken into care.

2.3. Measures

2.3.1. Quick structured clinical interview for DSM-5

The instrument is a structured interview created for making the major DSM-5 diagnoses. The QuickSCID-5 consists of 10 independent modules: Module A (episodes and mood disorders), Module B (screening for psychotic symptoms), Module C (substance use disorders), Module D (anxiety disorders), Module E (obsessive–compulsive disorder), Module F (attention-deficit/hyperactivity disorder). Module I (screening questions for other disorders), and Module J (questions for exclusion of mental disorders due to other medical conditions). Due to the modular nature, only the modules of interest can be administered (Somma et al., 2020).

2.3.2. Social and occupational functioning assessment

The SOFAS is a clinician-report tool that measures functioning at the time of the assessment. It does not directly depend on how severe the psychological symptoms are, but it primarily concentrates on the person's level of social and occupational functioning (Morosini et al., 2000). Precisely, SOFAS is structured as a comprehensive evaluation of the social and occupational functionality of a patient, rating from "superior functioning in a wide range of activities" (=100) to "inability to function in almost all areas" (<30).

2.3.3. Early recognition inventory-retrospective assessment onset of schizophrenia (checklist)

The Checklist ERIraos (Maurer et al., 2018) is a semi-structured interview that aims to identify early signs of mental illness evaluating the perceived psychopathological changes and the family history of the subject. It combines the non-specific distress symptoms that may accompany the schizophrenia prodromes (such as social withdrawal and depression, persecutory thoughts, loss of sense of reality, and hallucinations indicating an elevated risk of psychotic development), into a single list of 17 items (Meneghelli et al., 2014). A score ≥12 necessitates a referral to the Early Intervention Center for additional investigation.

2.3.4. Personality inventory for DSM-5

The Personality Inventory for DSM-5 (PID-5) has been created to assess the pathological personality traits of Criteria B in section III of the DSM-5 from a dimensional and inferential-contextual point of view. It is a self-report questionnaire composed of 220 items with a Likert scale (from 0 to 3). PID-5 is structured on 25 facets gathered into five main domains of personality traits: detachment, disinhibition, negative affectivity, antagonism, and psychoticism (Fossati et al., 2013).

2.4. Statistical analysis

According to the aims, the sample was divided into three different groups based on Programma 2000 assessment and labeled as follows: (1) Ultra-High Risk (UHR): consisting of patients who have exceeded the Checklist cut-off with a score >12. They specifically resulted to be positive for the last four items of the Checklist (which refers to frankly psychotic symptoms) and presented the risk factors for UHR diagnosis (family history of schizophrenia, a schizotypal personality disorder, the presence of emerging or worsening attenuated positive symptoms, deterioration of social and occupational functioning); (2) At Risk: consisting of patients who have exceeded the cut-offs for the Checklist but presented neither positivity to the last four items of the Checklist nor risk factors for the UHR diagnosis; and (3) Not at risk: consisting of all the patients who did not exceed the cut-offs of the assessment's scales for at-risk mental states.

Analyses of skewness and kurtosis were performed to assess the sample's distribution's normality and each variable's results within the acceptable range of ±2 (Podsakoff et al., 2003).

Firstly, Pearson's Chi-Square Test was conducted to investigate the development of psychotic risk in the sample exploring the evolution of the initial diagnosis over 12 months among patients recruited and assigned to three groups (Not at risk, At Risk, Ultra High Risk). Differences in social and occupational functioning (considering SOFAS scores), among the groups, were then explored by conducting a One-way ANOVA. Finally, a MANOVA was used to investigate common trans-diagnostic personality traits (PID-5) of psychotic risk groups. Both ANOVA and MANOVA Bonferroni multiple comparison tests were led. Analyses were performed using SPSS 25.0 statistical software.

TABLE 1 Socio-demographics characteristics of the sample.

Variables		Group	*N* (%)
Age			97 (100%)
M	20.5		
(SD)	(2.17)		
Gender		Male	44 (45.36%)
		Female	53 (54.63%)
Occupation		None	22 (22.68%)
		Student	6 (6.18%)
		Worker	67 (68.04%)
Misuse of alcohol		None	77 (79.38%)
		Yes	13 (13.40)
		Suspected	7 (7.22)
Misuse of substances		None	71 (73.19%)
		Yes	24 (24.74%)
		Suspected	2 (2.06%)
Previous contacts with child neuropsychiatry		Yes	45 (46.49%)
		None	52 (53.51%)
Familiarity with psychic disorder		Yes	46 (47.42%)
		None	51 (52.58%)

3. Results

The sample, aged 18–25 years with a mean age of 20.5 (SD = 2.17), was composed of 45.36% (=44) of males and 54.63% (=53) of females. Participants' demographic information is reported in Table 1 including habits in misusing alcohol and substances. Most of the sample had previous contact with Child Neuropsychiatry (=45) and familiarity with psychotic disorder (=46).

According to the SCID-5, the sample was divided into eight macro diagnostic categories: psychosis (=15), personality disorders (=32), bipolar disorder (=5), anxiety/depression (=27), substance/alcohol use disorders (=1), eating disorders (=2), trauma and stress-related disorders (=13), and dissociative identity disorder (=2). Pearson's Chi-square test was performed to analyze the evolution of the initial diagnosis over 12 months. As shown in Table 2, results revealed a significant association between the eight categories after 1 year ($\chi^2 = 45.04$; $p = 0.000$).

Participants were then analyzed for their levels of social and occupational functioning. Overall, the sample presented a moderate score for SOFAS (M = 60, SD = 13.43) with a minimum score of 20 and a maximum of 85. Differences in social and occupational functioning among the three groups (Not at risk, At Risk, Ultra High Risk) were explored with a one-way ANOVA. The results ($F(2, 94) = 9.068$; $p < 0.001$) and the Bonferroni Post-Hoc (Table 3) showed higher levels of social and occupational functioning in the Not at-risk group (M = 63.86) compared to the Ultra High Risk (M = 52.34) for $p = 0.004$, and At Risk (M = 63.72) groups for $p = 0.000$.

Finally, to investigate common trans-diagnostic personality traits (PID-5) between groups a MANOVA was required. A main effect in the three groups emerged for the PID-5 domains of detachment and disinhibition (Wilks's $\Lambda = 0.702$; $F = 3.478$; $\eta_{\text{partial}} = 0.162$, $p < 0.001$) as shown in Table 3. Negative affectivity and psychoticism were found to be significant on the Levene test and thus excluded from the investigation whereas antagonism was not significant in the Post-Hoc analysis. According to Bonferroni multiple comparison tests, significant differences were confirmed between groups for detachment [$F(2, 94) = 6.214$; $p = 0.003$; $\eta_{\text{partial}} = 117$] and disinhibition [$F(2, 94) = 4.215$; $p = 0.018$; $\eta_{\text{partial}} = 0.082$]. Specifically, the detachment was found to be higher in the group At Risk (M = 1.39) compared to that one Not at risk (M = 0.90) for $p = 0.003$, as well as disinhibition for which the group At Risk (M = 1.19) and Ultra High Risk (M = 1.24) reported higher scores in comparison to the Not at risk group (M = 0.91).

4. Discussion

Research on at risk mental states is a crucial field of investigation with implications for early intervention (Carrión et al., 2013; Kraan et al., 2017; van der Gaag et al., 2019; Joa et al., 2021). Studies have intensively focused on predictors of psychotic onset to minimize the likelihood of transition and improve social and occupational functioning.

For this reason, the current study's first aim was to explore the evolution of the initial diagnosis over 12 months among patients recruited and assigned to Not At risk, At Risk, and Ultra-High-Risk (UHR) groups. One year after the first assessment, the most prevalent category diagnoses were anxiety/depression, personality disorders, and psychosis in the total sample. Specifically, the most common diagnosis in the UHR group was psychosis (40.6%). This result is in line with Yung et al. (2003) who found that 40.8% of the high-risk youths had a psychotic onset after 1 year. One question that is currently unanswered is whether UHR/ARMS conditions – as they are currently conceptualized – should be considered exclusively as a risk condition for transition to psychosis (van Os and Guloksuz, 2017) or as a generic marker of vulnerability to different psychopathologies or even to progression to a generic deterioration in functioning, independent of other clinical disorders in comorbidity. As critically understated by van Os and Guloksuz (2017), perhaps multidimensional psychopathology at baseline in young help-seekers may predict several trajectories, one of which is the so-called transition to psychosis (Albert et al., 2018). Therefore, further studies on this topic, are undoubtedly needed. Moreover, it is possible that the number of transitions would have been greater whether, during the year, UHR patients had not received a psychological – or pharmacological, as required – intervention tailored to their needs (Yung et al., 2003, 2004).

Once the diagnostic categories most associated with high psychotic risk were established, differences in the level of social, occupational functioning, and personality traits were identified. Again, the lowest social and occupational functioning scores were found in the UHR group. Similar findings have been found in previous studies (Yung et al., 2004; Fusar-Poli, 2017; Radua et al., 2018). Specifically, the high-risk population presents a poor quality of life and impairment in social and occupational functioning (Yung and McGorry, 1996; Olvet et al., 2015; Fusar-Poli et al., 2016). These shortcomings are due to negative symptoms, disorganization, metacognitive deficits, and consequently an impaired Theory of Mind (Lin et al., 2012; Carrión et al., 2013; Yung et al., 2015; Kraan et al., 2017). Cotter et al. (2019) highlighted three potential factors that may influence the shortcomings which are (a) exposure to adverse life experiences, (b) the presence of positive and negative symptoms, and (c) cognitive dysfunction. The last two would directly impact social functioning; while having experienced adverse events would negatively affectivity, self-esteem, and self-efficacy, elements in themselves responsible for metacognitive defunctions, and self-stigmatizing attitudes, can reduce social functioning.

Concerning differences in PID-5 personality traits, the highest scores, in detachment and disinhibition, were found in At-risk and UHR groups.

Detachment was found to be a prevalent trait in people with psychotic risk (Meliante et al., 2021). It manifests as avoidance of emotions, social situations, interpersonal withdrawal, and anhedonia. This pattern is

TABLE 2 Diagnostic trajectories after 1year from the evaluation of risk for psychosis.

Variables	Not at risk	At risk	High risk	Total	*p*-Value
N	21	44	32	97	
%	21.65%	45.36%	32.98%	100%	
Primary diagnosis after 1 year					0.000[a]
Psychosis	0	2	13	15	
% On total sample	0%	2.1%	13.4%	15.5%	
% On group of risk	0%	4.5%	40.6%		
Personality disorders	7	11	14	32	
% On total sample	7.2%	11.34%	14.43%	32.97%	
% On group of risk	33.3%	25%	43.7%	100%	
Bipolar disorders	0	2	3	5	
% On the total sample	0%	2.1%	3.1%	5.1%	
% On the group of risk	0%	4.5%	9.4%		
Anxiety/Depression	10	15	2	27	
% On total sample	10.3%	15.5%	2.06%	27.8%	
% On group of risk	47.6%	34.1%	6.3%		
Substance/alcohol use disorders	0	1	0	1	
% On total sample	0%	1.0%	0%	1.0%	
% On group of risk	0%	2.3%	0%		
Eating disorders	0	2	0	2	
% On total sample	0%	2.1%	0%	2.1%	
% On group of risk	0%	4.5%	0%		
Trauma and stress related disorders	3	10	0	13	
% On total sample	3,1%	10.3%	0%	13.4%	
% On group of risk	14.3%	27.7%	0%		
Dissociative identity disorder	1	1	0	2	
% On total sample	1.0%	1.0%	0%	2.1%	
% On group of risk	4.7%	2.27%	0%		

[a]Pearson's Chi-square test.

consistent with widespread negative symptoms in psychotic risk patients (Freeman and Garety, 2014; Meliante et al., 2021). Moreover, according to research, avoidant behavior (expression of detachment) should be conceived as an attempt to manage positive symptoms by limiting disturbing external stimuli (Pallanti et al., 2000; McMillan et al., 2009). On this line, it is possible to hypothesize that these behaviors are directly involved in poor functioning and unsatisfactory quality of life (Cotter et al., 2019).

Individuals with high disinhibition traits engage in impulsive behaviors without thinking about possible future consequences (Krueger et al., 2012). The high scores, obtained by UHR patients in this dimension, were somehow expected and corroborates previous research (Yung et al., 2019; Hazan et al., 2020). In this regard, conscientiousness (the opposite of disinhibition) has been found to be negatively correlated with psychotic experiences (Shi et al., 2018). Personality traits, perhaps, in part, represent structural tendencies in the affectivity, cognition, and behavior of individuals that might elicit higher levels of stress, contribute to social isolation and reduce opportunities for disconfirmation of psychotic interpretation (Shi et al., 2018). Usually, high levels of disinhibition are common among patients diagnosed with borderline personality disorder (Boldrini et al., 2019; Longenecker et al., 2020). The result obtained in the current study could be explained in different ways. Recent research has focused on identifying the most prevalent personality disorders in high-risk patients, finding BPD as the most prevalent one (Ryan et al., 2017; Boldrini et al., 2019). High scores in disinhibition for UHRs can be explained by appealing to distractibility – one of the facets present in the disinhibition factor. It is known that UHR patients present difficulties in concentration, planning activities, and time management (Cotter et al., 2019), elements highly correlated with high levels of distractibility (Mukwevho, 2018).

To conclude the discussion on personality traits, remarks on negative affectivity, antagonism, and psychoticism are considered appropriate. No statistically significant differences were found between the groups for the traits. Previous studies – which have instead found a significant difference in the levels of negative affectivity – compared groups of patients with psychosis vs. psychiatric patients with different diagnoses, or patients at high psychotic risk vs. healthy controls (Uliaszek et al., 2015; Bastiaens et al., 2019). Thus, probably the lack of significance presented in the current study can be attributed to the type of groups compared. Antagonism is a personality domain not involved in psychotic risk (Fresán et al., 2015; van der Gaag et al., 2019). Regarding psychoticism, the results obtained confirmed those of Drvaric et al. (2018). Indeed, although psychoticism is defined as a set of unusual beliefs and experiences, eccentricity, and perceptual dysregulation (Krueger et al., 2012), no significant differences emerged between the groups. This could mean that psychoticism does not discriminate between psychotic and nonpsychotic patients (Longenecker et al., 2020) and it cannot be considered a trans-diagnostic trait that increases the psychotic risk (Bastiaens et al., 2019).

TABLE 3 Differences in individual characteristics.

Variables	Not at risk (0)	At risk (1)	High risk (2)	Total	*p*-Value	*Post hoc*
N	21	44	32	97		
Gender						
Male (%)	7 (33.3%)	16 (36.4%)	21 (65.6%)	44 (45.4%)	**0.019**[a]	
Female (%)	14 (26.4%)	28 (52.8%)	11 (20.8%)	53 (54.6%)		
School attended					**0.014**[a]	
None (%)	3 (12.5%)	7 (29.2%)	18 (58.3%)	28 (28.7%)		
College (%)	7 (21.2%)	17 (51.5)	9 (27.3)	33 (34%)		
University (%)	11(30.6%)	19 (52.8%)	6 (20.7%)	36 (37.1%)		
SOFAS	Mean (SD)					**(0) vs. (2) 0.004**
	63.86 (2.71)	63.72 (1.87)	52.34 (2.19)	60	**0.000**[b]	**(1) vs. (2) 0.000**
PID-5	Mean (SD)					
Detachment	0.90 (0.43)	1.39 (0.52)	1.19 (2.19)	97	**0.003**[c]	**(0) vs. (1) 0.002**
Disinhibition	0.91 (0.31)	1.19 (0.47)	1.24 (0.42)	97	**0.018**[c]	**(0) vs. (1) 0.045** **(0) vs. (1) 0.022**

Bold values significant is set at $p \leq 0.05$.

[a] Pearson's Chi-square test.

[b] ANOVA.

[c] MANOVA.

Although the results obtained can be considered promising, more studies would be needed. In this regard, Boldrini et al. (2020) identified through the SWAP-200 the following prototypical characteristics of patients at high risk for psychosis: avoidance of social relationships, suspiciousness, obsessive thoughts, lack of psychological insight, dysphoric and overwhelming feelings of anxiety and depression, strange and abnormal reasoning processes or perceptual experiences, symptoms of depersonalization and derealization, and negative symptoms of avolition, abulia, blunted affectivity, and impaired role functioning. In addition, as stated by Sevilla-Llewellyn-Jones et al. (2018) it is still not entirely clear to what extent personality may influence the development of psychosis. Personality profiles may not be markers of conversion to psychosis but contribute to high morbidity in individuals with CHR-P.

The study presents different limitations. First, the sample dimension is limited. Second, although the study is longitudinal, only two measures were included. Third, SCID-5 was only administrated during the assessment after 1 year. Moreover, the impact of Covid-19 was not evaluated. Lastly, only a self-report measure (PID-5) was used to assess personality traits. According to the results obtained in previous studies, future research should also include different instruments for personality assessment such as Shedler-Westen Assessment Procedure-200 (SWAP-200) and Millon Multiaxial Inventory (MCMI-III).

5. Conclusion

Results obtained by the current study should be considered a first attempt to better understand the diagnostic trajectories and trans-diagnostic personality traits in a group of young help-seekers, specifically in UHR. Findings have two main clinical implications: (a) Psychotherapy should focus specifically on maladaptive traits (b) Treatments for UHR should implement training aimed at improving social and occupational skills. All the traits and impairments identified in this clinical population are disabling during emerging adulthood, a stage of life in which succeeding well socially becomes critical to establishing oneself scholastically, occupationally, and above all, to enjoying satisfying interpersonal relationships (Velthorst et al., 2010).

To improve the clinical utility of psychosis classification systems, it is necessary to consider how symptoms may reflect dimensions of psychopathology that go beyond the boundaries of traditional diagnostic classifications (Longenecker et al., 2020).

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Niguarda Hospital in Milan's Ethical Committee (Protocol 305-19052021). The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Corrigendum: Personality traits and transition to psychosis one year after the first assessment

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A corrigendum on
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In the published article, five authors' names were written incorrectly, with first name and surname in the wrong order. Instead of "Malvini Lara, Barbera Simona, Tagliabue Sofia, Percudani Mauro and Oasi Osmano," the names should be written as "Lara Malvini, Simona Barbera, Sofia Tagliabue, Mauro Percudani and Osmano Oasi." All relevant parts of the original article have been updated.

Additionally, in the published article, there was an error in the text. "Person correlation" was written instead of "Pearson's Chi-Square Test."

A correction has been made to **2. Materials and methods**, "*2.4. Statistical analysis*," paragraph 3. The corrected paragraph is shown below.

"Firstly, Pearson's Chi-Square Test was conducted to investigate the development of psychotic risk in the sample exploring the evolution of the initial diagnosis over 12 months among patients recruited and assigned to three groups (Not at risk, At Risk, Ultra High Risk). Differences in social and occupational functioning (considering SOFAS scores), among the groups, were then explored by conducting a One-way ANOVA. Finally, a MANOVA was used to investigate common trans-diagnostic personality traits (PID-5) of psychotic risk groups. Both ANOVA and MANOVA Bonferroni multiple comparison tests were led. Analyses were performed using SPSS 25.0 statistical software."

The authors apologize for these errors and state that they do not change the scientific conclusions of the article in any way. The original article has been updated.

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Rethinking the risk for depression using the RDoC: A psychophysiological perspective

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Considering that the classical categorical approach to mental disorders does not allow a clear identification of at-risk conditions, the dimensional approach provided by the Research Domain Criteria (RDoC) is useful in the exploration of vulnerability to psychopathology. In the RDoC era, psychophysiological models have an important role in the reconceptualization of mental disorders. Indeed, progress in the study of depression vulnerability has increasingly been informed by psychophysiological models. By adopting an RDoC lens, this narrative review focuses on how psychophysiological models can be used to advance our knowledge of the pathophysiological mechanisms underlying depression vulnerability. Findings from psychophysiological research that explored multiple RDoC domains in populations at-risk for depression are reviewed and discussed. Future directions for the application of psychophysiological research in reaching a more complete understanding of depression vulnerability and, ultimately, improving clinical utility, are presented.

KEYWORDS

depression vulnerability, psychophysiology, research domain criteria, emotion, risk for psychiatric disorder

1. Introduction

Major depressive disorder (MDD) is a mood disorder that affects psychological and physiological functioning causing an elevated functional impairment and represents a leading cause of disease burden worldwide (World Health Organization, 2017). Symptoms of MDD include depressive mood, anhedonia, appetite changes, sleep disturbances, apathy, psychomotor retardation or agitation, lack of energy, excessive guilt and worthlessness, poor concentration, and suicidal thoughts. According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5), MDD is defined by the presence of five or more of these symptoms, one of which must be depressed mood or anhedonia causing social and/or occupational impairment. With these criteria, there are 227 possible combinations of symptoms for an MDD diagnosis (Zimmerman et al., 2015). Hence, a few underlying factors may give rise to very different sets of symptoms.

Given the pervasive nature of MDD, improving the early identification of depression risk, and developing strategies to prevent the onset of full-blown depression is a core priority (Wahlbeck and Mäkinen, 2008). For prevention efforts to succeed, it is necessary to identify people at risk early and, ideally, before they become ill. Studying individuals who currently have depression prevents assumptions about whether the observed conditions represent mere correlates of depressive states or reliable markers of its risk. Hence, in the field of clinical psychobiology, researchers are shifting their focus to the study of biomarkers that characterize individuals that have a greater risk to develop a full-blown depressive episode. One reliable risk condition is a parental history of MDD: indeed, adolescents with a parental history of depression are 3–5 times more likely to develop depression themselves (Gottesman and Gould, 2003; Goodman et al., 2011). Other at-risk conditions include individuals with dysphoria, a condition characterized by subclinical depressive symptoms. Last, individuals with past depression but currently free from clinical symptoms represent a risk condition of having a recurrence of the disorder (Michelini et al., 2021). These three conditions (i.e., parental history of MDD, dysphoria, and past depression) are more vulnerable to the development or recurrence of a full-blown depressive episode than the general population, thus representing target conditions to the study of psychobiological markers of MDD (Hardeveld et al., 2010; Laborde-Lahoz et al., 2015). Another way to identify psychobiological markers of a disorder is to conduct longitudinal studies predicting future psychopathology (Raulin and Lilienfeld, 2009). Some researchers have focused on the prevention of MDD by targeting these at-risk conditions with universal psychological treatments and findings have been promising but rather mixed (e.g., Horowitz and Garber, 2006; Brunwasser and Garber, 2016). Efforts to advance effective prevention and treatment strategies might be hindered by our relatively limited understanding of mechanisms implicated in the development and maintenance of depression.

Considering that the “categorical-polythetic” approach provided by the DSM-5 may not allow a clear identification of all at-risk conditions, a viable way to improve our knowledge of the pathophysiological mechanisms linked to depression is to move beyond this approach and, instead, adopt a dimensional approach (Cuthbert and Insel, 2013; Weinberg, 2023). In this context, the National Institute of Mental Health (NIMH) launched the Research Domain Criteria (RDoC) project, which aims at linking biological and physiological mechanisms to clinical phenomena to generate empirically derived, psychobiological markers of psychopathology (Insel et al., 2010; Cuthbert and Insel, 2013). The RDoC assumes that mental disorders are multidimensional disorders observable at different levels of analysis (e.g., from genetics to behavior). The RDoC matrix is rooted in a dimensional approach to mental health and includes six domains: Positive Valence Systems, Negative Valence Systems, Arousal/Regulatory Systems, Cognitive Systems, Sensorimotor Systems, and Systems for Social Processes. The columns of the matrix include the different units of analysis: genes, molecules, cells, circuits, physiology, behavior, and self-report along dimensional neuro-environmental trajectories. The underlying principle is that by integrating different levels of analysis along these dimensions, the RDoC approach will also contribute to the advancement of our understanding of vulnerability to psychopathology (Dillon et al., 2014). Therefore, RDoC dimensions and constructs should not only be considered as a correlate of psychopathology but also of increased vulnerability. To determine whether dysfunctions within RDoC components relate to future psychopathology, conducting studies based on at-risk categories is warranted.

In the “RDoC era,” psychophysiological models have an important role in the reconceptualization of mental disorders and their vulnerability (Shankman and Gorka, 2015). Indeed, psychophysiological studies have highly contributed to the development and refinement of each RDoC dimension for numerous psychopathological conditions. Psychophysiological models cover multiple levels of analysis of constructs of the RDoC (e.g., neural, autonomic, and psychological; Kujawa and Burkhouse, 2017). In addition, psychophysiological measures have several methodological advantages, such as they are non-invasive, well-tolerated, relatively economical biological measures, and can be used in early infancy through old age. In the present narrative review, studies that have employed a wide array of psychophysiological measures for the investigation of RDoC dimensions in at-risk samples will be described. Ultimately, this review emphasizes the relevance that psychophysiology is playing in the refinement of the RDoC matrix in the context of depression risk.

Regarding the methods for studies selection employed in the current narrative review, the focus was on central (event-related potentials, spectral and time-frequency measures, and the startle eyeblink reflex), peripheral (cardiovascular activity and skin conductance) psychophysiological level of analysis as well as other measures related to specific RDoC domains (e.g., pupillometry, cortisol levels, actigraphy). This narrative review includes studies spanning all age groups, but significant attention is posed to studies on childhood and adolescence as they represent vulnerable windows to the development of psychopathology (Jaffee et al., 2002).

2. The positive valence systems

The Positive Valence Systems (PVS) are a set of systems involved in anticipating, obtaining, and responding to pleasant or rewarding stimuli (Olino, 2016). Reduced PVS functioning in depression has been evidenced by multiple units of analysis (e.g., self-report, behavioral, and psychophysiological units; McFarland and Klein, 2009; Treadway and Zald, 2011; Treadway et al., 2012; Liu et al., 2014; Hajcak Proudfit, 2015; Nusslock and Alloy, 2017). Indeed, depression is characterized by reduced positive affect, anhedonia, impaired motivational disposition, and reward insensitivity, which could also represent risk factors for the disorder. Indeed, interest has increasingly turned to insensitivity to pleasant or rewarding content as a putative risk factor that precedes depression and may represent a mechanism for the disorder (Kujawa and Burkhouse, 2017; Weinberg, 2023).

2.1. Event-related potentials

At the psychophysiological level, deficits in the approach-related brain system can be assessed by measuring neural responses to pleasant or rewarding stimuli through the computation of electroencephalographic (EEG) event-related potentials (ERPs) during specific tasks. For example, the Late Positive Potential (LPP), a positive sustained centroparietal component that begins around 300 ms after stimulus onset, has been found to be particularly important for the study of affective processing. The LPP is often investigated through affective picture viewing paradigms, and it is larger to emotionally arousing (pleasant and unpleasant) relative to neutral stimuli (images of scenes, faces, or words, e.g., Palomba et al., 1997; Cuthbert et al., 2000; Schupp et al., 2007; Dell'Acqua et al., 2022c). Reduced LPP to pleasant stimuli is considered a marker of clinical depression in adults (Grunewald et al., 2019; Klawohn et al., 2021a; for a review see Hajcak Proudfit, 2015) and children (Whalen et al., 2020). Moreover, there is some evidence that the altered LPP may precede the development of the disorder. For instance, reduced LPP amplitude to pleasant pictures has been observed in adults with dysphoria (Benning and Ait Oumeziane, 2017; Moretta et al., 2021), in adults and children with a parental history of depression (Kujawa et al., 2012; Nelson et al., 2015; Moretta and Messerotti Benvenuti, under review[1]), in adults with remitted depression (Allison et al., 2021), and to prospectively predict depression onset (Levinson

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[1] Moretta, T., and Messerotti Benvenuti, S. (under review). Emotional processing in individuals with familial risk for depression: an ERP and cardiac deceleration study.

et al., 2018; Sandre et al., 2019). Specifically, regarding the parental risk for depression, Kujawa et al. (2012) found that even preschool children with a maternal history of depression, but no depressive symptoms, had a reduced LPP to pleasant images relative to controls.

Another ERP component that has been robustly observed to be reduced in depression is reward positivity (RewP, previously referred to as feedback negativity, see Hajcak Proudfit, 2015), a positive feedback-locked frontocentral deflection occurring ~250 ms following the receipt of a reward relative to loss feedback in simple gambling tasks. The RewP represents a valuable and reliable index of reward responsiveness (Hajcak Proudfit, 2015) and there is strong evidence for considering blunted RewP as a vulnerability marker of depression (Kujawa and Burkhouse, 2017). A blunted RewP has been observed in adults and children with a parental history of depression (Foti et al., 2011; Kujawa et al., 2014a,b; Kujawa et al., 2019), siblings with depressive symptoms (Weinberg et al., 2015b), remitted depression (Whitton et al., 2016; Weinberg and Shankman, 2017), and to prospectively predict the first onset of a depressive disorder in adolescent girls with no lifetime depression (Bress et al., 2013; Nelson et al., 2016; Michelini et al., 2021; Burani et al., 2021c). A study that included a large sample of never-depressed adolescent girls reported that reduced RewP amplitude was cross-sectionally related to baseline subclinical depressive symptoms and parental depression history and longitudinally predicted first-onset depressive disorder (Nelson et al., 2016). Moreover, Burani et al. (2021c) showed how a blunted RewP and maternal suicidal thoughts and/or behaviors predicted the onset of depressive symptoms at a 1-year follow-up in a sample of adolescent girls. Notably, within a group of adults with clinical depression, the LPP to pleasant images and RewP predicted a remission status 9 months following the assessment, whereby larger potentials were associated with a higher probability of remission, relative to those that had lower ERPs values (Klawohn et al., 2021b). The reviewed literature suggests that the LPP and the RewP, two distinct measures of neural sensitivity to appetitive cues, might represent early emerging markers of depression vulnerability.

2.2. Alpha asymmetry and EEG time-frequency measures

Other studies have examined EEG frequency bands related to approach motivation. A well-established index of affective disposition is frontal asymmetric alpha activity (Davidson, 1998), considered to be inversely related to the level of cortical activation, and an EEG marker of positive affect (Gable et al., 2021). Depression has been associated with an asymmetric pattern of resting-state alpha activity characterized by increased alpha in the left frontal cortex compared to the right, possibly reflecting the hypoactivation of approach-related motivation (Allen et al., 2004; but see also Van Der Vinne et al., 2017). Reduced resting-state left relative to right frontal EEG activity has been observed in unaffected offspring of individuals with MDD (Dawson et al., 1997), and prospectively predicted the onset of depression (Pössel et al., 2008; Nusslock et al., 2011). To date, only a few studies have examined alpha asymmetry during emotional processing in at-risk samples. A study observed reduced left frontal EEG activation (i.e., greater left alpha) to both happy and sad clips in children with a parental history of depression, suggesting that at-risk individuals might have reduced approach motivation during the viewing of all affective cues (Feng et al., 2012; Lopez-Duran et al., 2012). Similarly, individuals with a parental history of MDD showed greater left relative to right frontal EEG alpha activity during a reward-based laboratory task (Nelson et al., 2013). Furthermore, Mennella et al. (2015) found that young adults with, but not without, dysphoria showed reduced alpha desynchronization in the left relative to right anterior sites during an emotional imagery task of pleasant, neutral, and unpleasant narratives, indicating an overall blunted motivation in this at-risk condition. Most of the studies have analyzed alpha activity only at anterior scalp sites, but a smaller alpha desynchronization (i.e., greater alpha) in frontal and right centro-parietal regions to pleasant images was recently found in dysphoria (Messerotti Benvenuti et al., 2019). Given that right parietal activity reflects arousal (Bruder et al., 2005; Stewart et al., 2011), these results were interpreted as an under-engagement of the approach-related motivational system in individuals with dysphoria. Alpha asymmetry during the engagement in emotional tasks remains to be fully explored in depression vulnerability.

Considering the limited and mixed evidence regarding alpha asymmetry in the study of approach motivation in at-risk samples, research has explored other time-frequency correlates of affective processing of pleasant/rewarding stimuli. Delta oscillations are of particular interest as they appear to have a functional role in monitoring the motivational relevance of affective cues and in the identification of pleasant/rewarding stimuli that are generated by subcortical regions involved in the reward system (Knyazev, 2007, 2012; Foti et al., 2015). Blunted delta power to pleasant or rewarding stimuli, which was associated with clinical depression (Foti et al., 2015; Dell'Acqua et al., 2022d), has been observed in individuals with dysphoria (Dell'Acqua et al., 2022a) and to prospectively predict first-onset depressive disorder in a sample of never-depressed adolescent girls at an 18-month follow-up (Nelson et al., 2018). Moreover, Ethridge et al. (2021) explored the intergenerational concordance of delta power to rewards in women with a history of depression and their daughters and found that there was a positive relationship between offspring and mothers' delta power to rewards. Additionally, they found that having a mother with depression altered the typical increase in reward sensitivity seen during pubertal development, thereby interfering with neural development during this critical period (Ethridge et al., 2021).

2.3. Startle eyeblink reflex

Although most psychophysiological contributions to the study of the PVS in depression vulnerability come from EEG studies, other psychophysiological indices have also been useful in exploring this relation. For example, the startle eyeblink reflex consisting of the rapid evoked contraction of the *orbicularis oculi* muscle represents a measure of affective modulation when the startle probe is presented during affective processing mostly 500 ms after the beginning of the presentation of an emotional stimulus. Specifically, the reflex is potentiated during unpleasant affective states and inhibited during pleasant affective states (e.g., Bradley et al., 1999). The absence of startle attenuation to pleasant images, documented in depression (e.g., Dichter and Tomarken, 2008; see Boecker and Pauli, 2019), indicates reduced approach motivation and has also been documented in dysphoria (Mneimne et al., 2008) and in individuals with past but recurrent depression (Vaidyanathan et al., 2014).

2.4. Peripheral psychophysiology: Cardiovascular activity and skin conductance

Autonomic nervous system (ANS) changes are measures associated with both affective processing and arousal/metabolic requirements of emotional responding. Cardiac autonomic modulation, as the heart is dually innervated by the two branches of the autonomic nervous systems, can be detected by measuring heart rate that mirrors the sympathetic (acceleration) and parasympathetic (deceleration) nervous systems (Berntson et al., 1993). During active emotional tasks (e.g., imagery, public speaking) vagal withdrawal (i.e., cardiac acceleration) is considered a pattern of autonomic flexibility to respond to stimuli in the environment (Porges, 1997). Cardiac autonomic balance can also, and mostly, be measured through heart rate variability (HRV), a measure of beat-to-beat variation in the heart over time that reflects the balance between the two ANS branches on the heart (Task Force of the European Society of Cardiology and the North American Society for Pacing and Electrophysiology, 1996). Reduced HRV reflects reduced cardiac vagal inhibitory control and has been observed in response to pleasant and unpleasant emotions during active tasks (i.e., imagery, recall of events) in healthy individuals (e.g., Marci et al., 2007; Kreibig, 2010). Individuals with dysphoria showed reduced heart rate increases and less HRV reductions, which reflect inadequate cardiac vagal control, during the imagery of pleasant, but not unpleasant or neutral, scripts relative to controls (Messerotti Benvenuti et al., 2015). In addition, reduced skin conductance response, a measure of the activity of sympathetic cholinergic neurons at the level of eccrine dermal sweat glands (Venables and Christie, 1980), to pleasant stimuli (but also unpleasant) has been shown in individuals with dysphoria relative to a control group (Benning and Ait Oumeziane, 2017; De Zorzi et al., 2021).

2.5. Interim conclusion

Taken together, the reviewed psychophysiological findings provide consistent support for a lack of sensitivity to pleasant and rewarding stimuli in vulnerability to depression. More integrative research is needed to clarify which of these measures might be more useful in the early identification of MDD as well as whether they could be leveraged together to improve clinical utility in at-risk samples.

3. The negative valence systems

The Negative Valence Systems (NVS) encompass five constructs related to responses to aversive stimuli or events. These constructs include responses to acute threat, potential threat, sustained threat, loss, and frustrative non-reward. Compared to the PVS, data on the reactivity to unpleasant stimuli in depression and vulnerability to depression have been extensively produced in several (and different) research areas and therefore the findings are rather mixed and sometimes even unable to show any significant effect (for a meta-analysis and a review on psychophysiological studies on emotional reactivity see Bylsma et al., 2008 and Bylsma, 2021). Initial theories suggested that depression would be characterized by an increased reactivity to unpleasant emotional stimuli based on the idea that individuals' background affective state would prime reactivity to a stimulus of matching valence (Rosenberg, 1998; Rottenberg, 2017). Cognitive theories of depression (Beck and Bredemeier, 2016) seem to have a similar hypothesis: negative cognitive schemas guide preferential processing of negative stimuli which, in turn, lead to enhanced attention and intake of these cues. For instance, in support of this claim, individuals with dysphoria, but not controls, repeatedly showed a prolonged cardiac deceleration during passive viewing of unpleasant stimuli as compared with neutral ones, suggesting a sustained intake of unpleasant cues and a mood-related bias in this at-risk group (Messerotti Benvenuti et al., 2020; Moretta et al., 2021). Additionally, children of mothers with MDD showed greater physiological reactivity, indexed by pupil dilation, to sad, but not happy or neutral faces compared to children of non-depressed mothers (Burkhouse et al., 2014). However, the greater processing of unpleasant images observed in dysphoria does not seem to lead to greater action preparation and reactivity. Indeed, from most research using both passive and active tasks and different psychophysiological measures, depression appears to be mostly characterized by a reduced emotional reactivity to unpleasant stimuli (Foti et al., 2010; MacNamara et al., 2016; Hill et al., 2019; for a review see Bylsma, 2021). The lack of reactivity to unpleasant contents is in line with the emotion context insensitivity hypothesis (ECI; Rottenberg et al., 2005; Bylsma et al., 2008; Bylsma, 2021), which suggests that depression might be characterized by an overall blunted emotional reactivity, with reduced psychophysiological responses to all affective cues.

3.1. Event-related potentials

In support of the ECI model in depression risk, studies on the LPP during affective picture processing have also observed reduced LPP to unpleasant images in dysphoria relative to a control group (Benning and Ait Oumeziane, 2017; Grunewald et al., 2019), although some studies failed to find this effect (Moretta et al., 2021). Besides, the offspring of parents with a history of MDD had a reduced LPP to unpleasant faces and scenes compared to a control group (Kujawa et al., 2012; Nelson et al., 2015; Moretta and Messerotti Benvenuti, under review[1]). Importantly, in a large longitudinal study (Michelini et al., 2021), blunted LPP to unpleasant stimuli was one of the main predictors of fist-onset depressive disorder over a period of 3 years. However, findings are rather mixed as other studies linked maternal risk for MDD with enhanced LPP to unpleasant images (Speed et al., 2016).

Another way to examine the Negative Valence System is to assess EEG responses to the commission of an error (i.e., error monitoring). Indeed, making a mistake is generally perceived as subjectively unpleasant and, at times, it can be perilous and threatening to one's life (Weinberg et al., 2016). A specific physiological measure of error monitoring is EEG error-related negativity (ERN), which arises as a negative electrocortical deflection in the ERP at frontocentral scalp sites within 100 ms following the commission of an error vs. a correct response (Gehring et al., 1995). The ERN has been mostly employed in the study of anxiety disorders (e.g., Meyer et al., 2018a), but there is some evidence that the ERN is blunted in adults and children with clinical depression (Ruchsow et al., 2004, 2006; Schrijvers et al., 2008; Weinberg et al., 2015c; Dell'Acqua et al., 2023) and depression risk (Meyer et al., 2018b; Tabachnick et al., 2018). For instance, Meyer and colleagues reported that the offspring of women with recurrent MDD had a reduced ERN relative to a control group, even when accounting for maternal anxiety (Meyer et al., 2018b). Another study showed that subclinical depressive symptoms were linked to blunted ERN in children involved with Child Protective Services (Tabachnick et al., 2018). However, other studies reported greater ERN in clinical depression (Chiu and Deldin, 2007; Holmes and Pizzagalli, 2010). Although these results are promising, more research on multiple at-risk populations is needed to clarify whether a blunted ERN can be considered a psychobiological marker of depression.

3.2. Startle eyeblink reflex

Other evidence comes from studies on the startle reflex measured at the *orbicularis oculi* muscle during exposure to emotional cues, which have reported reduced startle potentiation to unpleasant stimuli in individuals with dysphoria (Messerotti Benvenuti et al., 2020) but also enhance startle potentiation in individuals with past but recurrent depression (Vaidyanathan et al., 2014), suggesting that risk may not be equivalent in remitted individuals.

3.3. Skin conductance

As noted above in the PVS section, reduced skin conductance during the viewing of all emotional stimuli in individuals with dysphoria relative to a control group was reported (Benning and Ait Oumeziane, 2017). However, while reduced reactivity to unpleasant cues in affective processing tasks may represent a psychobiological marker of depression, greater skin conductance during sad mood induction and recovery were observed in the offspring of mothers with depression relative to a control group (Daches et al., 2020).

3.4. Interim conclusion

Taken together, the literature examining the NVS functioning in depression risk is mostly inconsistent and this might be due to several reasons, including cross-study differences in tasks and types of stimuli used, and/or the presence of comorbid anxiety symptoms (for reviews, see Weinberg et al., 2015a; Dickey et al., 2021). Although the role of NVS functioning in vulnerability to depression is not definite, many reviewed psychophysiological studies on emotional reactivity in at-risk samples suggest that vulnerability might be related to blunted responses to unpleasant stimuli, indicating a general pattern of blunted motivation in accordance with the ECI model.

4. The arousal and regulatory systems

The DSM-5 criteria for MDD include physical alterations, such as fatigue, sleep disturbances, and appetite changes. Beyond these three bodily symptoms, no other physical symptom is mentioned. However, other somatic symptoms are prevalent in individuals with depression, including headaches, musculoskeletal symptoms, palpitations, and upset stomach (Breslau et al., 2000; Vaccarino A. L. et al., 2008). Arousal might have a primary role in the somatic and neurovegetative symptoms experienced by individuals with depression and they can be ascribable to the Arousal and Regulatory Systems (ARS) of the RDoC (Gunzler et al., 2020). Somatic symptoms of depression are associated with longer disease duration, greater disability, poorer clinical outcomes, and elevated healthcare costs (Vaccarino A. L. et al., 2008; Vaccarino V. et al., 2008). These somatic consequences could partly be due to metabolic, immuno-inflammatory, autonomic, and hypothalamic–pituitary–adrenal axis (HPA) imbalances which can also reflect an altered psychoneurimmumological interaction. These imbalances are often present among MDD patients (Penninx et al., 2013) and they can increase the risk of developing cardiovascular diseases, metabolic syndromes, and overall immune system deterioration (Wolkowitz et al., 2011).

4.1. Sleep quality: EEG and actigraphy

Circadian rhythm alterations, such as sleep problems and insomnia, are not only a correlate of MDD but accumulating evidence suggests that they may represent a biomarker of the disorder (Modell and Lauer, 2007; Wiebe et al., 2012). Sleep disturbances are also a typical residual symptom following remission from depression (Carney et al., 2007). For instance, fragmented REM sleep assessed with the EEG (e.g., reduced sleep spindles, shorter latencies to REM, longer REM), was related to subclinical depressive symptoms (Pesonen et al., 2019), was observed in remitted individuals (Jindal et al., 2002), in adolescents and adults with a parental history of MDD (Lopez et al., 2010; Bat-Pitault et al., 2013), and was predictive of depression onset in at-risk adolescents (Rao et al., 2009). Moreover, reduced sleep quality, as assessed by self-report and actigraphy measures, was reported in adolescents with a parental history of MDD (Chen et al., 2012; Wescott et al., 2019), and to prospectively predict depressive symptoms in adolescents (Bei et al., 2015). Notably, altered sleep structure, as assessed with actigraphy and EEG, was observed even in infants born from depressed mothers, suggesting that even the prenatal environment could promote depression vulnerability of the child (Armitage et al., 2009; Bat-Pitault et al., 2017). Other researchers have looked at EEG vigilance and arousal and reported reduced arousal, as indexed by greater posterior resting alpha power in individuals with a parental history of MDD (Bruder et al., 2012).

4.2. Peripheral psychophysiology: Cardiovascular activity and skin conductance

Vulnerability to depression has also been related to autonomic unbalances, such as increased heart rate and reduced HRV in resting conditions (in depression: Kemp et al., 2010; Koch et al., 2019; with dysphoria, familial risk, and remitted; Vaccarino V. et al., 2008; Dell'Acqua et al., 2020; Moretta and Messerotti Benvenuti, 2022). Reduced resting HRV in a wide array of at-risk samples suggests that decreased cardiac autonomic balance might serve as an early marker of depression vulnerability. Moreover, a multi-wave study on a large sample of university students showed that a smaller decrease in respiratory sinus arrhythmia (RSA, a measure of vagal activity) and greater increases in heart rate in response to sad clips predicted greater depressive symptoms when individuals encountered negative life events, perhaps due to attenuated self-regulatory abilities (Stange et al., 2017). A reduced cardiac autonomic balance, as indexed by greater parasympathetic activation (reduced decreases in HRV) and sympathetic withdrawal (reduced pre-ejection period), during psychological (e.g., unsolvable puzzle) and physical challenges (e.g., handgrip), was also observed in youths with past depression relative to a control group (Bylsma et al., 2015). Conversely, while individuals with MDD showed blunted RSA and reduced heart rate increase to stress tasks (i.e., cold pressor and speech task), those in remission did not show the same pattern (Salomon et al., 2013; Bylsma et al., 2014), suggesting that the lack of withdrawal of parasympathetic control during stress might be state-dependent and not a putative risk factor of MDD in remitted individuals.

Another psychophysiological measure related to autonomic activity is skin conductance. As previously described, skin conductance mirrors exclusively the sympathetic nervous system activity. Accordingly, during the viewing of pleasant and unpleasant pictures, healthy individuals showed comparable skin conductance responses to similarly arousing stimuli, both pleasant and unpleasant, relative to neutral ones. Instead, individuals with subclinical depression showed reduced skin conductance to all emotional stimuli, supporting both the hypothesis of reduced functioning of the Arousal and Regulatory Systems, as well as the PVS and NVS domains (Benning and Ait Oumeziane, 2017). Similarly, reduced skin conductance response was reported in individuals with depression during a mental arithmetic task (Kim et al., 2019) and in individuals with dysphoria during a public speaking task (Schwerdtfeger and Rosenkaimer, 2011). Additionally, even unaffected offspring of chronically depressed mothers showed reduced skin conductance to stressful situations (i.e., arguments between adults; Cummings et al., 2007).

4.3. Cortisol levels

Another measure related to the Arousal and Regulatory domain is cortisol, the main stress hormone that reflects HPA functioning and that has been widely used in the study of neuroendocrine and dysfunctions in MDD (Lopez-Duran et al., 2009; Herbert, 2013). Individuals with depression have been shown to have elevated morning cortisol (e.g., Michael et al., 2000) and a greater cortisol awakening response (CAR; e.g., Bhagwagar et al., 2005; Vreeburg et al., 2009; but see also Huber et al., 2006). Interestingly, increased morning cortisol (e.g., Young et al., 2006; Dougherty et al., 2009) and CAR (e.g., Vreeburg et al., 2010; Nederhof et al., 2015) have been found in never-depressed offspring of parents with a depressive disorder. Moreover, higher CAR cortisol levels were reported in adolescents who subsequently developed a major depressive episode in the following year (Goodyer et al., 2000; Adam et al., 2010; Vrshek-Schallhorn et al., 2013). Collectively, these findings suggest that vulnerability to depression may be related to a hyperactive HPA, mostly in relation to its circadian rhythm (morning cortisol and CAR). The increased activity of the HPA axis is thought to be mostly related to reduced inhibition by endogenous glucocorticoids in the synthesis and release of the adrenocorticotrophic hormone-releasing factor in the paraventricular nucleus and adrenocorticotrophic hormone in the pituitary (Pariante and Lightman, 2008). Regarding cortisol reactivity to a stressor, a relatively blunted cortisol stress reactivity even when controlling for baseline measures was repeatedly observed in MDD (Burke et al., 2005; Harkness et al., 2011). However, whether a blunted cortisol stress reactivity represents a psychobiological marker of depression is rather unclear, but some studies reported reduced cortisol reactivity to stressors in adults and children with dysphoria (de Rooij et al., 2010; Hankin et al., 2010; Suzuki et al., 2013), those with a familial risk for depression (Morris et al., 2017), and in individuals in remission (Morris et al., 2014; but see also Morris et al., 2012; Höhne et al., 2014). However, to our knowledge, cortisol stress reactivity has not been examined in individuals with a parental risk for depression, and whether depression risk relates to blunted cortisol reactivity should be further explored.

4.4. Interim conclusion

Collectively, vulnerability to depression seems to be characterized by alterations of the Arousal and Regulatory Systems, such as sleep disturbances and autonomic unbalances in resting and stress-related conditions. As supported by studies on heart rate and cortisol, individuals at-risk for depression seem to be characterized by somatic heightened activation in resting conditions. Studies that assessed cardiovascular reactivity, skin conductance, and cortisol changes to pleasant and unpleasant stimuli (i.e., images, stressors) suggest that at-risk samples might have reduced physiological arousal when mobilization is required. These results emphasize that the Arousal and Regulatory Systems support the affective systems in the PVS and NVS domains and are consistent with the ECI hypothesis of a blunted emotional reactivity (Bylsma et al., 2008; Bylsma, 2021).

5. The cognitive systems

In addition to affective and somatic symptoms, cognitive symptoms have been widely reported in individuals with depression. One of the DSM-5 criteria for depression is, indeed, a diminished ability to think, concentrate, or make decisions (American Psychiatric Association, 2013). Cognitive dysfunctions in depression include impairments in cognitive control. Studies have reported that individuals with depressive symptoms show reduced sustained and divided attention (McClintock et al., 2010), overgeneralized declarative memory (Zhou et al., 2017), reduced cognitive flexibility, set-shifting, planning, and updating (Dotson et al., 2020; Dell'Acqua et al., 2022b). These deficits align with the Cognitive Systems domain of the RDoC, which includes constructs of Attention, Perception, Declarative Memory, Language, Cognitive Control, and Working Memory (Insel et al., 2010; Cuthbert and Insel, 2013). Cognitive control deficits have emerged as one of the potential behavioral endophenotypes of depression (Webb et al., 2016). Indeed, cognitive control deficits often persist in remitted individuals (Snyder, 2013), are a stable and reliable characteristic (Sarapas et al., 2012), and showed moderate-to-high heritability (Friedman et al., 2008). In addition, there is some evidence of cognitive control impairments in healthy, unaffected twins at risk for MDD (Christensen et al., 2006).

5.1. Event-related potentials

Besides, impairments in the Cognitive Systems are strictly related to the PVS and NVS domains. For instance, numerous studies have investigated cognitive control in affective contexts in relation to depressive symptoms (e.g., Koster et al., 2011; Joormann and Vanderlind, 2014). Although most research on cognitive control typically focuses on behavioral measures, such as reaction times in various tasks (e.g., Go/No-Go, Stroop; Kertz et al., 2019), some studies have explored the electrocortical correlates of cognitive processing in emotional contexts in depression and individuals vulnerable to depression. A task that has been broadly used is the Emotional Go/No-Go. For example, an enhanced No-Go P300 to negative relative to positive faces was positively correlated with depressive symptoms (Zhang et al., 2016) and was observed in individuals with dysphoria but not in controls (Krompinger and Simons, 2009), suggesting that greater processing resources were needed to inhibit the motor response during the presentation of unpleasant stimuli. Indeed, the P300 is an ERP related to attentional processing and resource allocation (Gray et al., 2004). Similarly, in an oddball paradigm, individuals with dysphoria and remitted depression, but not controls, showed greater P300 following sad relative to happy target faces, suggesting that these samples showed more attentional bias to these stimuli (Bistricky et al., 2014). These initial ERPs findings suggest that a mood-related bias may characterize vulnerability to depression when a cognitive effort is required. Contrariwise, Messerotti Benvenuti et al. (2017) showed a reduced Go/No-Go effect for P3 and delta power in response to pleasant and neutral, but not unpleasant, stimuli in individuals with dysphoria relative to non-dysphoric individuals. These findings suggest that individuals with dysphoria need a reduced and/or less effortful response inhibition to pleasant stimuli, supporting the hypothesis of reduced PVS activity. Evidence for reduced attention to pleasant stimuli comes also from eye-tracking studies, which have shown that individuals with past depression and those with dysphoria spent less time attending to pleasant, but not unpleasant images relative to controls (Sears et al., 2010, 2011).

Another electrocortical measure of cognitive control is the ERN, an event-related potential discussed within the NVS domain. Indeed, the ERN does not only reflect sensitivity to an endogenous threat (i.e., commission of an error) but it is also implicated in cognitive control abilities, namely the ability to rapidly detect errors and adaptively regulate actions in a dynamic environment (Weinberg et al., 2016). Some models on the ERN suggest that this measure acts as an early warning signal following the commission of an error evaluating the need to raise cognitive control resources allocated to the task (Weinberg et al., 2016). As previously described, the literature on the ERN in depression and its risk is still conflicting, with studies evidencing reduced (Ruchsow et al., 2004, 2006; Schrijvers et al., 2008; Weinberg et al., 2015a; Meyer et al., 2018b; Tabachnick et al., 2018;Dell'Acqua et al., 2023) or greater ERN (Chiu and Deldin, 2007; Holmes and Pizzagalli, 2010) in these groups.

5.2. Interim conclusion

Collectively, from the reviewed studies, the interaction between cognition and the PVS and NVS in determining depression vulnerability becomes evident. Particularly, individuals at-risk for depression seem to have inhibition difficulties of unpleasant stimuli and facilitation of pleasant ones. Taken together, psychophysiological research on cognitive dysfunctions and the interference of emotion on cognitive processing in at-risk populations is still in its infancy and more studies with more heterogeneous paradigms are needed to further identify psychophysiological markers related to the Cognitive Systems of depression vulnerability.

6. The sensorimotor systems

Psychomotor disturbances (retardation or agitation) are core features of depression and are included as a diagnostic criterion in the DSM-5. Considering that motor activity (e.g., walking) is needed to increase the chances of rewarding and pleasant events (e.g., meeting some friends or a partner), it is not surprising that psychomotor retardation and reduced gross motor activity are core features of depression (Razavi et al., 2011; Bewernick et al., 2017; Walther et al., 2019; Shankman et al., 2020; Wüthrich et al., 2022). Indeed, motor processes are strictly related to motivational drive and positive emotionality that support approach actions (Walther et al., 2019). These motor disturbances align with the Sensorimotor Systems of the RDoC, a domain that was recently added to the matrix (Garvey and Cuthbert, 2017). The Sensorimotor domain includes four constructs, namely Motor Actions, Agency and Ownership, Habit, and Innate Motor Patterns. Psychomotor retardation can be ascribed to the Motor Actions Construct.

6.1. Actigraphy

The assessment of motor disturbances in depression has long been confined to self-report measures and only recently research is shifting toward more objective and ecological measures, such as actigraphy (Walther et al., 2019). Low levels of motor activity, as assessed by a wrist-worn actigraphy, were documented in older adults with remitted depression relative to an age-matched control group (Pye et al., 2021) and were related to subclinical depressive symptoms (Mendlowicz et al., 1999).

6.2. EEG spectral features of motor activity

The EEG correlates of motor activity disturbances have only been investigated in clinical depression and have focused on the examination of resting spectral characteristics in relation to psychomotor retardation levels (Nieber and Schlegel, 1992; Cantisani et al., 2015). For example, a left-lateralized pattern of frontal alpha activity was negatively associated with activity levels (assessed with an actigraphy) in individuals with MDD, suggesting that psychomotor retardation may be related to impaired motivational drive (Cantisani et al., 2015). A negative covariance between resting alpha power over motor areas and activity levels was also reported (Nieber and Schlegel, 1992; Cantisani et al., 2015). Considering that alpha power mirrors inhibition of a cortical region, these results might indicate that psychomotor retardation is reflected in reduced motor cortex activity even in conditions of rest, potentially representing a trait feature or these alternations (Cantisani et al., 2015). Overall, it would be valuable to further explore the link between psychomotor retardation and motivation dispositions by means of fine psychophysiological measures (e.g., startle reflex) in depression and its risk.

6.3. Interim conclusion

The lack of systematic research on psychomotor disturbances in at-risk samples does not allow for determining whether these disturbances represent a core underlying etiological mechanism of MDD. Studies on risk samples but also longitudinal designs are warranted to better identify whether motor disturbances may represent a viable target for MDD prevention. This would have several advantages, considering that targeting motor functions could be accomplished in different ways (i.e., physical activity, and brain stimulation; Walther et al., 2017).

7. The systems for social processes

Depressive symptoms have long been associated with social impairments and poor social functioning (Gotlib and Hammen, 1992). Social impairments are included within the Systems for Social Processes of the RDoC, which include the following domains: Affiliation and Attachment, Social Communication, Perception and Understanding of Self, and Perception and Understanding of Others. Depression is associated with social anhedonia, namely reduced drive for social affiliation, but also with increased sensitivity to social rejection. As might already be evident, this dimension is closely related to the PVS, particularly in the study of depression.

Sensitivity to social rewards has been included in the Affiliation and Attachment domain and can be assessed with the reward positivity component (RewP, see Section 2) during a social feedback task. For example, in the island gateway task, participants play a game in which they are traveling along the Hawaiian Islands and trying to avoid being voted off the island by other (computerized) players whom they are told are age-matched peers (Kujawa et al., 2014a,b). Participants create online profiles, and, in a series of rounds, vote other players on or off the island, while receiving feedback on which players voted them on or off. Participants receive approximately the same number of acceptances and rejections over the course of the task. It has been recently observed that reduced RewP to social rejection during this task significantly predicted the onset of depressive symptoms in a sample of adolescents (Pegg et al., 2019, 2021), suggesting that blunted neural sensitivity to being socially excluded might represent a psychobiological marker of MDD. Similarly, subclinical depressive symptoms were linked to reduced time-frequency delta power to social rewards (Jin et al., 2019). Additionally, other studies indicated a smaller RewP to social acceptance in individuals with depression (Kujawa et al., 2017; Distefano et al., 2018) and those at risk for the disorder (Freeman et al., 2022a,b).

Related to the Cognitive Systems, the offspring of parents with depression recruited more resources to have an optimal performance during a cognitive task (i.e., larger P300) to prevent making a speech in front of an audience (in case of suboptimal performance), thus avoiding social evaluation (Pérez-Edgar et al., 2006). These latter findings are at odds with the hypothesis of reduced sensitivity to social rejection in depression vulnerability. Further research is needed to better parse social functioning and its psychophysiological correlates in depression vulnerability. Further support for reduced sensitivity to social affiliation, individuals with dysphoria showed a reduced increase in heart rate to social rewards relative to a control group (Brinkmann et al., 2014).

8. Discussion

The present review integrated findings from psychophysiological research in individuals at elevated risk for depression development or maintenance, owing to a familial history, dysphoria, or past depression, as well as longitudinal studies that examined predictors of future depression, adopting an RDoC lens. Hence, each of the described psychophysiological underpinnings could confer a higher risk to develop or maintain full-blown depression and, notably, are apparent before the onset of the disorder (see Table 1; Figure 1 for a summary of the reviewed literature).

In sum, consistent evidence across multiple psychophysiological levels indicates that reduced responses to appetitive/rewarding cues, belonging within the Positive Valence domain, characterize individuals that are more vulnerable to depression onset. Indeed, based on the reviewed literature, reduced approach motivation seems to represent the most consolidated and robust vulnerability marker of depression. Evidence on the Negative Valence is more mixed, but most studies suggest that at-risk samples may be characterized by a greater intake of unpleasant information that, however, does not lead to greater reactivity but to a blunted reactivity to unpleasant cues. These findings suggest that, in line with the ECI hypothesis (Bylsma et al., 2008), blunted positive and negative emotional reactivity might represent a risk factor for MDD. Depression risk appears to be also characterized by alterations in the Arousal and Regulatory domain, whereby at-risk samples are characterized by sleep alterations and autonomic unbalances in resting conditions and during the viewing of emotional images or stress induction paradigms. Within the Cognitive domain, EEG studies have looked at how emotional cues modulate cognitive resources in depression vulnerability and found that at-risk samples experience inhibition difficulties during the presentation of unpleasant content and facilitated inhibition to pleasant content, suggesting that – at the cognitive level – enhanced attention and processing of mood-related content might be a risk factor of MDD. Moreover, whether motor disturbances that characterize depression, ascribable to the Sensorimotor domain, are viable vulnerability factors of depression still needs to be properly explored, although some studies suggest that low levels of motor activity might characterize at-risk samples. Last, psychophysiological research has recently begun to examine correlates of social processes, but this work is still in its early stages and needs to be extended to other levels of analysis.

From the reviewed literature, what emerges is a strong interrelation among each of the RDoC domains in depression vulnerability. For example, by studying autonomic reactivity (Arousal and Regulatory domain) to unpleasant laboratory stressors (Negative Valence domain), cognitive processes (Cognitive domain) to affective stimuli (Positive and Negative Valence domain), and the relation between psychomotor retardation (Sensorimotor domain) and approach motivation (Positive valence domain) or baseline cortical arousal (i.e., posterior alpha; Arousal and Regulatory domain), researchers are concurrently tackling several dimensions related to depression vulnerability. Indeed, it becomes clear that vulnerability may not be conferred by a single process but by the interrelation of many processes. This highlights how the development of a single condition is truly a product of the interplay among multiple factors that can be potentially targeted for prevention and early intervention.

Nevertheless, another important aspect that, according to the RDoC framework, has a transversal impact on all domains is environmental influences. For example, exposure to negative stressful life events is a well-established risk factor for psychopathology and seems to have an impact on multiple domains. Chronic stress has significant adverse effects on brain regions implicated in reward processing (Pizzagalli, 2014; Ethridge et al., 2018; Burani et al., 2021b) and endocrine and autonomic regulation (Sheth et al., 2017), processes that have been described throughout this review. Of note, there is evidence of how stressful life events interact with neural activity to rewards to prospectively predict the development of depression (Burani et al., 2021a), further supporting the role of an environmental influence on the functioning of an RDoC domain in determining vulnerability for psychopathology. Although this was not the focus of this review, many other environmental factors may act as catalysts for vulnerability factors in determining the development of depression (Bronfenbrenner and Morris, 2007).

Future work should aim at incorporating multiple dimensions to identify narrower and specific vulnerability profiles to ultimately improve the ability of clinicians to recognize people early and implement *ad-hoc* strategies (e.g., Craske et al., 2016). However, to do this, some issues in the pursuit of psychophysiological vulnerabilities of depression will have to be addressed. Firstly, for the assessment of each RDoC domain, it is important to unify paradigms and methods to promote the replicability of results and build robust evidence

TABLE 1 Summary of the studies within each RDoC domain in relation to risk for depression development and maintenance included in the review.

Study	Risk group	Primary findings
Positive valence systems		
Benning and Ait Oumeziane (2017) and Moretta et al. (2021)	Dysphoria	Blunted LPP to pleasant stimuli
Moretta and Messerotti Benvenuti (under review)[1], Nelson et al. (2015), and Kujawa et al. (2012)	Parental history of MDD	
Allison et al. (2021)	Past depression	
Levinson et al. (2018) and Sandre et al. (2019)	Prospective prediction of MDD onset	
Foti et al. (2011), Kujawa et al. (2014a,b), Kujawa et al. (2019), and Weinberg et al. (2015b)	Parental history of MDD	Blunted RewP
Weinberg and Shankman (2017), Whitton et al. (2016)	Past depression	
Burani et al. (2021c), Bress et al. (2013), Michelini et al. (2021), and Nelson et al. (2016)	Prospective prediction of MDD onset	
Dawson et al. (1997)	Parental history of MDD	Reduced resting-state left relative to right frontal EEG activity
Nusslock et al. (2011) and Pössel et al. (2008)	Prospective prediction of MDD onset	
Feng et al. (2012) and Lopez-Duran et al. (2012)	Parental history of MDD	Greater left EEG alpha power to both happy and sad clips vs. neutral
Mennella et al. (2015)	Dysphoria	Reduced frontal left relative to right alpha desynchronization during an emotional imagery task of pleasant, neutral, and unpleasant narratives
Messerotti Benvenuti et al. (2019)	Dysphoria	Smaller alpha desynchronization in frontal and right centro-parietal regions to pleasant images
Dell'Acqua et al. (2022a)	Dysphoria	Blunted time-frequency delta power to pleasant images
Nelson et al. (2018)	Prospective prediction of MDD onset	Blunted time-frequency delta power to rewards
Mneimne et al. (2008)	Dysphoria	Absence of startle attenuation to pleasant images
Vaidyanathan et al. (2014)	Past depression	
Benning and Ait Oumeziane (2017) and De Zorzi et al. (2021)	Dysphoria	Reduced skin conductance response to pleasant (but also unpleasant) images
Messerotti Benvenuti et al. (2015)	Dysphoria	Less heart rate increases and less reductions in HRV during the imagery of pleasant scripts
Negative valence systems		
Messerotti Benvenuti et al. (2020) and Moretta et al. (2021)	Dysphoria	Prolonged cardiac deceleration in response to unpleasant stimuli
Burkhouse et al. (2014)	Parental history of MDD	Greater physiological reactivity, indexed by pupil dilation, to sad, but not happy or neutral faces
Benning and Ait Oumeziane (2017) and Grunewald et al. (2019)	Dysphoria	Reduced LPP to unpleasant images
Moretta and Messerotti Benvenuti (under review)[1], Nelson et al., 2015, and Kujawa et al., 2012	Parental history of MDD	
Moretta et al. (2021)	Dysphoria	No reductions of LPP to unpleasant images
Michelini et al. (2021)	Prospective prediction of MDD onset	Blunted LPP to unpleasant stimuli was one of the main predictors of fist-onset depressive disorder over 3 years
Speed et al. (2016)	Parental history of MDD	Enhanced LPP to unpleasant images
Messerotti Benvenuti et al. (2020)	Dysphoria	Reduced startle potentiation to unpleasant stimuli
Vaidyanathan et al. (2014)	Past depression	Enhanced startle potentiation to unpleasant stimuli
Benning and Ait Oumeziane (2017)	Dysphoria	Reduced skin conductance response to unpleasant stimuli
Daches et al. (2020)	Parental history of MDD	Greater skin conductance during sad mood induction and recovery
Meyer et al. (2018b)	Parental history of MDD	Reduced ERN
Tabachnick et al. (2018)	Dysphoria	

(Continued)

TABLE 1 (Continued)

Study	Risk group	Primary findings
Arousal and regulatory systems		
Pesonen et al. (2019)	Subclinical depressive symptoms	Reduced sleep quality (i.e., fragmented REM sleep) assessed with EEG
Jindal et al. (2002)	Past depression	
Bat-Pitault et al. (2013), Bat-Pitault et al. (2017), and Lopez et al. (2010)	Parental history of MDD	
Rao et al. (2009)	Prospective prediction of depressive symptoms	
Armitage et al. (2009), Chen et al. (2012), and Wescott et al. (2019)	Parental history of MDD	Reduced sleep quality assessed with actigraphy
Bei et al. (2015)	Prospective prediction of depressive symptoms	
Bruder et al. (2012)	Parental history of MDD	Reduced posterior cortical arousal indexed by greater posterior resting EEG alpha power
Dell'Acqua et al. (2020)	Dysphoria and past depression	Reduced resting HRV
Moretta and Messerotti Benvenuti (2022)	Parental history of MDD	
Vaccarino V. et al. (2008)	Past depression	
Dougherty et al. (2009), Nederhof et al. (2015), Young et al. (2006), and Vreeburg et al. (2010)	Parental history of MDD	Increased morning cortisol and CAR
Adam et al. (2010), Vrshek-Schallhorn et al. (2013), and Goodyer et al. (2000)	Prospective prediction of MDD onset	Higher CAR cortisol levels predicted MDD onset 1 year later
Salomon et al. (2013)	Past depression	No differences in heart rate reactivity to stressors (speech and cold pressor)
Bylsma et al. (2014)	Past depression	No blunted RSA during a stress
Stange et al. (2017)	Prospective prediction of MDD onset	Smaller decreases in RSA and greater increases in heart rate in response to sad clips predicted greater depressive symptoms when individuals encountered an environmental stressor
Bylsma et al. (2015)	Past depression	Greater parasympathetic activation (reduced decreases in HRV) and sympathetic withdrawal (reduced pre-ejection period), during psychological (e.g., unsolvable puzzle) and physical challenges (e.g., handgrip)
de Rooij et al. (2010) and Suzuki et al. (2013)	Dysphoria	Blunted cortisol levels during stress reactivity paradigms
Morris et al. (2014)	Past depression	
Morris et al. (2017)	Parental history of MDD	
Höhne et al. (2014) and Morris et al. (2012)	Past depression	Greater cortisol levels during stress reactivity paradigms
Schwerdtfeger and Rosenkaimer (2011)	Dysphoria	Reduced skin conductance in a public speaking stress paradigm
Cummings et al. (2007)	Parental history of MDD	Reduced skin conductance to stressful ecological situations
Cognitive systems		
Krompinger and Simons (2009) and Zhang et al. (2016)	Dysphoria	Enhanced No-Go P300 to negative faces
Bistricky et al. (2014)	Dysphoria and past depression	Greater P300 following sad targets in oddball task
Messerotti Benvenuti et al. (2017)	Dysphoria	Reduced Go/No-Go effect for P3 and delta power in response to pleasant and neutral, but not unpleasant, stimuli
Meyer et al. (2018b)	Parental history of MDD	Reduced ERN
Tabachnick et al. (2018)	Dysphoria	
Sensorimotor systems		
Pye et al. (2021)	Past depression	Low levels of motor activity, as assessed by a wrist-worn actigraphy
Mendlowicz et al. (1999)	Dysphoria	
Systems for social processes		
Pegg et al. (2019) and Pegg et al. (2021)	Prospective prediction of MDD onset	Reduced RewP to social rejection

(Continued)

TABLE 1 (Continued)

Study	Risk group	Primary findings
Jin et al. (2015)	Dysphoria	Reduced time-frequency delta power to social rewards
Freeman et al. (2022a)	Parental history of MDD	Smaller RewP to social acceptance
Freeman et al. (2022b)	Prospective prediction of depressive symptoms	
Pérez-Edgar et al. (2006)	Parental history of MDD	Recruitment of more resources to have an optimal performance during a cognitive task (i.e., larger P300) to avoid social evaluation
Brinkmann et al. (2014)	Dysphoria	Reduced increase in heart rate to social rewards

CAR, cortisol awakening response; EEG, electroencephalography; ERN, error-related negativity; HRV, heart rate variability; LPP, late positive potential; MDD, major depressive disorder; RewP, reward positivity; RSA, respiratory sinus arrhythmia.

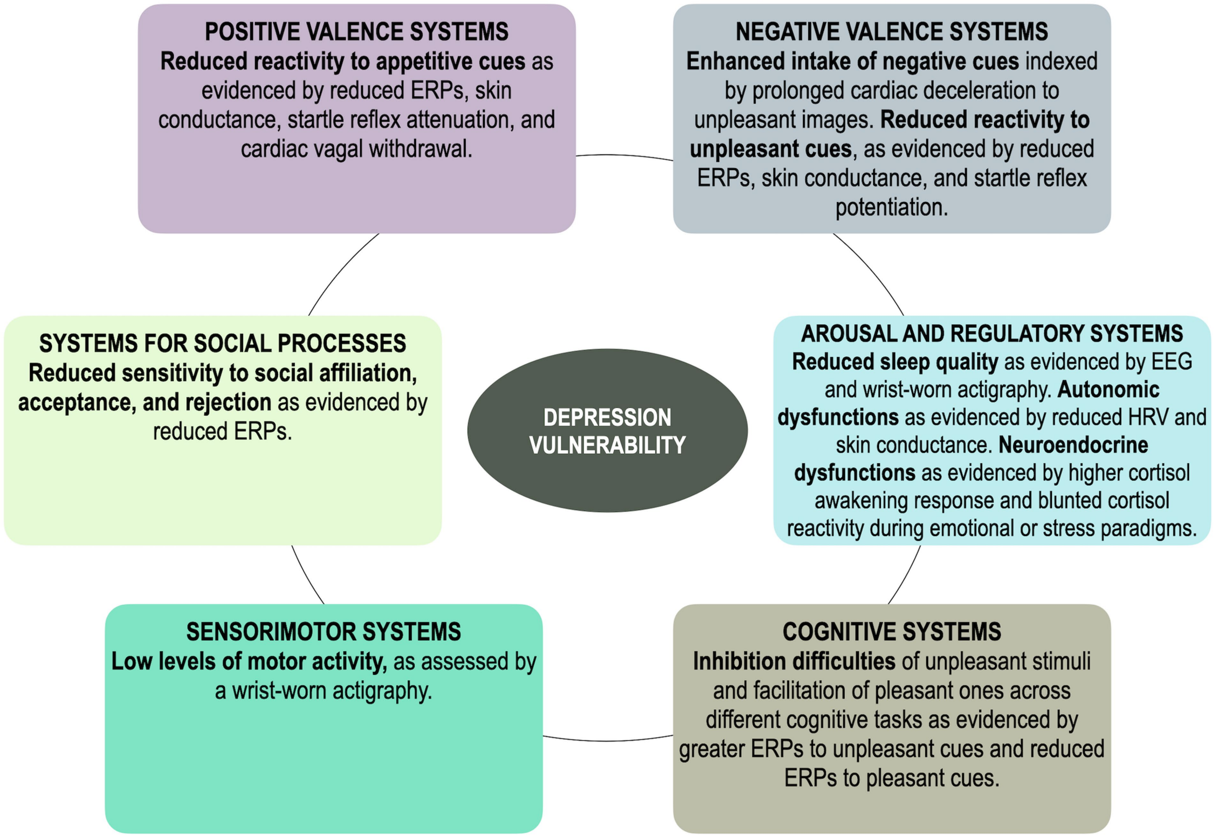

FIGURE 1
A simplified and schematic illustration of the main findings regarding all RDoC systems in vulnerability to depression. ERPs, event-related potentials.

across investigations. Then, it is also important to account for sociodemographic variables that may drive some of the mixed findings, such as gender, race, and socioeconomic status. Further, to precisely identify vulnerability profiles, more longitudinal investigations examining trajectories of risk are warranted. Another important point that should be further expanded is the role of development, emphasized in the RDoC model. In particular, the RDoC framework advises posing attention to the importance of improving the knowledge of typical and atypical developmental trajectories as well as enhancing prevention and intervention efforts by identifying reliable and valid biomarkers of risk for psychopathology in early in life. The current narrative review focused on the available studies that included a broad age range, including studies on children, but future efforts should be made to conduct more research on depression risk during early life. Additionally, the present review focused on studies that employed psychophysiological models as these represent a useful framework in redefining dimensions involved in psychopathology and present numerous methodological advantages (e.g., non-invasive, well-tolerated, and economic). However, there are still some barriers to these methods in improving the understanding of psychopathology among minoritized races and ethnicities (e.g., Kredlow et al., 2017; Choy et al., 2022).

In conclusion, the present work described, for each RDoC domain, studies aimed at identifying psychobiological markers of depression risk. Insights into some viable mechanisms that contribute to the development of depression in at-risk samples were provided and the effectiveness and potential of psychophysiological models within the

RDoC framework for exploring and understanding depression pathophysiology were emphasized. Nonetheless, despite the significant progress that has been made, additional effort is required to better identify vulnerability profiles that can precisely predict the disorder.

Author contributions

CDA, EP, DP, and SMB: conceptualization. CDA: writing the original draft, editing, and reviewing. EP, DP, and SMB: supervision, review, and editing. DP and SMB: funding acquisition. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Latent classes of eating disorders and addictions by sex: Implication of alexithymia and stressful life events in youths

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Introduction: Eating disorders (EDs) and behavioural addictions show common psychological vulnerability factors such as alexithymia and stressful life events (SLE). This study aims, firstly, to explore the prevalence and latent profiles of participants based on their risk of suffering EDs, gambling disorder (GD), alcohol and/or drug abuse, and compulsive buying (CB) by sex. Secondly, it aimed to test whether alexithymia and having experienced SLE are associated with group membership.

Methods: The sample was predominantly drawn from university students and social networks. It was composed of 352 young adults between 18 and 35 years old, of whom 77.8% were women and 22.2% men.

Results: The results showed that the most prevalent disorders of the sample were alcohol, EDs, CB, drugs and GD, respectively. Moreover, latent class analyses were conducted based on the risk of suffering EDs or addictions by sex. Three main profiles were found: 'Men with addictions', 'Healthy women' and 'Women with EDs'. Finally, differences in SLE and alexithymia levels were tested by latent classes. "Men with addictions" and "Women with EDs" had higher scores on alexithymia and SLE than the group of "Healthy women". However, the group of "Women with EDs" (class 3) reported significantly higher levels of SLE and alexithymia than the other two groups.

Discussion and conclusion: In conclusion, we discuss the possibility that some vulnerability factors operate generally and transdiagnostically in EDs and addictive disorders. The identification of clinical phenotypes could complement and deepen prediction, prevention and treatment research in clinical settings. The need to take sex and gender differences into account is reinforced.

KEYWORDS

eating disorder, addiction, gambling, alexithymia, stressful life events, sex differences

Introduction

The complex heterogeneity of comorbid mental health disorders, such as alcohol use disorders, drug addiction, gambling disorder (GD), compulsive buying (CB), or eating disorders (EDs) makes it necessary to explore the main underlying transdiagnostic risk factors that could lead to these mental health conditions (Crews and Boettiger, 2009; Romer, 2010; Lavender and Mitchell, 2015; Rømer Thomsen et al., 2018; Brunelle and Grossman, 2022). Research should be directed to clarify common causes and similar development patterns of addictive behaviours and EDs, in order to identify specific characteristics of subgroups of patients and, in turn, clinical implications for prevention and intervention.

Gambling disorder was the first behavioural addiction recognised within the diagnostic category of 'Substance-Related and Addictive Disorders' in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* [DSM-5; American Psychiatric Association (APA), 2013]. Currently, GD is the only behavioural addiction recognised in DSM-5, despite widespread interest among researchers and health professionals in behaviours, such as CB, 'food addiction', 'sexual addiction', 'exercise addiction' or 'internet addiction', among others. However, further empirical evidence is still needed to determine the transferability of DSM-5 criteria to other addictive behaviours (Potenza, 2014; Robbins and Clark, 2015).

A recent study has reported that the prevalence of GD in Spain is 0.72%, which is now higher than that indicated in the DSM-5 [0.2–0.3%; American Psychiatric Association (APA), 2013; Chóliz et al., 2021]. A systematic review of worldwide GD prevalence estimates it between 0.12 and 5.8% (Calado and Griffiths, 2016), while the estimated prevalence of young people meeting the criteria for GD varies from 0.2 to 12.3% (Calado et al., 2017). Existing evidence also indicates that online gambling is the leading cause of GD in the youth population (Chóliz, 2016). Men show higher prevalence of GD than women (Wong et al., 2013). However, some studies have identified greater severity of GD in women than in men (Grant et al., 2012; Merkouris et al., 2016; Chóliz et al., 2021).

Regarding CB, a meta-analysis by Maraz et al. (2016) estimated a pooled prevalence of 4.9%, showing a higher trend among younger ages and females (Granero et al., 2016; Estévez et al., 2020). However, other studies of the area have shown a similar prevalence among men and women (Koran et al., 2006), suggesting that the sex difference lies in the types of goods purchased (Hayhoe et al., 2000). However, there are still not enough studies incorporating a gender perspective to adequately interpret the results of either GD or CB.

The national Spanish survey on the prevalence of alcohol and other drugs showed that alcohol is currently the most widely consumed psychoactive substance and the one with the earliest onset of use, along with tobacco. Regarding illicit drug use, cannabis is the most consumed substance, followed by cocaine. Meanwhile, the prevalence of prescribed and non-prescribed hypnosedatives continued to increase over the last decade, and it is the only substance that is more prevalent among women than among men (Delegation of the Spanish Government for the National Plan on Drugs, 2020).

Behavioural addictions often co-exist with other psychiatric disorders such as EDs (Starcevic and Khazaal, 2017). EDs are characterised by a persistent disturbance of eating behaviour. The three main types of EDs are anorexia nervosa (AN), bulimia nervosa (BN) and binge eating disorder (BED; Hay, 2020). Recent studies indicated that weighted means of lifetime EDs were 8.4% for women and 2.2% for men, tending to emerge between early and late adolescence (Galmiche et al., 2019; Momeñe et al., 2022a). However, EDs incidence continues to increase, becoming a genuine concern for mental health services, especially among young girls.

Several studies have reported that CB and EDs are highly comorbid. In this line, a study by Munguía et al. (2021b) reported that the co-occurrence of CB and EDs leads to a more severe clinical profile and a worse treatment outcome when compared to healthy controls or patients without this comorbidity (de Mattos et al., 2018). In contrast, the prevalence of GD and EDs appears to be lower (Jiménez-Murcia et al., 2013). One important epidemiologic consideration for these results is the impact of sex. That is, the expectation of alleviating a negative affect through behaviour ('negative urgency') has been found to be strongly related to dysfunctional eating behaviours in women, whereas dysfunctional gambling activities have been associated with men (Fischer and Smith, 2008). However, the very fact that EDs are more common in women and GD is more common in men has implied a limited awareness of the comorbidity of these conditions. In fact, dual diagnosis studies of patients suffering from GD and EDs suggest clinically relevant differences (Jiménez-Murcia et al., 2015). More specifically, the clinical picture of GD + EDs appears to be more severe, with a higher tendency towards alcohol and drug abuse, depressive disorders, bipolar disorders, anxiety disorders, personality disorders, impulsivity, suicidality and more gambling-related cognitive distortions (Kim et al., 2018; Lemón et al., 2021).

The increased comorbid presence of EDs and behavioural addictions shows common psychological vulnerability factors that could require specific clinical attention (Fernández-Aranda et al., 2019). Moreover, it has been observed that even if there is no direct relationship between EDs and addictive pathologies, some common risk traits are likely (von Ranson et al., 2013; Munguía et al., 2021a).

There is an extensive database of study results in the literature that associates alexithymia and trauma with a tendency towards addictions and EDs (Zdankiewicz-Ścigała and Ścigała, 2020; Momeñe et al., 2022b). It has been conceptualised that early trauma disturbs the development of cognitive and affective processing, integration of thinking and feeling, and the capacity to understand and express emotional states (Craparo et al., 2014). Several researchers have posited that stressful life events play a central role in the development of alexithymia (Morie et al., 2020; Zdankiewicz-Ścigała and Ścigała, 2020).

Alexithymia is a multifaceted personality trait first described by Sifneos (1973) that involves difficulties in the identification and description of one's own and other's emotions, trouble distinguishing between feelings and bodily sensations of emotional arousal, and an externally orientated thinking style. For example, excessive food intake, excessive alcohol or drug use, CB or GD would be associated with a lack of the capacity to think and express affects. Consequently, it could lead to a reliance on immediate stimuli and the development of non-verbal compensatory strategies to escape, dampen or manage intolerable emotions (Van Strien and Ouwens, 2007; Marchetti et al., 2019; Herman et al., 2020).

Objectives

In recent years, this line of research examining the relationship between alexithymia and stressful life events regarding addictive behaviours and EDs has gained relevance due to their increased prevalence, clinical and prognostic implications, particularly among young people. Previous studies have not analysed differences in impulse control disorders based on the risk of suffering from them. Furthermore, to the best of our knowledge, the scientific literature does not provide information about how stressful life events and alexithymia influence the development of different addictive and ED profiles, at least in an interrelated and non-segmented way. For this reason, the main objective of this study is to explore the prevalence and latent profiles of participants based on their risk of suffering EDs, GD, alcohol, and/or drug abuse and CB behaviour by sex, in a sample of young adults between the ages of 18 and 35. It also aimed to analyse whether alexithymia and having suffered stressful life events were associated with latent class membership based on risk of addictions and/or EDs and according to sex.

Hypothesis

- Girls would show higher scores in EDs and CB, while boys would show higher scores in addictive behaviours, particularly in GD and drugs.
- It is expected to find a final model of two or three latent classes.
- Participants who score high in addictions and/or EDs would show higher scores in alexithymia and would have experienced more stressful life events.
- Alexithymia and stressful life events will be associated with latent class profiles with the highest risk of EDs and/or addictions.

Method

Participants

Three hundred and 52 young adults participated in the study. The inclusion criterion was to be between 18 and 35 years old ($M = 22.93$, SD = 3.30). In contrast, the only exclusion criterion to participate was being under 18 years old. Most of the sample were women (77.8%; men: 22.2%), and most had university studies (72.7%). Regarding occupational status, 51.4% were students, 25% were students and workers and 20% were only workers.

The sample was recruited through three main ways. On the one hand, students from the Complutense University of Madrid were asked to participate. Students were from degrees related to health and social sciences. On the other hand, data were collected using non-probabilistic sampling through the snowball method. That is, the researchers of the study disseminated the objective of the research and the link to the questionnaire in their close social and professional environment, making the latter do the same with their environment, successively. In third and last place, the questionnaire was also diffused on social networks (e.g., WhatsApp, Instagram, email, Facebook, or LinkedIn), as well as university bulletin boards, journals and websites with divulgation purposes and through the official college of psychologists. No compensation was offered.

Instruments

Impulse control disorders and addiction

The MULTICAGE CAD 4 (Pedrero et al., 2007) is formed by 32 items that assess eight impulse control disorders and addictions (with four items in each factor): Drug and Alcohol Use Disorder (Items 1–4), Gambling Disorder (Items 5–8), Substance addictions (Items 9–12), Eating Disorders (Items 13–16), Internet Addiction (Items 17–20), Gaming Addiction (Items 21–24), Compulsive Spending (Items 25–28) and Sex Addiction (Items 29–32). In this study, we used four of those eight factors (i.e., Alcohol Abuse, Drugs, Compulsive Spending and Eating Disorders). Each subscale is evaluated by reproducing the CAGE scheme (Hayfield et al., 1974): self-perception of the problem, perception by cohabitants, associated feelings of guilt, and signs of abstinence or inability to control the behaviour. The questionnaire is rated on a dichotomous scale '*Yes/No*', in which none or one affirmative answer indicate '*no problem*', two affirmative answers indicate the '*possible existence of the problem*', three affirmative answers indicate '*very probable existence of the problem*' and four affirmative answers indicate '*sure existence of the problem*'. Accordingly, the risk of each addiction was determined on the basis of three risk groups. Scores between 0 and 1 were categorised as '*non-risk group*', scores of two points were categorised as '*probable risk group*', and scores between 3 and 4 were categorised as '*quite probable risk*' (see Table 1). The cut-off point was set by the authors at two affirmative responses to indicate problem behaviour and/or presence of addiction. Cronbach's alpha for the total original scale was 0.86. For the present study, the internal consistency of the four subscales used were: eating disorders $\alpha = 0.60$, alcohol addiction $\alpha = 0.60$, drug addiction $\alpha = 0.63$ and compulsive buying $\alpha = 0.67$.

Gambling disorder

The *South Oaks Gambling Screen* (SOGS) questionnaire was used (Lesieur and Blume, 1987) in its Spanish version (Echeburúa et al., 1994). It is a 20-item screening questionnaire based on the DSM-III (American Psychiatric Association, 1980) and DSM-III-R diagnostic criteria for pathological gambling (American Psychiatric Association, 1987). The scale contains items related to gambling patterns, sources of money to gamble or pay debts and emotions involved. The response format consists of a '*Yes/No*' dichotomous scale. Scores above four points suggest the possible presence of GD. The instrument presents good psychometric properties, showing an appropriate internal consistency for the original scale ($\alpha = 0.94$), and the convergent validity with DSM-IV criteria was 0.94. In the present study, Cronbach's *alpha* for the SOGS was 0.60.

Alexithymia

The *Toronto Alexithymia Scale-20* (TAS-20; Taylor et al., 1985) was used to measure alexithymia in its Spanish version (Martínez-Sánchez, 1996). The scale contains 20 items that measure alexithymia through three main factors: (1) Difficulty Identifying Feelings, which refers to problems identifying emotions, with some confusion with physical symptoms, (2) Difficulty Describing Feelings, referring to the inability to communicate one's feelings and use emotional vocabulary, and (3) Externally-Oriented Thinking, in which individuals tend to neglect their inner emotional states. The scale is rated on a six-point Likert scale ranging from zero (*strongly disagree*) *to* five (*strongly agree*). The internal consistency is adequate for the overall scale ($\alpha = 0.83$ for the original scale and 0.81 for the Spanish adaptation). In the current study, Cronbach's alpha was 0.85.

Stressful life events

The *Centrality of Event Scale* (CES; Berntsen and Rubin, 2006) was used to assess stressful life events. It was adapted to Spanish by Fernández-Alcántara et al. (2015). The scale measures aspects related to how individuals process traumatic events. Before answering the scale, participants were asked to write down the most traumatic or stressful event they had ever experienced, to base the response on that event when completing the scale. The CES contains 20 items rated on a five-point Likert scale ranging from one (*strongly disagree*) to five (*strongly agree*). The internal consistency is satisfactory both for the original scale and the Spanish adaptation ($\alpha = 0.94$). In this study, Cronbach's alpha was 0.93.

TABLE 1 Percentages and number of participants per category of eating disorder and addictions.

	Eating disorder			Alcohol			Drugs			Compulsive buying			Gambling	
	No risk	Probable risk	Quite probable risk	No risk	Probable risk	Quite probable risk	No risk	Probable risk	Quite probable risk	No risk	Probable risk	Quite probable risk	No risk	Risk
n	261	49	19	232	70	35	298	24	14	284	39	15	320	32
%	79.3	14.9	5.8	68.8	20.8	10.4	88.7	7.1	4.4	84.1	11.5	4.4	90.9	9.1

Procedure

This study used a cross-sectional research design. All participants completed the survey online (through a link to the questionnaire) or *via* a QR code that gave access to the same questionnaire. To access the questionnaire, participants had to be over 18 years old, have read the study information, and provide informed consent. Completing the questionnaire lasted around 30 min.

Before completing the questionnaire, all participants received general information about the main objectives of the research study. It was made clear that there were no right or wrong answers, and they could contact the main researcher by mail if they needed further information about the study. Confidentiality, anonymity and voluntary participation were ensured for all participants, and they did not receive any compensation for participating. The Institutional Review Board approved the study. This study was performed in line with the principles of the Declaration of Helsinki.

Statistical analysis

Before conducting the main analysis, patterns of missing data were explored through the MCAR Little test. Then, descriptive analyses were conducted to explore the prevalence of eating disorders and different addictions (in percentages). Secondly, main analyses focused on the latent groups of participants based on the risk of suffering EDs or addictions. Specifically, latent class analyses were conducted (LCA) with Mplus 7.11 (Muthén and Muthén, 1998–2013). In doing so, the variables of sex, risk of EDs, CB, GD, alcohol, and drugs addiction were included in the examination of the latent classes.

In this way, latent class models were compared (with odds ratios tests), and a final model was estimated. The adequacy of the models was based on several model fit indicators and model test comparisons. Specifically, we used Akaike's Information Criterion (AIC), the Bayesian Information Criterion (BIC), the mean-adjusted Bayesian Information Criterion (aBIC), entropy, the Lo–Mendell–Rubin adjusted likelihood ratio test (LMRa) and the bootstrap likelihood ratio test (BLRT). Lower values of AIC, BIC and aBIc indicate better fit (Hu and Bentler, 1999). Entropy indicates the level of precision of profile classification in values from 0 to 1, so values closer to one are indicators of higher accuracy (Celeux and Soromenho, 1996). The LMRa and BLRT are loglikelihood tests that compare a model with the model with one less class, so significant results indicated a significant increment of model fit for the model with one more class (Nylund et al., 2007).

Finally, ANCOVAs were computed to test the differences in alexithymia and stressful life events between the class membership controlling by age. Pair comparisons between classes were examined with Bonferroni correction.

Results

Before conducting the analyses, the MCAR Little test was applied to test the patterns of missing data. The test was not significant [$\chi^2_{(987)} = 1054.04$, $p = 0.068$], so it was assumed that missing data were completely at random, and analyses were developed by pairwise deletion.

The initial analyses were conducted to explore the prevalence of EDs and addictions. As displayed in Table 1, approximately two out of 10 participants were at risk of EDs. The most prevalent risk of addiction was alcohol consumption, with almost one-third of the participants at some risk. Drugs and CB were less prevalent, as a smaller amount of 15% of the participants presented some risk. GD was the least prevalent and was present in one out of every 100 participants.

The primary analyses were focused on exploring the latent groups of participants based on their risk of EDs and addictions through latent class analysis (LCA). The first step of the LCA procedure was to examine the number of latent classes comparing models with an incremental number of classes (i.e., latent groups), including risk of EDs and additions in these models.

The models with 1–4 latent classes were compared (see Table 2). The results showed that the 2-class model had a better model fit indicator than the 1-class model, and it significantly increased model fit based on the LMRa and BLRT. The 3-class model had better AIC, BIC, aBIC, and entropy than the 2-class model. Also, the LMRa and BLRT were significant, showing that the 3-class model had a significantly better fit than the 2-class model. Finally, the 4-class model was compared to the 3-class model. In this case, the inclusion of one more class in the model worsened all model fit indicators, and the LMRa and BLRT showed no significant increment in the model fit of the 4-class model compared to the 3-class model. Therefore, the 3-class model was retained as the final model.

The second step of the LCA procedure was to observe the composition of each of the three classes of the final model attending to the risk prevalence of EDs and addictions in each class. The composition of each class is presented in Table 3. All participants in Class 3 had some risk of EDs, were all women, and had no risk of addiction to drugs. Class 3 had a higher risk of GD as well as of CB than Class 2. Compared to Class 1, Class 3 showed lower risk of all addiction risks (i.e., alcohol, drugs and GD) but similar levels of CB.

Class 1 was the only group with a higher presence of men, as men were more than 1.5 times more likely than women to belong to Class 1. Women were significantly more prevalent in Class 2 than in Class 1 and represented eight out of 10 participants. Class 1 had a higher risk of ED, alcohol, drugs, CB and GD than Class 2.

Based on these results, Class 2 was described as a group represented mainly by women without EDs or addictions, so it was named 'Healthy women'. The great majority of the participants belonged to this group (70.7%). Class 3 was described as a group of women with EDs who were at risk for alcohol, GD and CB, but not for addiction to drugs. Therefore, this group was named 'Women with EDs'. This group comprised 16.5% of the sample. Class 1 was mainly represented by men at risk for all the measured additions but without EDs. Consequently, this group was named 'Men with addictions'. This group comprised 12.7% of the sample.

The third step of the LCA procedure was to test the differences in the levels of stressful life events and alexithymia by latent classes (i.e., healthy women, women with EDs and men with addictions). The results of these analyses revealed significant differences between classes in both variables (see Table 4). Concretely, regarding alexithymia, the group of Women with EDs (Class 3) showed significantly higher levels of alexithymia than the group of Healthy women (Class 2; $p = 0.002$) or the group of Men with addictions (Class 1; $p = 0.010$). There were no significant differences in alexithymia between the group of Men with addictions (Class 1) and the group of Healthy Women (Class 2; $p = 0.592$).

Regarding stressful life events, Women with EDs (Class 3) reported significantly higher level of stressful life events than the group of Healthy women (Class 2; $p = 0.031$) or the group of Men with addictions (Class 1; $p = 0.009$). There was no significant difference between the group of Men with addictions (Class 1) and Healthy women (Class 2; $p = 1.00$).

Discussion

The present study first explored the prevalence of EDs and addictive behaviours in youth population. Results show that the most prevalent disorders are alcohol, EDs, CB, drugs and GD, respectively. The empirical literature has shown that EDs and CB are more prevalent in women, whereas GD and drugs are more prevalent in men (Granero et al., 2016; Chóliz et al., 2021; Momeñe et al., 2022a). Regarding alcohol, although the prevalence tends to be higher in men, both sexes show risky drinking patterns during youth (Delegation of the Spanish Government for the National Plan on Drugs, 2020). However, there are studies with contradictory results, showing greater tendency for young women to drink alcohol, especially binge drinking (White, 2020). In this study, the sample was predominantly comprised of women, so the prevalences found are consistent with our hypotheses and previous literature in the area. Our results add to the evidence that sex and gender roles play an important role in the prevalence of specific mental health conditions and associated attitudes (Rodríguez et al., 2019; Bacigalupe et al., 2020). In this line, it has been argued that girls tend to transgress rules when this is somehow socially permitted or justified (e.g., binge drinking in adolescence and youth stages of life) and only with some types of substances or behaviours (the socially accepted or legalised ones, such as alcohol, overeating or buying; Martínez-Redondo and Luján-Acevedo, 2020).

Secondly, latent class analysis was carried out based on the risk of suffering an ED and/or addictive disorders (i.e., alcohol, drugs, GD and CB) by sex. Moreover, this study aimed to test whether alexithymia and having experienced certain stressful or traumatic life events were associated with group membership. Results have shown the existence of three main profiles. These profiles were: the first group, which was called '*Men with addictions*' (Class 1), the second group, named '*Healthy women*' (Class 2), and a third group, called '*Women with EDs*' (Class 3).

The first group, *'Men with addictions'* (*Class 1*), was composed mostly of males with high-risk behaviours of drug consumption,

TABLE 2 Comparison of latent class models.

Model	AIC	BIC	aBIC	Entropy	LMRa	BLRT
1-Class model	2221.89	2260.53	2228.80	–	–	–
2-Class model	2145.67	2260.80	2160.18	0.77	96.72***	98.22***
3-Class model	2128.34	2251.97	2150.46	0.81	38.73***	39.33***
4-Class model	2134.33	2300.46	2164.05	0.82	15.76	16.01

AIC, Akaike's Information Criterion; BIC, Bayesian Information Criterion; aBIC, sample-size-adjusted Bayesian Information Criterion; LMRa, Lo–Mendell–Rubin adjusted likelihood ratio test of K—1 vs. K Profiles; and BLRT, bootstrap likelihood ratio test of K—1 vs. K Class.***$p < 0.001$.

TABLE 3 Final model estimates in percentage scale and comparisons between classes.

Variable	Class 1 (*n*=45)	Class 2 (*n*=249)	Class 3 (*n*=58)	Comparisons					
				Class 1 vs. 2		Class 1 vs. 3		Class 2 vs. 3	
				OR [95% CI]	η	OR [95% CI]	η	OR [95% CI]	η
Sex									
Male	62.2	17.6	0.0	7.67** [3.87, 15.22]	0.37	95.53** [12.10, 754.49]	0.67	12.45* [1.68, 92.30]	0.18
Female	37.8	82.4	100.0						
Eating disorder									
No risk	74.3	97.2	0.0	0.08** [0.03, 0.22]	0.35	147.23** [18.42, 1,176,58]	0.74	1754.50** [215.17, 14360.23]	0.91
Probable risk	25.7	2.8	60.1	12.25** [4.51, 33.27]	0.34	0.24** [0.11, 0.56]	0.33	0.02** [0.01, 0.05]	0.65
Quite probable risk	0.0	0.0	39.9						
Alcohol									
No risk	19.5	78.2	77.9	0.07** [0.03, 0.15]	0.45	0.07** [0.03, 0.17]	0.59	0.94 [0.47, 1.90]	0.01
Probable risk	52.0	15.3	12.7	5.81** [2.94, 11.45]	0.32	7.62** [2.85, 20.35]	0.43	1.31 [0.55, 3.11]	0.04
Quite probable risk	28.5	6.5	9.4						
Drugs									
No risk	53.0	94.8	100.0	0.07** [0.03, 0.15]	0.45	0.04** [0.01, 0.18]	0.52	0.58 [0.13, 2.63]	0.04
Probable risk	21.8	5.2	0	5.21** [2.12, 12.78]	0.22	16.86** [2.07, 137.35]	0.33	3.24 [0.42, 25.24]	0.07
Quite probable risk	25.2	0.0	0						
Compulsive buying									
No risk	59.2	92.0	72.9	0.13** [0.06, 0.28]	0.34	0.57 [0.25, 1.31]	0.13	4.36** [2.09, 9.10]	0.24
Probable risk	26.5	7.3	15.6	4.67** [2.06, 10.56]	0.23	1.98 [0.75, 5.23]	0.14	0.42^{t} [0.18, 1.00]	0.12
Quite probable risk	14.3	0.7	11.5						
Addiction to gambling									
No risk	57.3	100.0	86.15	181.96** [23.40, 1414.95]	0.60	4.57** [1.76, 11.84]	0.32	0.03** [<0.01, 0.21]	0.31
Risk	42.7	0.0	13.5						

OR, Odd ratio. For the estimation of OR with zero cells, a fixed value (0.5) was added.
*$p < 0.05$, **$p < 0.01$.

alcohol, GD and CB, but no risk of EDs. This group reported having experienced stressful life events, as well as high scores on alexithymia (although lower than the group of women with EDs). The second group, *'Healthy women' (Class 2)*, consisted of the majority of the study sample, and was overwhelmingly female and with no risk of either addictive behaviours or EDs. Scores in alexithymia and stressful life events were the lowest of the three groups. The third group, *'Women with EDs' (Class 3)*, consisted only of females at high risk of EDs, with a tendency to dysfunctional alcohol use patterns, CB and gambling activities, but without drug use. This group exhibited the highest levels of alexithymia, as well as having suffered stressful life experiences. In fact, 'Women with EDs' (Class 3) reported significantly higher levels of stressful life events

TABLE 4 Alexithymia and stressful life events by classes.

Variable	Descriptive statistics						ANCOVA comparison between classes[a]	
	Class 1 men with addiction (*n*=45)		Class 2 healthy women (*n*=249)		Class 3 women with eating disorders (*n*=58)			
	M	SE	*M*	SE	*M*	SE	*F*	*p*
Alexithymia	53.94	14.61	46.42	14.50	59.00	16.18	9.46	<0.001
Stressful life events	3.66	0.69	3.30	0.77	3.74	0.60	7.06	0.001

[a]Age was included as control variable.

and alexithymia than the group of 'Healthy women' (Class 2) and the group of 'Men with addictions' (Class 1).

These results align with previous findings indicating the importance of alexithymia and stressful life events in explaining the onset and maintenance of impulsive risk-taking behaviours (i.e., EDs or addictions; White et al., 2018; Marchetti et al., 2019; Herman et al., 2020). A model proposed by Blaszczynski and Nower (2002) theorises that GD arises from early life stressors, suggesting that engaging in maladaptive behaviours is a way of coping with stress and emotional issues (Nower and Blaszczynski, 2004). In this sense, individuals who experience affective overload have been found to be more vulnerable to developing compensatory non-verbal strategies. It has also been argued that when people are faced with traumatic life events, they focus primarily on survival and self-protection, which could have profound effects on their emotion regulation and coping capacity (van der Kolk, 2000). That is, they may be at a higher risk of developing a coping style in which the goal is taking action rather than understanding and expressing those emotional states (Zdankiewicz-Ścigała and Ścigała, 2020).

In this vein, people with alexithymic traits generally attempt to regulate their emotional states through impulsive behaviours rather than cognitively (Shishido et al., 2013). Impaired emotion regulation has been extensively linked to the aetiology of compulsive behaviours among alexithymic individuals (e.g., binge eating, drug and/or alcohol addiction or GD; Orsolini, 2020). Studies have supported the hypothesis that alexithymia may constitute a stable personality trait, strongly influenced and caused by many factors, including stressful life and early traumatic experiences, which may, in turn, lead to increased vulnerability both to EDs and addictive disorders (Lane et al., 2000; Lyvers et al., 2019; Shank et al., 2019; Lenzo et al., 2020). According to Kaur (2019), individuals who experienced more stressful childhood experiences and reported less ability to identify their moods (i.e., alexithymia) were more likely to use an addictive behaviour as a maladaptive coping mechanism. In addition, posttraumatic disorders are significantly more recurrent in young people in treatment for addiction and EDs than those without them, and are associated with a costlier treatment and worse prognosis (Wang et al., 2020; Momeñe et al., 2022a).

Therefore, in view of the above, the results of the present study highlight the importance of examining stressful life events and alexithymia as precipitating and/or maintenance factors for engaging in risky behaviours among young people. Latent class analysis highlights that experiencing stressful life events and alexithymia may play a central role in the aetiopathogenesis, maintenance and relapses of eating and addictive disorders (Brewerton and Brady, 2014). In fact, the two risk groups (i.e., 'Men with addictions'—Class 1 and 'Women with EDs'—Class 3) reported higher scores on both factors (stressful life events and alexithymia) compared to the group with no risk of either addictions or EDs ('*Healthy women*'—Class 2). Moreover, our findings suggest that both factors are of particular relevance in the case of young women with EDs (Class 3). These results are in line with previous studies indicating that women experience more stressful life events during the life cycle, which may also be influencing their cognitive vulnerability (Hankin and Abramson, 2001). However, given that men with addictions also exhibited elevated means for both alexithymia and stressful life events, we suggest conducting studies with a larger sample of men in the future.

In conclusion, this could lead us to consider that vulnerability factors such as alexithymia and stressful life events operate generally and, therefore, the symptomatic expression and development of one of the disorders (i.e., EDs, CB, GD, alcohol or drugs addiction) is likely to be highly influenced by the associated gender roles. This may contribute to explain why, in the group analysis, EDs were found in the all-female group (Class 3), whereas drug use was found in the mostly-male group (Class 1). In the same vein, we note that in the present study, which was comprised of a predominantly female sample, the highest prevalence was shown for EDs, CB or alcohol, disorders that have been found to occur more frequently in women than in men, in both adult and young populations, as well as in clinical and general populations (Davenport et al., 2012; Otero-López and Villardefrancos, 2014; Maraz et al., 2016; Mestre-Bach et al., 2017). By contrast, GD and drugs were the least prevalent in the study sample, which comprised very few men.

Limitations and future lines

This study presents some limitations. Firstly, the study employed a cross-sectional design, which precludes establishing the direction of the associations and interpreting results in terms of causality. Longitudinal studies are needed in future studies to study in depth the interactions among variables of interest. In this regard, future lines should explore whether or not stressful life events precede addictive behaviours, including if there are different profiles depending on stressful life events occurring before or after problematic behaviours, and also if there is a difference in the interaction of the variables between EDs and addictions. Likewise, identifying which are those specific stressful or traumatic events in the individual's life could be essential to fully understanding possible predisposing, precipitating, and/or perpetuating risk factors.

Secondly, it is recommended to homogenise the sample, increasing the number of male participants in the study. Furthermore, results in this study are based on sex differences, so it would be appropriate to conduct future studies focused on gender differences. This would allow exploring and better understanding social conditions and determinants, as well as the differential needs of women and men when facing addiction. Nevertheless, we have discussed the main results based on gender analyses, to include socially constructed attributes for women and men to interpret the results obtained.

Thirdly, the MULTICAGE-CAD 4 and the SOGS scales showed low internal reliability in the present study, with Cronbach's alpha values under 0.70. This may be due to the dichotomous response of the items which may reduce the Cronbach alpha values (Greer et al., 2006;

Adamson and Prion, 2013). As well, the mixed administration method, the continent in which the sample was recruited and the non-clinical sample may explain the low values observed also in other studies (Esparza-Reig et al., 2021). Therefore, the results should be interpreted with caution and replicated with other samples and measures.

Fourthly, we note that some of the questionnaires (i.e., MULTICAGE-CAD 4) are screening tests. Therefore, it would be advisable to administer other types of complementary tests to confirm a possible diagnosis. However, screening is useful for detecting possible pathological behaviours in the general population. Moreover, considering the mean age of the participants and that there are participants from university and social networks, the results are not generalizable to older people and other diagnoses or contexts. However, the subclinical sample of this study does allow us to observe vulnerability factors in youths, which may precede the development of more severe addictive behaviours or Eds in adulthood. This is particularly beneficial for preventive purposes.

Conclusion and clinical implications

Taken together, this study demonstrates the importance of researching the impact of stressful life events and alexithymia in the development and early recognition of EDs and addictive disorders in the young population, especially among women at risk of EDs. Transdiagnostic approaches to mental health that include the identification of common risk factors, such as alexithymia or having experienced stressful life events, could support the identification of clinical phenotypes to complement and deepen prediction, prevention and/or treatment research in clinical settings.

From a biopsychosocial model, we discuss the possibility that some vulnerability factors operate generally and transdiagnostically in EDs and addictive disorders. Accordingly, the development of one of the disorders could be shaped by the individual's specific learning history and gender roles, suggesting a more general framework for integrating dispositional and learned risk factors. However, more research is needed to clarify these issues. In particular, future areas of investigation could explore how gender roles influence the development of mental disorders, as well as the influence of pathology-specific risk factors.

In summary, therapeutic techniques that promote mentalisation and the elaboration of stressful or traumatic experiences could be highly beneficial for treating EDs and addictive behaviours, in young women particularly.

Data availability statement

The datasets generated during and/or analysed during the current study are not publicly available due to confidentially. Requests to access the datasets should be directed to lauramacia@deusto.es.

Ethics statement

The studies involving human participants were reviewed and approved by The Institutional Review Board of the University of Deusto (ETK-17/20–21). The patients/participants provided their written informed consent to participate in this study.

Author contributions

LM: drafting of the manuscript, introduction, discussion, and conclusion. JM: design and target setting of the manuscript and bibliography. PM: drafting supervision and drafting of the method. MH: data analysis and results. PJ: principal investigator and coordinator of the funded project II recruitment of the sample. AE: supervision, manuscript design, and team coordination (principal investigator of the team). All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The reviewer GT declared a past co-authorship with one of the authors, AE, to the handling Editor.

Publisher's note

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Neuroscience-based psychotherapy: A position paper

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In the recent years, discoveries in neuroscience have greatly impacted upon the need to modify therapeutic practice starting from the evidence showing some cerebral mechanisms capable of coping with mental health crisis and traumatic events of the individual's life history by redesigning the narrative plot and the person's sense of the Self. The emerging dialogue between neuroscience and psychotherapy is increasingly intense and modern psychotherapy cannot ignore the heritage deriving from studies about neuropsychological modification of memory traces, neurobiology of attachment theory, cognitive mechanisms involved in psychopathology, neurophysiology of human empathy, neuroimaging evidence about psychotherapeutic treatment, and somatoform disorders connecting the brain and the body. In the present article, we critically examined sectorial literature and claimed that psychotherapy has to referred to a neuroscience-based approach in order to adopt the most tailored interventions for specific groups of patients or therapy settings. We also provided recommendations for care implementation in clinical practice and illustrated challenges of future research.

KEYWORDS

traumatic memories, attachment theory, cognitive psychopathology, empathy, neuroimaging, somatoform disorders, neuroscience, psychotherapy

1. Introduction

In the second half of the 19th century, schools in psychotherapy were born according to different epistemological constructs and methods, with the aim of removing trauma, modifying symptoms of affective nature, and promoting the development of a healthy personality (Janiri et al., 2009). Psychotherapy can be defined in relation to three main elements, that is a helping relationship established after the parent–child one, the creation of a secure base from which the therapist influences the patient through psychological techniques, and a patient who has the capacity to benefit from such an experience (Strupp, 1978). However, Freud himself first recognized the limit of the only adoption of a pure introspective approach, stating that *the deficiency in [our] description would probably vanish if we were already in a position to replace the psychological terms by physiological or chemical ones* (Freud, 1920, p. 60). He first endeavored to establish the restraint of the "*talking cure*" and to clarify that the progress of what we currently name as "neuroscience" would have achieved the result to bridge this gap (Solms and Turnbull, 2018).

With the advent of neuroscience, a highly integrated discipline, as well as astrophysics, knowledge in the fields of molecular and cellular biology, biochemistry, neurophysiology, neuroradiology, and general and experimental psychology, has harmoniously merged, creating a body of evidence of which psychotherapy has to benefit. One of the most fruitful experiences that determined a new approach to scientific research in brain science was that of Francis O. Schmitt, who set up the Neuroscience Research Program (NRP) at the Massachusetts Institute of Technology (MIT) in 1962. He intended the NRP as a research field connecting physical, biological, and neural science for a better understanding of the liaison between mind, brain, and behavior (Adelman, 2010). Neuroscience grew rapidly from this time point on as scientists from all areas of the life sciences rapidly moved into the field. This process culminated with the foundation of the Society for Neuroscience (SfN) in 1969 (Adelman, 2010).

An important turnover in the process of the emerging dialogue between psychotherapy and neuroscience was undoubtedly the scientific contribution of Kandel (1998, 2012), who went on to the Nobel Prize for medicine/physiology in 2000 by providing a breakthrough perspective on how biology has influenced modern psychiatry, especially on how memory and learning processes can explain behavior and its disorder and implications of the neurobiological research in psychotherapy. Kandel's description of the influence of culture on genetics and of the mechanism of "reconsolidation" of memory emphasizes the importance of psychotherapy for mental disorders. Particularly, practicing psychotherapy as a strategic and significant influence on the patient's living environment can be particularly effective in modeling gene expression and promoting behavioral modifications (Etkin et al., 2005).

Beyond different treatment approaches (i.e., psychoanalysis and psychodynamic therapies, cognitive–behavioral therapy, humanistic therapy, family and system psychotherapy, interpersonal psychotherapy, and integrative or holistic therapies) (Roth and Fonagy, 2005), psychotherapy involves common elements, such as verbal and non-verbal exchanges as interactions between therapist and patient, therapeutic alliance, empathy, resilience to trauma, cognitive restructuring, and new learning (Gabbard, 2009) that we currently believe psychotherapists have to read under the magnifying glass of neuroscience. Currently, on at least six major study areas, some of which already pointed out in Janiri et al. (2009), neurosciences have provided valuable contributions to the understanding of the neurobiological substrate of brain changes useful for psychotherapy practice: memory of trauma, neurobiological correlates of human attachment, mirror neurons system and theory of mind (ToM), brain modifications after psychotherapeutic treatment, and somatic symptoms and disorders. To let the scientific audience better focus on these areas, we provided a summary table for each section of the manuscript reporting major recommendations for mental health practitioners. We firmly affirm that psychotherapists in the modern era can no longer ignore discoveries in the field of neuroscience and have to learn from them in order to implement their clinical practice.

2. Psychotherapy of traumatic memories

There are organic molecular mechanisms that are fundamental for the establishment of long-term memories. For instance, the corticosterone hormone, which corresponds to the cortisol in humans, released after a stressor input in animals, rapidly interacts with growth factors produced in the brain, in particular with the brain-derived neurotrophic factor (BDNF), a neurotrophin essential for long-term synaptic plasticity (Alberini, 2009). These mechanisms occur in the medial temporal lobe, specifically in the hippocampus, which plays a central part in long-term memory formation (Johnston and Amaral, 2004). Peripheral BDFN levels are lower in psychiatric disorders (Boulle et al., 2012), and a recent systematic review has shown that BDNF seems to present variations after psychotherapy, especially in patients with bulimia, post-traumatic stress disorder (PTSD), insomnia, and borderline personality disorder, with a reduction in symptomatology (Claudino et al., 2020).

Memory represents a system of brain networks that presides over different functionally coordinated and anatomically independent cognitive mechanisms sharing the ability to store information (Squire, 2004). Particularly, explicit (or declarative) memory is involved in the psychotherapeutic process. As reported in Freud-Fliess Letters (1887–1904), *Our psychic mechanism is formed, is created through a process of stratifications. The material that is present as memory or trace of memory undergoing continuous reconstruction, a renewal with respect to the present, to new circumstances. Memory is not present once, it does not remain as a single trace but continues to renew itself* (Albertini, 2014). Research in neuroscience has documented that the storage of memories is allowed in relation to a certain level of stress (Schwabe et al., 2012). When the stress level is relatively moderate, memories are formed and retained, and when the stress becomes too prolonged or intense, it generates a negative effect on memories that can even be lost, like in the case of trauma (Alberini, 2011). Moreover, regardless of its valence (i.e., positive *vs.* negative), the intensity of an emotion experienced during an original event increases the likelihood that the memory will be recalled later. Scientific evidence has shown that an increased arousal results in a more augmented physiological interaction between the amygdala and the hippocampus, leading to an enhanced encoding and long-term consolidation of information (Lane et al., 2015).

Starting from these findings, it is possible to advance hypotheses on the mechanisms that take place in the room of the psychotherapist when memories are remembered by the patient, precisely traumatic ones. Reconsolidation mechanisms would offer the opportunity to restore memories with a different emotional level, that is, lower stress intensity and greater control. At a molecular level, memory consolidation of an experienced event (i.e., long-term memory) is formed as synaptic connections within a set of neurons (Gallistel and Matzel, 2013). To this end, an experienced event induces a neuronal depolarization and an influx of intracellular Ca^{2+}, which initiates a downstream molecular cascade that results in the transcription and translation of plasticity-related proteins (PRPs) inducing changes in neuronal networks as remodeled synaptic connections (Sekeres et al., 2017). The activity among synaptic connections leads to the development of "memory engram" requiring a period of quiescence to be stabilized that can be potentially interrupted by protein-synthesis inhibition or interference from new learning (Sekeres et al., 2017). The multiple trace theory (MTT) (Nadel and Moscovitch, 1997; Moscovitch and Nadel, 1999) offers insight into how the repeated recollection of prior events can transform memory representations. Accordingly, the establishment of long-term memory involves a long interaction between hippocampal regions of the medial temporal lobes and medial prefrontal cortex. MTT proposes that each time an episodic memory is elicited by active retrieval or recollection, an update trace is created, incorporating information from the old trace and new recall. According to Albertini (2014), *remembering with the psychotherapist* creates the possibility of associating old reactivated memories with new ones moving from painful experiences faced during treatment. In the presence of new elements and of the support given by the therapist, restored memory has different qualities (i.e., less traumatic and emotionally intense). MTT supports that memories are not the same record of the original event but undergo updating and reshaping as they age and when they are altered by recollection during psychotherapy (Lane et al., 2015).

The psychotherapeutic process promotes the possibility of associating old memories reactivated with new experiences of the present, thus soliciting a real behavioral change (Lane, 2020).

A number of psychotherapeutic techniques are considered in the emerging field of "memory therapeutics" including accelerated resolution therapy, rewind techniques, cognitive restructuring, and imagery modification. They aim to help the patient to feel less distressing sensations during memory reactivation, achieve a novel perspective about past negative events, rescript a different ending, and transform trauma using metaphors (Waits and Hoge, 2018). Since memory traces of traumatic events can be weakened, it is helpful to underline the influence of experiences made during psychotherapeutic treatment. Specifically, a distinct type of successful traumatic memory processing in PTSD psychotherapy includes threat processing by intensive imaginal memory retrieval through the support of the therapist for the reappraisal of the event, self-referential reflection on associated beliefs and emotions, and memories retelling (Ford, 2018).

Key points

- The BDNF—which is related to synaptic plasticity—seems to be low in psychiatric disorders;
- A moderate level of stress is necessary for memory storage;
- Memory reconsolidation supports the psychotherapeutic process for the creation of alternative ways of behaving; and
- Psychotherapy of traumatic memories consists of specific techniques in the case of PTSD.

3. Neurobiology of attachment therapy

According to Holmes (1993), attachment theory provides a psychological grounding that is applicable to all forms of psychotherapy in terms of a secure base (i.e., consistency, regularity, and reliability, a combination of warmth and firm boundaries), emersion of autobiographical competence (i.e., a secure attachment in therapy enables the patient to tell a different story about himself/herself), ability in processing affect (i.e., primitive emotions aroused in therapy are modulated by the attunement of the therapist and become manageable for the patient), and coping with loss (i.e., the expression of repressed pain or the modulation of unprocessed angry is an important part of each psychotherapeutic treatment). Attitudes and behavioral modifications of parents during the maternal gestational period, childbirth, breastfeeding, and in the first 3 years of the child's life imply a synergy between hormonal and neurochemical systems and lead to changes in brain structure and functionality, stimulating or inhibiting certain brain areas (Kim, 2016; Grumi et al., 2021). Early life experiences with the own caretakers have a huge impact on the child's brain development because repeated relationship patterns shape undifferentiated neurons into coherent firing networks supporting specific cognitive-affective brain structures (Schore, 2003; Kandel et al., 2013; Grawe, 2017; Siegel, 2020). The attachment relationship between the baby and the primary caretakers represents the link between the neurobiological programming of brain development and early care experiences. The child's bond to caregivers is implicated in the development of the right hemisphere and of specific brain areas (i.e., prefrontal cortex, orbitofrontal cortex, and limbic system) conditioning interpersonal relationships. In fact, such brain areas are involved in the processing and expression of emotional information and influence affective states' modulation and decoding of facial expressions, gestures, and prosody (Etkin et al., 2015). Remarkably, starting from a neuropsychoanalysis perspective, Schore (2022) contended that the right brain represents the psychobiological substrate of the unconscious human mind, as first described by Sigmund Freud, able to process emotional stimuli with implicit attention outside the role of awareness. Early relational experiences with caretakers are transferred into the psychotherapeutic process. Maternal and paternal mental illnesses in the perinatal period negatively impacting the interaction with the baby represent risk factors for the development of the parenting style because they may inhibit the abovementioned child's brain areas (Stein et al., 2014; Lautarescu et al., 2020). Conversely, when parental care contemplates the growth needs of the child, and neuronal networks conform to ensure positive responses to the environment, adults presenting with secure attachment show higher levels of reflective functioning and mature defenses that serve in better regulating affective states than those with insecure attachment (Tanzilli et al., 2021).

3.1. Perinatal psychotherapy

With the acronym Perinatal Mood and Anxiety Disorder (PMAD), a consensus in the scientific community has been obtained about the need to go beyond a focus on postpartum depression in the perinatal period toward a more comprehensive mother' symptomatology, including the spectrum of depressive and anxiety disorders, the obsessive–compulsive disorder, the PTSD and the puerperal psychosis (Byrnes, 2018). Furthermore, fathers may display anxiety disorders, somatic symptoms, hypochondria, substance abuse, and behavioral reactivity as maladaptive responses to paternity (Baldoni and Giannotti, 2020). To address these issues, perinatal psychotherapy assumes a fundamental part in caretakers' health regarding manifestations of mental suffering, starting from the multifactorial etiopathogenetic origin of maternal and parental mental illnesses, including neurobiological and hormonal modifications due to childbirth. The activation of the superior temporal sulcus, the amygdala, the right inferior frontal gyrus, and the insula is particularly sensitive to changes in hormonal levels involved in parental care, including augmentation in oxytocin and vasopressin levels in both parents and decrement in testosterone and estradiol for men (Abraham et al., 2014; Witteman et al., 2019). Interesting advances in psychotherapy research have recently highlighted the role of some hormones, such as cortisol and oxytocin, in mediating the relationship between the therapist and the patient, too. The cortisol, or the stress hormone representing the final product of the hypothalamic–pituitary–adrenal axis, is secreted in psychosocial stress contexts (Dickerson and Kemeny, 2004) and is capable of modulating the emotional experience influencing the affect. For instance, higher cortisol levels are associated with significant increases in negative affect in patients with major depressive disorder (MDD) (Booij et al., 2016). Levi et al. (2021) have studied the extent to which therapist's cortisol modulates patient's affect during psychodynamic psychotherapy of MDD by collecting salivary samples before and after specified sessions and data from patient's retrospective reports of in-session affect. The study provided initial evidence that the positive or negative affect of the patient is mediated by the therapist's changes in cortisol levels, supporting the importance of a special social support context built by the interpersonal relationship as an empathic response to the stress manifested by depressed patients. When in a safe situation, a person profoundly perceives his/her engagement, the oxytocin may also be released, supporting reciprocity, empathy, compassion, and synchronized behavior and characterizing parent–infant relationship (Schneiderman et al., 2012; Feldman, 2017). Oxytocin, as the neurohormone associated with care behavior, is implicated in the pathophysiology of MDD in humans (Engel et al., 2019), too, and it is a potential candidate for explaining treatment outcomes in relation to patient–therapist synchrony. Zilcha-Mano et al. (2020) have demonstrated that psychotherapeutic treatment is effective when patients suffering from MDD and therapists are biologically synchronized in oxytocin levels change, giving cutting-edge directions for future research. Starting from these preliminary findings, we think that psychotherapists working on perinatal mental health should reflect on how they build a supportive context and place themselves in sync with the patient since this can actually affect his/her affective state with significant implications for the child's care.

3.2. Couple psychotherapy

The integration of the attachment theory with neuroscience also poses a relevant application in the psychotherapy of couples about the dyadic affect regulation during treatment. The goal of neuroscience-based psychotherapy in this specific setting is to help each partner understand his/her part in altering the relationship, starting from personal attachment needs and psychophysiological reactions elicited in the communication with the significant other. By understanding how each partner's nervous reaction is affected by emotional reverberation triggered in the couple's interaction, partners can be treated in psychotherapy to recreate greater emotional control and a secure relationship base (Goldstein and Thau, 2004). When a couple's attachment schema is breached, partners may seek treatment, and psychotherapy plays a pivotal role in restoring a balance between them. Particularly, they should be encouraged to become progressively aware of their unconscious, implicit memories driving personal communication patterns (Schore, 2003). In this way, when partners get into a crisis and start psychotherapy, they are stimulated to progressively recognize the subcortical emotional system they have constructed during the love affair in order to rebuild it in a creative and positive manner. The therapist has to be able to normalize conflictual states by soliciting the couple to pay attention to autonomic responses to dangerous, frightening, and disruptive stimuli, which may be conveyed in the communication between partners, in order to control them and promote assertiveness.

Key points

- An attachment-based approach in psychotherapy looks at the connection between the infant's primary experiences and caregivers' responses;
- The development of the right hemisphere and of the prefrontal cortex, orbitofrontal cortex, and limbic system is influenced by such a relationship in childhood;
- Perinatal psychotherapists should pay attention to neurochemical and hormonal modifications in new parents;
- The awareness of the subcortical emotional system driving interpersonal communication between partners is a goal of neuroscience-based couple psychotherapy.

4. Cognitive psychopathology and psychotherapy

Cognitive defect varies to some extent in psychiatric disorders (Millan et al., 2012). However, it is still unclear how cognitive deficits may limit the ability of patients to actually attend psychotherapy or how cognitive problems may preclude a positive response to treatment. Cognitive symptoms such as those related to frontal lobe damage provoke a series of cognitive (e.g., disturbances in attention, planning, rigidity, inertia, criticism, control, inhibition, and decision-making) and emotional deficits (e.g., apathy, abulia, anhedonia, impulsiveness, behavioral inadequacy, aggression, and sociopathy) can greatly impact psychological interventions in patients with neurological disorders (Robinson et al., 2019) or acquired brain injury (Thøgersen et al., 2022). Psychotherapists have to be aware of executive dysfunction hindering the therapeutic process as an impairment that can strongly restrain its effect (Diamond, 2013; Cozolino, 2017), specifically in the case of particular approaches designed for older adults because of diminished specific frontal skills reported in elderly (Goodkind et al., 2016).

In this context, cognitive psychopathology offers an original contribution to psychotherapy for an in-depth understanding of psychiatric disturbances by making available the broad patrimony inherited from modern clinical neuropsychology (Timpano Sportiello, 2008). In particular, it can contribute to improving psychotherapeutic practice by refining the diagnosis and the differential diagnosis, offering relevant information to be provided to psychiatrists in the case of patients following combined treatments (i.e., neuropsychopharmacology), and enhancing the reliability of the prognostic judgment, also in relation to psychosocial rehabilitation interventions (e.g., behavioral skills training in psychiatric disorders). Cognitive dysfunction predicts psychosocial impairment; thus, its assessment is fundamental for rehabilitation purposes, especially in the case of severe psychiatric diseases (Etkin et al., 2022).

Disturbances in autobiographical memory, reality testing, interpretation of others, and fragmentation of a person's thought as an individual apart from everyone else are the consequences of the disruption of the "Default Mode Network" (DMN) (Raichle and Snyder, 2007; Andrews-Hanna et al., 2014; Mak et al., 2017) and are present in anxiety, depression, PSTD, and schizophrenia (Broyd et al., 2009; Cozolino, 2017). Neural areas, including the medial prefrontal cortex, the midline regions of the posterior cingulate cortex, and the precuneus region of the parietal cortex that turned on/off only to self-related task engaging of an individual, have been recently shown to support the DMN (Raichle and Snyder, 2007; Mak et al., 2017; Buckner and DiNicola, 2019). These findings have sustained the hypothesis that it may be the neuronal basis of the *Self* (i.e., personal and social awareness and ability in differentiated cognition and perception) (Faustino, 2022). Moreover, the dorsolateral prefrontal cortex, which is considered the neural circuit of working memory, also enables us to pay attention to something in the *here-and-now* (Siegel, 2006). Results are fundamental in psychotherapy—especially in Gestalt therapy—because its normal functioning permits to place the basis for the correct understanding of present feelings, emotions, and interpersonal reactions as they occur in the ongoing treatment sessions with no or little emphasis on past experiences. In a few words, it allows patients to concentrate on a new way of behaving built together with the psychotherapist.

The cognitive psychopathology perspective proposes that cognitive dysfunctions, which are closely related to emotional and relational processes, may contribute to the development, maintenance, and recurrence of psychiatric symptoms (Seron and Van der Linden, 2000). Psychotherapists must be exercised in drawing specific conclusions from a deep investigation of patients, including their cognitive evaluation, with the aim of taking into account particular mechanisms associated with mental pathology during the treatment course. Cognitive impairment consisting of dysfunction in working memory, attention/executive functions, processing speed, and visual and verbal learning represents a core feature of schizophrenia that is present in 62%–98% of patients and has been described in the first psychiatric episode, in healthy close relatives and in persons at high risk of developing the disease, and both in ongoing and remission phases (Morozova et al., 2022). Anxious symptoms produce significant deficits in attention control efficiency, especially in inhibition and switching (Shi et al., 2019). Symptoms frequently complained by depressed patients include attentional lability, concentration difficulties, dysmnesia (e.g., forgetfulness and word-finding difficulty), problem-solving, decision-making, judgment, and mental slowness (Richardson and Adams, 2018), whereas cognitive impairment in bipolar disorder is not limited to the affective episodes but persist in euthymic phases and mainly pertain attention, executive functions, learning, memory, and psychomotor speed (Cipriani et al., 2017). Patients with obsessive–compulsive disorder are significantly impaired in visuospatial memory, executive functions, verbal memory, and verbal fluency (Shin et al., 2014). Poor executive or "top-down regulation" of appetitive (i.e., reward, incentive salience) or aversive (i.e., stress, negative affect) processes is recognized as a basic impairment in behavioral addiction and a potentially relevant target for intervention, too (Ramey and Regier, 2019).

Cognitive remediation (CR)—sometimes referred to as cognitive enhancement therapy—is an intervention targeting cognitive deficits using scientific principles of learning in order to improve functional outcomes and rehabilitation of life skills (Wykes, 2018). CR has been conducted in various psychiatric disorders. Empirical evidence supports its efficacy in schizophrenia (Vita et al., 2021). CR techniques have also been applied to eating and weight disorders, attention-deficit hyperactivity disorders, mood disorders, anxiety disorders, substance use disorders, and autism spectrum disorders (Kim et al., 2018). We encourage psychotherapists to practice cognitive remediation techniques before treatment, especially when patients are so ill, in order to train them in promoting reflection on their thinking styles and exploring new strategies for everyday life. Such an approach may decrement the high dropouts rate from treatment, increase engagement in the therapeutic alliance (Tchanturia and Hambrook, 2010), and provide an opportunity for extending cognitive improvements to everyday functioning (Wykes, 2018) before discussing about feelings and emotions representing the core elements of the psychotherapeutic process.

We also affirm that the relationship with the psychotherapist does not only work because of the emotional bond with the patient but also when the practitioner is able to assign him/her adequate cognitive tasks in real life by taking into account the cognitive biases specifically characterizing personal cognitive profile. Only a correct weighting of what the patient is able to transfer from the therapeutic session to practical life experiences provides a concrete possibility of change. This becomes particularly true for cognitive–behavior psychotherapy (CBT) using homework assignments in order to maximize its effect (Kazantzis et al., 2005). Quite recently, a neuroscience-informed cognitive–behavioral approach (i.e., "The Waves of the New ABCs") was developed to describe a continuous processing of internal and external stimuli that results in emotions, behaviors, and thoughts using the ABCDE model (Field et al., 2015), too.

Finally, with specific regard to depression, cognitive psychopathology can offer useful indications for psychotherapeutic treatment. We stress that the medial and orbital prefrontal regions play a key role in mediating the interaction between affective states and cognition: Depressed patients show facilitation of performance when responding to stimuli with a negative emotional tone (Elliott et al., 2002). Remarkably, mood-congruent memory (MCM) represents a psychological phenomenon where emotional memory is biased toward contents affectively congruent with a past or current mood (Faul and LaBar, 2022). Especially in the case of the MCM phenomenon, we recommend psychotherapists to operate through normalizing a deranged cognitive control process, which determines that information with an adverse emotional tone is recorded and recalled more successfully, contributing, in turn, to mood deflection. In the opinion of the authors, since psychophysiology consists a part of clinical neuroscience (Rabavilas and Papageorgiou, 2003), it appears advantageous to monitor psychophysiological variations associated with the MCM phenomenon through the ambulatory technological system (Loeffler et al., 2013), in order to allow the patient a more comprehensive appraisal of his/her emotional involvement in remembering evocative stimuli. Biofeedback instrumentation is able to identify maladaptive physiological responding and recognizing of mind-body connections can further facilitate psychotherapeutic progress.

Key points

- Cognitive deficits—especially executive ones—may preclude a successful psychotherapeutic treatment;
- The DMN may be recognized as the neuronal basis of the *Self* and its disruption is present in anxiety, depression, PSTD, and schizophrenia;
- Psychotherapists should assess their patients in terms of cognitive functioning according to the neuropsychological impaired profile typically reported in a specific psychiatric disease;
- CR therapy should be practiced by psychotherapists in the case of patients with serious illnesses prior to the treatment, with the final aim of a better therapy start;

- Homework assignments used in CBT should be formulated according to the potential cognitive deficits reported by patients in treatment; and
- Psychotherapists performing retrieval of memories during treatment should pay attention to the MCM phenomenon in the case of patients suffering from MDD.

5. The therapeutic process of human empathy

The mirror neuron system (MNS) represents a distributed network of brain cells that discharges when a primate performs an action or observes an action performed by a similar one (Jeon and Lee, 2018). The MSN plays an important role in imitative behavior, especially in deciphering others' actions. They were originally found in the macaque's brain on the ventral premotor cortex and inferior parietal lobule (IPL) (di Pellegrino et al., 1992; Gallese et al., 1996; Rizzolatti et al., 1996). Later neuroimaging studies revealed corresponding activations in some human brain districts, that is, the prefrontal motor cortex, the areas around the intraparietal sulcus, and the supratemporal sulcus (Jellema and Perrett, 2003; Puce and Perrett, 2003; Rizzolatti and Craighero, 2004; Fogassi et al., 2005). Remarkably, the IPL visuo-motor organization receiving visual information from the eyes and somatosensory information from the mouth, the hands, and the arms calls into question the evidence that it may represent the neural basis of the ability to understand the intentions of the actions performed by others (Fogassi et al., 2005).

Mirror neurons are not only involved in motor perception but also in interpersonal cognition (Baird et al., 2011), suggesting that people perceive emotions in others by activating the same emotional response in themselves (Gallese, 2003). Although no conclusive evidence for a "broken mirror theory" has been provided, it has been hypothesized that a neuropathological functioning of the brain structures associated with mentalization deficits may exist in some psychiatric disorders characterized by social-cognitive deficits such as schizophrenia (van der Weiden et al., 2015) and autism spectrum disorders (Cattaneo et al., 2007; Gallese et al., 2013). Deficits in social cognition would depend on the particular function investigated (e.g., social threat and facial recognition) and are associated with characteristic symptoms of specific personality disorders (Herpertz and Bertsch, 2014).

Beyond the MSN, the empathy-related processing largely used in the therapeutic relationship also involves the temporo-parietal areas, the prefrontal cortex, and the temporal poles as a neurobiological substrate of the ToM, referring to the metacognitive ability to infer another person's mental state from his/her experiences and behavior (Vogeley et al., 2001; Vogeley and Fink, 2003; Frith and Frith, 2007; Schulte-Rüther et al., 2007). Remarkably, the dorsolateral prefrontal cortex strongly participates in the empathic response through emotion regulation and perspective-taking, and such capacities are reflected by brain structural variations in psychotherapists. Domínguez-Arriola et al. (2022) have demonstrated that psychotherapists display a significantly thicker left dorsolateral prefrontal cortex on the A9/46d region than non-therapists and that it correlates with the Empathic Concern (EC) scale score but not with any of the other psychometric measures adopted in the study. The authors concluded that the greater thickness of this region could reflect a superior tendency to regulate one's affective state in a professional context that demands augmented empathic skills than other jobs.

Scientific evidence on human empathy research is consistent with Kohut's emphasis on the therapeutic understanding of the patient prior to the interpretation of his/her dynamics (Stone, 2005). The discovery of mirroring mechanisms generates interesting implications for psychotherapeutic practice. The patient has an innate and programmed capacity to internalize, embody, and imitate the state of another person, and through psychotherapy, he/she can discover himself/herself in the other's mind (Janiri et al., 2009). Accordingly, proximity to the patient (i.e., proxemics), bodily movements (i.e., kinesics), and paralanguage (i.e., a no-lexical component of speech) are fundamental dimensions in the therapeutic setting (Cappas et al., 2005) that have to be correctly managed by psychotherapists prior to discuss about feelings and emotions (Faustino, 2021).

The knowledge of the neurophysiology of human empathy is also fundamental in social behavior, and group psychotherapy can take advantage of it. Psychotherapy can use the power of relationships to help patients increase wellbeing and enhance interactive capacity in familiar and social environments, and group therapy offers a unique setting to this end. According to Badenoch and Cox (2010), the brain's capacity to change is sensitive to environments providing moderate emotional arousal, attuned interpersonal relationships, and experiences that disconfirm earlier implicit learnings. Furthermore, the practice carried out by a patient in a group setting allows them to observe from their own mind the minds of others and concurs in the ability to elaborate emotional states associated with past memories through increased integration between the middle prefrontal cortex and limbic regions, creating a broader sense of confidence and stability (Siegel, 2007) through discussion with the group. As the limbic region becomes more dominated by emotional resonance circuits than in the past, internal and behavioral reactivity to activating stimuli decreases, providing the possibility to experiment with control thanks to the group as a source of response regulation (Badenoch, 2008). According to Schermer (2010), beyond mirroring and identification among group members, therapist attunement and interpretation represent two relevant features of group psychotherapy. The therapist attends the non-verbal and paraverbal communication as an expression of bonding and mutuality that emerge in the group. Since mirror neurons can register shared intentions, goals, and emotions, they impact the ongoing cohesion, norms, affective tone, and objectives of each session. Moreover, when the group is a close-knit one, and the psychotherapist has been able to nourish it, members often feel as if they can anticipate what someone is going to say next in the session, and such an impression is therapeutic because it helps members to feel less alone with their troubles and tuned with each other.

Finally, we also stress that psychotherapy practice based on empathic resonance is highly relevant in re-experiencing distressing life episodes to significantly impact response prevention by restraining patients from the use of unhelpful coping mechanisms and by improving behavioral control. Furthermore, it can exert an emotional regulation upon anger, guilt, and anxiety intensity and provides reassuring experiences that can permanently modify the implicit coding of stressful events. This is particularly true in PTSD, which is characterized by trauma re-experience, emotional numbing, avoidance, and exaggerated arousal (Frans et al., 2005). According to Peri et al. (2015), *face-to-face* exposure to traumatic memories in a safe environment with the psychotherapist may improve the acquisition of emotion regulation leading the patient to create new associative brain networks. Through the use of such a technique, modulated emotional responses are mirrored back to the patient by the psychotherapist allowing him/her to re-experience painful emotions in a controlled manner.

Key points

- The MNS and the ability of the ToM support therapeutic relationship, and psychotherapists should be aware of this;
- The patient can discover himself/herself in the psychotherapist's mind during treatment and better hold his/her negative emotions;
- Group psychotherapy supports empathic resonance among members able to strength attentional control over the limbic system reactivity; and
- The exposure technique to traumatic memories in PTSD should be done in a *face-to-face* manner between the patient and the psychotherapist in order to improve emotional regulation.

6. Neuroimaging and psychotherapy

Psychotherapy represents a well-established strategy for a large part of psychiatric disorders. Despite this, psychotherapeutic interventions do not equally work for all patients because mechanisms through which they may reduce symptomatology remain difficult to fully understand. However, with the advent of neuroimaging techniques, researchers have new tools to find biomarkers of brain functioning associated with psychotherapeutic treatment or recognized as outcome predictors. Neuroimaging of patients with psychiatric disorders has revealed variances from healthy individuals, such as differences in measures of regional cerebral blood flow (rCBF), changes in local blood oxygenation level dependent (BOLD), brain metabolites levels, and functional connectivity (Weingarten and Strauman, 2015). Functional imaging methods comprise several types of modalities, such as functional magnetic resonance imaging (fMRI), positron emission tomography (PET), and single-photon emission computed tomography (SPECT). With different advantages and limitations (Peres and Nasello, 2008), such techniques share two general approaches to the study of psychotherapy effectiveness, that is, the usage of neuroimaging in the pre/post-treatment and the identification at baseline of brain-based predictors of response to treatment (Weingarten and Strauman, 2015).

With regard to the first approach, neurobiological research has shown a shared neural circuitry of emotion dysregulation associated with anxiety and depression. Prefrontal cortical regions, including the anterior cingulate cortex, the dorsomedial and ventromedial prefrontal cortices, as well as dorsolateral and ventrolateral prefrontal cortices, provide a "top-down regulation" over limbic regions (i.e., the amygdala, the hippocampus, and the insula) reacting to emotional information (Fournier and Price, 2014). Psychotherapeutic techniques relying on cognitive mechanisms associated with frontal domains, such as logical reasoning (e.g., emotions labeling), problem-solving, cognitive reappraisal, cognitive restructuring, modification of patient's self-representations, and mindfulness (Frewen et al., 2008) can help in remediating the inefficiency of such a regulation, by modulating reaction to negative emotional stimuli (Fournier and Price, 2014). Specifically, research in mindfulness currently integrates theory and methods from eastern contemplative traditions, western psychology, and neuroscience and is based on neuroimaging techniques, physiological measures, and behavioral tests (Tang et al., 2015). In addition to this, complementary emotion-focused techniques, such as experiential focusing, systematic evocative unfolding, evocative experiential states, and relaxation techniques (e.g., diaphragmatic breathing and progressive muscle relaxation) can contribute to enhancing emotional soothing by a "bottom-up regulation" of the subcortical network, too (Faustino, 2022). In light of this, we highlight that a top-down and bottom-up integrated approach to the treatment of anxious or depressive symptoms is necessary to counteract the symptomatology reported by the patient. A very recent systematic review of fMRI studies examining the neural basis of CBT concluded that although anxiety and associated disorders are mediated by different neural circuitry, it can increase prefrontal control of subcortical structures (Brooks and Stein, 2022). In a pool of fMRI studies, it has also been reported that amygdala hyperactivation in PTSD is due to the ineffective inhibitory control by the medial prefrontal cortex (Stevens et al., 2013), while dysregulation in corticostriatal circuitry has been reported to describe the neuropathology of obsessive–compulsive and related disorders (Milad and Rauch, 2012).

With regard to the second approach, the use of neuroimaging to identify predictors of treatment outcomes in patients with psychiatric disorders has been rapidly increasing in the last few years (Weingarten and Strauman, 2015). Sectorial literature investigating predictive neuroimaging markers of psychotherapy response has specifically suggested that the anterior cingulate cortex, amygdala, and anterior insula emerged as potential markers in MDD and some anxiety disorders (Chakrabarty et al., 2016). Two resting-state PET studies found that CBT responders have lower pretreatment metabolic activity in the subgenual anterior cingulate cortex (Konarski et al., 2009; McGrath et al., 2013); a hypometabolism of the right anterior insula was also found as associated with the positive response to CBT (McGrath et al., 2013). Other resting-state functional studies showed an increased orbitofrontal cortex activity as associated with response to behavioral therapy in obsessive–compulsive disorder (Brody et al., 1998; Yamanishi et al., 2009). In a sample of patients with panic disorder, an improved response to exposure-based CBT was predicted by increased pretreatment activation in the bilateral insula and left dorsolateral prefrontal cortex during threat processing, as well as increased right hippocampal gray matter volume (Reineke, 2014). An fMRI study concluded that the excessive amygdala response to fear reflecting difficulties in managing anxiety reactions elicited during CBT might limit optimal response to therapy in PTSD (Bryant et al., 2008). Hyperactivity of higher-order visual areas as a reaction to emotional stimuli was associated with a response to CBT for social anxiety (Doehrmann et al., 2013; Klumpp et al., 2013). CBT response was also predicted by pretreatment activity in prefrontal regions and the amygdala in patients with a generalized social anxiety disorder (Klumpp et al., 2014). Recently, it has been reported that the resting-state pretreatment metabolic activity in the fronto-insular cortex may distinguish between patients likely to respond to psychotherapy, while high metabolic activity in the subgenual anterior cingulate cortex may be predictive of poor outcomes in MDD (Dunlop and Mayberg, 2014).

We conclude that research in brain imaging and psychotherapy may increase the availability of evidence-based standardized protocols for selected groups of patients affected by psychiatric disorders. Since psychotherapy requires a considerable amount of time and effort, having the means to foresee from the beginning whether a patient is likely to benefit from treatment could be of great clinical utility, and neuroimaging represents a promising method to this end. However, research in this area needs to acquire other evidence, and a certain amount of caution must be used with respect to the single patient application of brain imaging techniques which should be corroborated by comparison of altered neurophysiological patterns typically involved in the same clinical population.

Key points

- Neuroimaging techniques can be used to find biomarkers of brain functioning associated with psychotherapeutic treatment or to recognize outcome predictors;
- A neural circuitry of emotion dysregulation is associated with anxiety and depression symptoms, and psychotherapists should perform bottom-up and top-down regulation techniques to better control them;
- Research in brain imaging and psychotherapy may increase evidence-based standardized protocols for selected groups of psychiatric patients in order to augment treatment response and cost-effectiveness of health outcomes; and
- Technical and statistical limitations of integrating single-case (functional) neuroimaging and psychotherapy should be considered by therapists.

7. Interpersonal neurobiology perspective for somatic symptoms and related disorders

Various definitions, including "psychosomatic symptoms," "functional symptoms," "subjective health complaints," "somatization," "somatic symptom distress," and "bodily distress," have been used to depict a person's suffering related to physical symptoms (Van den Bergh et al., 2017). Diagnostic categories of *Somatic Symptom Disorder* (SSD) in the *Diagnostic and Statistical Manual for Mental Disorders*, fifth edition (DSM-5) (APA, 2013), *Somatoform Disorders* in the 10th Revision of the *International Statistical Classification of Diseases and Related Health Problems* (ICD-10) (World Health Organization, 2004) or *Bodily Distress Disorder* in the ICD-11 (WHO, 2019) are currently used in psychiatry nosography to classify the suffering of a person with a significant focus on physical symptoms such as pain, weakness, and breathlessness to a level that results in significant distress and functional limitation, low quality of life, work participation, and social interaction. Physical symptoms may or may not be associated with a diagnosed medical condition; however, the emphasis is on excessive thoughts, feelings, or behaviors related to their monitoring. Bodily distress is higher associated with depression and anxiety than specific medical conditions with comparable symptoms and well-defined organic pathology (e.g., IBS vs. inflammatory bowel disease, FMS vs. rheumatoid arthritis) (Henningsen, 2022). Moreover, individuals with somatic symptoms and related disorders experience difficulty in accepting that their concerns are excessive and prefer consulting general medical services rather than mental health services, which result in increased healthcare costs. A meta-analysis found that approximately 30% of patients in primary care settings fulfill the criteria for somatic symptoms disorder, and up to 50% of them present with at least one physical complaint (Haller et al., 2015).

Somatic symptoms and related disorders are challenging to treat for psychotherapists (Weigel et al., 2020). Because patients with somatic symptoms and related disorders are notably heterogeneous with respect to the nature and origins of their problems, the ability to design tailored interventions represents a central feature (Luyten and Fonagy, 2020). In the opinion of the authors, a neuroscience-based psychotherapy approach to such disorders should be performed within the framework of interpersonal neurobiology (IPNB), a scientifically grounded theory developed by Siegel (1999) as a field combining a wide array of science branches. The IPNB addresses three fundamental aspects of life, that is relationships (i.e., the sharing of energy and information flow), the brain (i.e., the embodied mechanisms of energy and information flow), and the mind (i.e., an emergent self-organizing activity of the brain regulating the flow of energy and information). Siegel stated that *A healthy mind is a mind that creates integration within the body and its brain* (…) (Siegel, 2019, p. 229). "Integration" represents the basis of harmony in human beings and is essential for their health. The IPNB perspective supports the hypothesis that mental disorders are both an outcome of blocked integration and result in further impairments to integration (Siegel, 2012). The integration or linking of differentiated parts of a system can be seen as the fundamental process of wellbeing and appears to be at the core of emotional regulation. Neural integration, enabling differentiated areas to communicate effectively to be part of a functional whole, can promote emotional regulation (Siegel, 2019). To this end, the "vertical integration" invoked by the author (Siegel, 2006) includes body-proper sensations, brainstem, limbic circuits, and middle prefrontal cortex structures. In the opinion of the author, this can be particularly relevant for somatic symptoms and related disorders treatment in order to transform a disconnected way of living into a more integrated personal identity. We think that mindful awareness training as a form of internal attunement (Siegel, 2012) can constitute an example of an intervention from which such a kind of mental disorder may benefit. Reducing physiological arousal and interoceptive hypervigilance through relaxation and exploring emotional control, experiences, expectations, beliefs, and illness behavior, as well as correcting catastrophic misinterpretations of somatic sensations (Van den Bergh et al., 2017; Henningsen, 2022) during psychotherapeutic treatment can further enhance the vertical integration.

Key points

- The IPNB developed by Siegel (1999) may explain in more detail the need for integration between the body and the mind for subjective wellbeing;

- A "vertical integration" of body-proper sensations, brainstem, limbic circuits, and middle prefrontal cortex structures supported by specific techniques may aid the treatment of somatic symptoms and related disorders.

8. Discussion

According to previous attempts to point out neuroscience-based psychotherapy principles (Cappas et al., 2005; Faustino, 2021), the traditional dualism between brain and mind is no longer tenable. In the near future, we wish that neuroscience-based psychotherapy can contribute to the unification of its fragmented field, given that each specific school approach explains only 8% of the variance of the results and the most important common factor called into question to explain the patient's change after treatment is the therapeutic alliance (Wampold and Imel, 2015). Nearly 75% of patients commonly receiving psychotherapy improve after treatment compared to those who do not receive any treatment or ameliorate on their own (Jiménez et al., 2018). Moreover, psychotherapy—without difference in schools approach—is comparable in effectiveness to medication and has no relevant side effects (Leichsenring et al., 2022).

Memory is a fundamental trait of adaptive behavior, and it is never the same as itself. Starting from studies exploring molecular and cellular mechanisms underlying long-term memory formation and reconsolidation, psychotherapists should be fully aware of the crucial role they have in redesigning the patients' narrative plot, with a significant impact on identity and psychopathological symptoms relief. The investigations in which biological markers have found their way into psychotherapy research are still rare to date. We think that this represents a promising area to be implemented in the near future, bypassing potential methodological limitations (Piotrkowicz et al., 2021) as in the case of BDNF detection that should be added as a supplement to symptom scales commonly used to analyze psychotherapeutic effects. Since their potential to provide information about a therapeutic alliance that cannot be only derived from self-report questionnaires, salivary oxytocin/cortisol should be collected repeatedly during the treatment course from both patient and therapist before the therapeutic session, in order to collect biological data able to better describe the special bond between patient and therapist.

As people use their cognitive abilities to engage in everyday life, cognitive psychopathology has to be considered a crucial aspect of individuals adhering to psychotherapy. Many psychiatric disorders include the disruption of some aspects of cognition, and these deficits may predispose individuals to psychopathology, constitute an early marker, sustain the disorder, and predict the likelihood of functional recovery and successful rehabilitation. As a result, cognition and associated neural circuitry should be recognized as a key target of treatment by psychotherapists.

According to Bonini et al. (2022), studies of mirror mechanisms will lead to new research avenues in neuropsychiatric conditions in the near future. We are also confident in the increasing use of neuroimaging techniques to refine our understanding of both the outcome and process of psychotherapy, inform practitioners about evidence-based methods for specific psychiatric disorders, and help researchers to better define treatment protocols. In the opinion of the authors, an in-depth study of the implications of the dopaminergic mesocorticolimbic system of patients is really promising, with the aim of depicting the process of motivation to change as an intrinsic lever of the psychotherapeutic process. To this end, we think that brain imaging can play a relevant role, too.

Professionals must have timely access to information for optimal care implementation and a promising area of research based on advancements in MRI techniques (e.g., diffusion tensor imaging, DTI; BOLD fMRI signals from different brain regions) referred to the "connectome," will permit researchers to shift attention from discrete brain areas to networks of brain regions supporting psychological dysfunction (Weingarten and Strauman, 2015). Systematic validation of biomarkers for independent clinical populations and integration with clinical data can augment their value for predicting psychotherapy outcomes. However, initial neuroimaging findings should be replicated in larger clinical populations and across a range of psychiatric disorders avoiding clinical decision-making on single cases due to the person's complexity (e.g., the potential presence of comorbidity) and limited generalizability of results.

Finally, we want to point out that by a neuroscience-based view of psychotherapy, the brain should be properly recognized as an interpersonal and a historical organ along the drawn lines of social neuroscience or neurophenomenology (cf., Varela, 1996; Cacioppo et al., 2002; Fuchs, 2003). This can stem a potential drift toward a more accurate knowledge of somatization and mind–body connection.

9. Conclusion

We have explored several paths regarding the neurobiological mechanisms through which psychological changes occur to sustain the future development of psychotherapy based on brain functioning and modeling. The latest discoveries in the neuroscientific field have shed light on the means by which psychotherapy proves to be a successful practice. For its part, psychotherapy can contribute to neuroscience by making available data from an accurate clinical activity that links the semeiotic investigation to the uniqueness of the patient and that bases its workout on the relational dimension of change, i.e., the therapeutic relationship. We also speculate that a neuroscience-based approach can really change and ameliorate our current psychotherapeutic interventions starting immediately by integrating in clinical practice patients' evaluation of cognitive domains mainly involved in the manifested mental disorder, top-down regulation techniques over the limbic system (i.e., emotions labeling, problem-solving, cognitive reappraisal, cognitive restructuring, mindfulness, and modification of patients' self-representations) and bottom-up interventions addressing somatosensory features of unresolved trauma (cf., Odgen et al., 2006) as well as "memory therapeutics" (i.e., accelerated resolution therapy, rewind techniques, cognitive restructuring, and imagery modification) able to redesign the narrative plot and the person's sense of the Self. Such improvements can be finalized after training of practitioners where necessary. Finally, according to a previous review suggesting that psychotherapy can influence the brain and behavior through the adaption of gene expression to the environment (Jiménez et al., 2018), we endorse the increasing consensus that it entails new learning in the context of an emotional relationship leading to epigenetic modifications after treatment.

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All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The psychological consequences of Sudden Infant Death Syndrome (SIDS) for the family system: A systematic review

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The Sudden Infant Death Syndrome (SIDS) is a tragic and difficult experience for families. It involves not only the death of the baby but also the loss of a future as a parent, sibling or grandparent. The subsequent grief is multifaceted and each family member has different needs and resources. Through a systematic review of literature, we identified 24 studies between 1982 and 2021: they dealt with individual, family and couple experience when a SIDS occurs; in addition, some studies compared perinatal loss and neonatal loss with SIDS loss. Our results point out the need for an intervention that focuses on the needs of each family member and tailored around the specifics of SIDS loss rather than general grief.

KEYWORDS

sudden infant death syndrome (SIDS), systematic review, family grief, psychological impact, couple grief, individual grief

1. Introduction

Sudden Infant Death Syndrome (SIDS) is "the sudden unexpected death of an apparently healthy infant less than one year of age that remains unexplained after a thorough case investigation, including performance of a full autopsy with ancillary testing, investigation of the site of death, and review of the clinical history" (Goldstein et al., 2019a, p. 626).

The Centers for Disease Control and Prevention refers to SUDI as a sudden and unexpected death of an infant occurred in the first year of life in which the cause was not apparent before investigation; these deaths often occur while the infant is asleep or in his or her sleep area. If no known cause of death can be determined despite several thorough investigations, SIDS may be used as a diagnosis of exclusion (Center of Disease Control and Prevention, 2021). This definition combines three cause-of-death categories in the International Classification of Diseases, 10th Revision (ICD-10): SIDS (code R95), unknown or unspecified causes (code R99), and accidental suffocation and strangulation in bed (code W75) [World Health Organization (WHO), 2019]. However, the debate over the labeling and classification of unexplained sudden infant deaths continues without a universally accepted standard procedure (Shapiro-Mendoza et al., 2021). The term SIDS has often been confused and criticized because it is not a well-defined diagnosis with precise pathognomonic features and its application can be highly subjective (Byard, 2018).

According to recent international comparisons, the SIDS rate in Europe is estimated at 25 cases per 100,000 live births. However, different definitions and study protocols have been noted, making relationships variable and international comparisons complex (de Visme et al., 2020). In Italy, the incidence is estimated to be approximately 250 new cases or 0.5‰, although no national registry is available (Ministry of Health, 2021). However, infant mortality has declined slightly in Western countries thanks to the spread of prevention campaigns (Moon, 2016). Nevertheless, some unexplained deaths remain, making it difficult to determine causes and to create a unified registry of surveillance data that makes them internationally comparable (Goldstein et al., 2019a).

The lack of a consistent and international methodology for evaluating cases can slow data collection and complicate the classification of SIDS deaths, which could be labeled differently depending on the jurisdiction in which they occur, which does not do justice to the death of the child itself (Byard et al., 2019). This fact underscores that it would be short-sighted to look for a single cause of sudden infant death syndrome. Rather, scientific evidence suggests the hypothesis that SIDS is the result of a combination of risk factors and pathophysiological responses that are different for each individual struggling with their own biological vulnerabilities and predispositions (Byard and Krous, 2003). Currently, the most relevant model in terms of risk factors is the "Triple Risk Model," which states that SIDS risk is highest when the infant has all three identified factors: an individual vulnerability, a critical developmental period, and exposure to an exogenous stressor (Filiano and Kinney, 1994).

Although some medical and epidemiological issues remain unresolved, psychological research has begun to examine the consequences for families experiencing this painful event (Goldstein et al., 2019a). The loss of an infant to SIDS is a profound and tragic experience (Goldstein et al., 2018, 2019b, 2020, 2022) and includes not only the death of the infant, but also the loss of an imagined and idealized family future and the fading of future expectations as parents, siblings, or grandparents. Grief in the family has many facets, and each family member grieves in different ways, has different needs and resources (Walsh and McGoldrick, 1991, 2013).

However, compared to perinatal and neonatal losses, SIDS occurs suddenly, remains unexplained, and is followed by exhausting medico-legal procedures for parents (Dyregrov and Matthiesen, 1987; Boyle et al., 1996), which suggests to us a more complicated grieving process (Goldstein et al., 2022). As observed in perinatal losses (Gandino et al., 2020), the death of a child from a sudden and unexplained cause can also have consequences for health care workers and professionals (Forster and Hafiz, 2015).

After the joy of the birth of their child, the family is confronted with the loss of light, as in an "eclipse" where a celestial body obscures the source of light, leaving the observer in an inevitable cone of shadow. The unexpected and unexplained loss of a baby is a particularly destabilizing event for the family (Byard, 2009) precisely because of the phenomenology with which it occurs and the short- and long-term consequences (Goldstein et al., 2019b). Upon discovery of death, parents find themselves at a "crime scene," surrounded by police, coroners, and emergency responders (Byard, 2009). Often forgotten in the aseptic and rigid coronial procedures is an aspect of SIDS that is anything but unimportant: the grieving family (Goldstein et al., 2022).

According to our systemic relational perspective, death can be described as an event that affects the entire family; in fact, all individuals within the family system suffer from the loss at both the personal and relational levels (Walsh and McGoldrick, 1991, 2013). After a loss, family life is shaken to its foundations and must inevitably reorganize its structure and build a new one around the loss (Boss and Greenberg, 1984). For all family members, any death involves multiple losses: of the deceased person, of roles and relationships, of the family unit, of hopes and ideas about the future. To understand the nature of grief in the family, it is important to recognize that the individual and relational effects of loss operate simultaneously and are influenced by each other; in fact, individual grief is both matrix and product of change within the entire family system (Gilbert, 1996). Based on the assumption that grief is both a social and a familial process (Neimeyer et al., 2014), we hypothesize that SIDS may have psychological effects not only on the mother, but also on the father, couple, siblings, grandparents, and ultimately the family system.

This systematic review arose from the need to provide a qualitative synthesis of the psychological impact of SIDS not only at the personal level, but also on family and couple dynamics. A better understanding of what parents, siblings, and extended family experience is useful in providing forms of support or possibly interventions that address the needs and priorities of these individuals. The grief that follows the loss of a child to SIDS crashes into the lives of affected families like a bolt from the blue, and although there is a strong commitment to prevention campaigns worldwide, the etiology of sudden infant death syndrome is not yet clear. Therefore, until medical science provides the answers we all expect, it is of great interest to explore not only the risk factors for SIDS, but also to be prepared for what this event means at the couple and family level. This review should serve as a starting point for timely and up-to-date training of health professionals who should utilize the figure of the psychologist as the primary coordinator for family bereavement care.

The research questions that this systematic review aims to answer are: What are the consequences of SIDS at the personal and family level? What is the grieving process of the mother, father, couple, and other family members? The aim of this review is therefore to develop a better understanding of the difficulties faced by bereaved families after a fatality attributed to SIDS.

2. Materials and methods

2.1. Information sources and research strategies

The following systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for searching, systematizing, and reporting systematic reviews (Moher et al., 2009; Page et al., 2021). The search was conducted from July 2021 to December 2021 and has no specific time interval. It was decided not to limit the search to a short time frame in order to include as many studies as possible. Each article was independently reviewed for eligibility by two individuals.

Studies were identified by querying online databases (ProQuest Psychology Journal, PsycARTICLES, PsycINFO), focusing on the psychological impact of SIDS at the family, personal, and couple levels. The combination of keywords in this first step was: (1) sudden infant death syndrome OR sids OR sudi OR suid OR sudden unexplained death in infants, AND (2) bereavement OR grief, AND (3) parent' OR mother' OR father' OR sibling'.

2.2. Selection of articles

The database search yielded a total of 1,430 studies. This output was screened to select only those studies that met the defined objectives. The following criteria were used in the selection process: (1) the initial keyword search was limited to the abstract to ensure greater relevance to the topic under investigation, (2) they were peer-reviewed articles, and (3) they were published in English. Given our focus and our aim to conduct a comprehensive and complete analysis, we chose English-language publications because of the greater amount of international literature available. A total of 1354 studies were screened and 76 met the first stage criteria (**Figure 1**).

Subsequently, this number was further reduced to 61 after eliminating 15 duplicates. 13 records were automatically removed, while 2 duplicates were manually removed.

After duplicates were removed, the 61 selected studies were analyzed by title and abstract, resulting in a group of 44 articles. Of these, 17 articles were removed because they (1) addressed causes, risk factors, and SIDS prevention; were more concerned with religion than with the consequences of SIDS for family members; addressed specific conditions (abuse, drug, and tobacco use), SUDEP, and stillbirths; and, finally, addressed medical research or book reviews. Studies that addressed the search for medical causes of SIDS or risk and prevention factors were excluded because, although they were of great scientific relevance, they were not consistent with the objectives of the present study.

In the fourth and final selection phase, 44 full-text studies were assessed and reduced to 24, as 20 did not meet the inclusion criteria. Because SIDS occurs in the first year of life, it was decided to exclude all studies with samples in which death occurred after the first year of life ($n = 6$); to focus on a specific typology rather than a general category, studies whose sample included a broader range of perinatal/neonatal loss experiences were excluded without a separate analysis for SIDS cases ($n = 4$); literature reviews ($n = 4$) and case reports/series ($n = 2$) were excluded due to lack of new research data and difficulty of generalization. Studies addressing professionals, instruments, and intervention programs ($n = 4$) were considered ineligible because they did not meet the requirements of the research question. The remaining 24 articles-see **Figure 1** for the PRISMA flow diagram-meet the inclusion criteria and were subjected to qualitative analysis to answer the research questions.

3. Results

The systematic analysis of the literature was carried out considering the objectives, the inclusion and exclusion method used and the results. The selection process is shown in **Figure 1**, while detailed information on each article can be found in **Table 1**.

The selected studies were conducted in different parts of the world: United States ($n = 11$), Israel ($n = 1$), Norway ($n = 4$), Finland ($n = 1$), Ireland ($n = 2$), United Kingdom ($n = 1$), Australia ($n = 3$), New Zealand ($n = 1$), and South Africa ($n = 3$).

They cover a period of four decades, from 1982 to 2021, with: a greater frequency in the 1990s ($n = 13$), followed by the period from 2010 to 2020 ($n = 4$), the 1980s ($n = 4$), from 2020 to the present ($n = 2$), and the period from 2000 to 2010 ($n = 1$).

Sixteen studies used quantitative techniques, five used qualitative methods, and three used a mixed methodology.

3.1. Data extractions

As can be seen from **Table 1**, the review of the literature reveals that six *ad hoc* questionnaires have been used in quantitative studies (Williams and Nikolaisen, 1982; Price et al., 1985; Dyregrov and Matthiesen, 1987; Thuen, 1997; Irizarry and Willard, 1999; Goldstein et al., 2020). Of these six studies, three also used other instruments, such as the Impact of Event Scale (IES), the 20-item Goldberg General Health Questionnaire (GHQ-20), the State-Trait Anxiety Inventory (STAI), the Bodily Symptom Scale (BSS), the Beck Depression Inventory Short Form (BDI-SF) (Dyregrov and Matthiesen, 1987), the Symptom ChackList-90 and Bradburn's Affect-Balance Scale (Thuen, 1997), and the Parental Bereavement Questionnaire (PBQ) (Goldstein et al., 2020). Four studies used structured interviews (Downey et al., 1990; Powell, 1991, 1995; Carroll and Shaefer, 1993), and of these four studies, two included additional instruments such as the Symptom Check List-32 (Downey et al., 1990) and the SIDS Parent Coping Inventory (SPCI) (Carroll and Shaefer, 1993). One study used semi-structured interviews and also incorporated the Child Behaviour Check List (CBCL) (Hutton and Bradley, 1994). Of the original sixteen quantitative studies, five used only scales such as: NJSRC Parent Questionnaire (Ostfeld et al., 1993); Delusions Symptoms States Inventory/States of Anxiety and Depression (DSSI/sAD), (Boyle et al., 1996); Symptom Check List-90 (Thuen and Schlytter, 1996); Parental Bereavement Questionnaire (PBQ), (Goldstein et al., 2018); Spielberger State-Trait Anxiety Inventories (STAI-T and STAI-S), Edinburg Postnatal Depression Scale (EPDS), Timeline Follow-Back (TLFB), PBQ (Goldstein et al., 2019b). Of the five qualitative studies, two used in-depth interviews (Rubin, 1984; Edwards et al., 2009), one study used interviews and focus groups (Väisänen, 1998), one study conducted text analysis (Finlay and Krueger, 2011), and one study used semi-structured interviews (Plews-Ogan et al., 2021). Finally, of the three mixed-method studies, one used an *ad hoc* questionnaire (De Frain et al., 1992), one used a questionnaire with scales such as the IES, the 20-item GHQ, and the STAI State Version (STAI-X1) (Dyregrov and Dyregrov, 1999), and one used a questionnaire, in-depth interviews, and the Hospital Anxiety and Depression Scale (HADS) (Garstang et al., 2016).

3.2. Analysis of the samples

The sample of each study refers exclusively to SIDS cases, with the exception of a minority that uses a heterogeneous sample

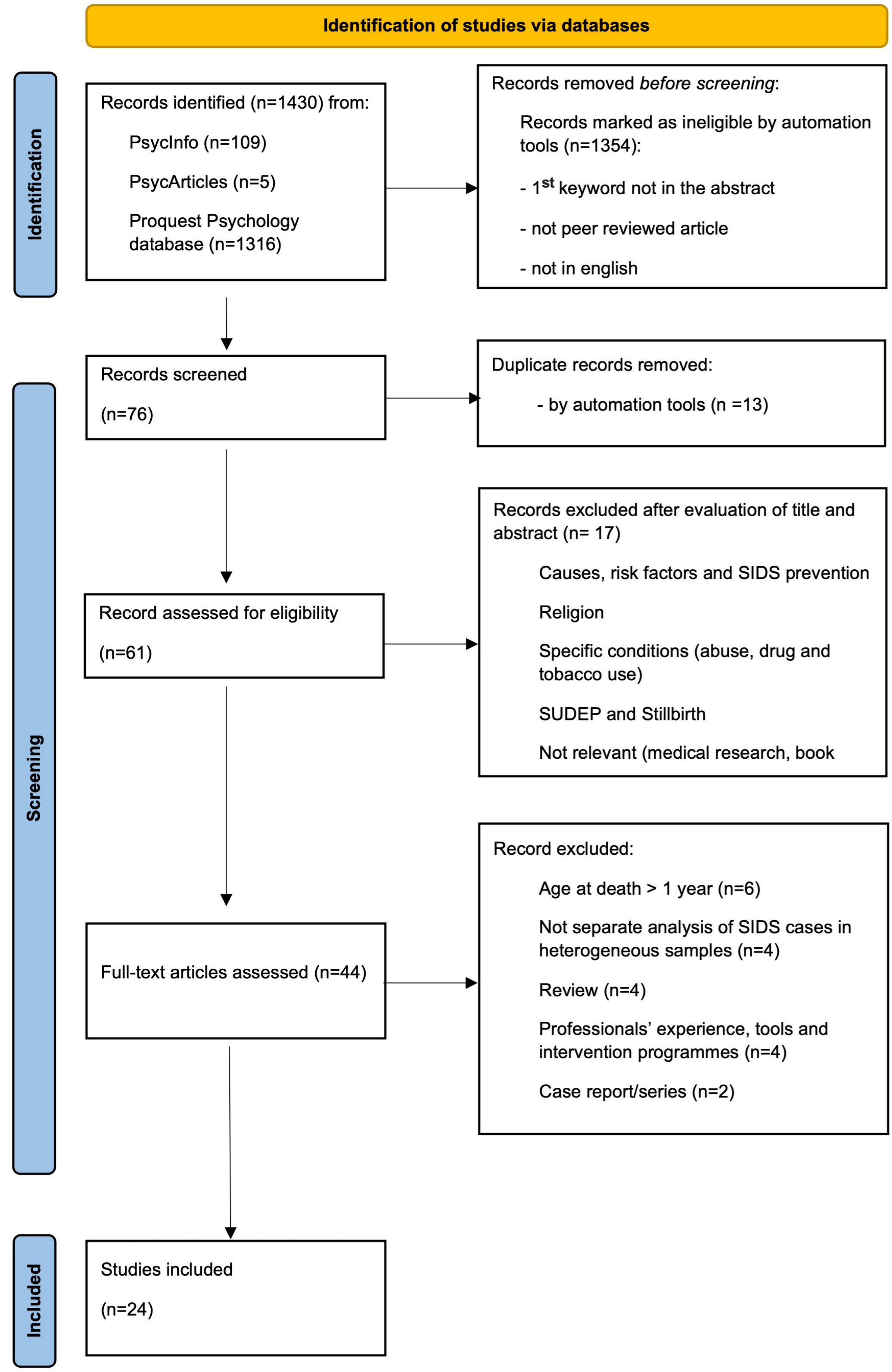

FIGURE 1
PRISMA flow diagram for literature search.

that includes perinatal, neonatal, and SUDI deaths (Dyregrov and Matthiesen, 1987; Boyle et al., 1996; Väisänen, 1998; Garstang et al., 2016). In addition, the sample of 24 studies includes 9 to 365 participants, of which only 4 had a control group (Hutton and Bradley, 1994; Boyle et al., 1996; Thuen and Schlytter, 1996; Goldstein et al., 2019b). All studies analyzed a sample of subjects, with the exception of one study that focused on evaluating 20 websites dedicated to victims of SIDS, but from which we conventionally derived the activity of 20 subjects (Finlay and Krueger, 2011). Finally, data from studies of siblings come from parental perceptions, particularly maternal perceptions, and therefore indirectly examine siblings' experiences (Powell, 1991; Hutton and Bradley, 1994).

3.3. Family members affected

The selected articles address the experiences of those affected by a family tragedy due to SIDS. We found that eight of them focus on the experiences of mothers (Rubin, 1984; Price et al., 1985; Ostfeld et al., 1993; Boyle et al., 1996; Finlay and Krueger, 2011; Goldstein et al., 2018, 2019b, 2020), one on the paternal experience (Edwards et al., 2009), 10 on the couple (Williams and Nikolaisen, 1982; Dyregrov and Matthiesen, 1987; Downey et al., 1990; Carroll and Shaefer, 1993; Thuen and Schlytter, 1996; Thuen, 1997; Dyregrov and Dyregrov, 1999; Irizarry and Willard, 1999; Garstang et al., 2016; Plews-Ogan et al., 2021), two on sibling experiences (Powell, 1991; Hutton and Bradley, 1994), one on the family unit consisting of mother, father, and children (Powell, 1995), one on grandparents (De Frain et al., 1992), and one on the extended family consisting of mother, father, children, and grandparents (Väisänen, 1998).

3.4. Thematic features

The 24 studies included in the review provide an overview of the SIDS event and illustrate in its complexity the many aspects associated with the sudden death of a newborn and the associated impact at all levels of the family. Williams and Nikolaisen (1982), Carroll and Shaefer (1993), Thuen and Schlytter (1996), and Irizarry and Willard (1999) focused on the gender differences that exist between parents due to SIDS, examining the adjustment strategies used by each partner and the different reactions that occur even after a long time. This last aspect is addressed by Rubin (1984) and by Dyregrov and Dyregrov (1999), who examined the difficult adjustment to such a painful and traumatic loss that does not seem to heal completely even with time, leaving parents with the painful feeling of still having to deal with an unexplained death. In such situations, there is a risk of developing a persistent and complicated bereavement disorder, for which a higher risk of diagnosis was found in the population that experienced a SIDS death in the family (Goldstein et al., 2018), although this is also likely related in part to pre-loss risk factors (Goldstein et al., 2019b).

Several studies (Price et al., 1985; Downey et al., 1990; Ostfeld et al., 1993; Väisänen, 1998; Plews-Ogan et al., 2021) have focused on the issues associated with parental and family loss, ranging from sharing the pain, attributive concerns, adjustment to marriage, impact on desire for more children, and the complex nature of the recovery process, to reinvesting energies to move forward and live more serenely with the reality of loss (Price et al., 1985; Downey et al., 1990; Ostfeld et al., 1993; Väisänen, 1998; Plews-Ogan et al., 2021). The desire to chase life moving forward rather than remaining immobile is confirmed by Powell (1995), who showed how a child in the year following the loss did not inhibit the grieving process but enhanced it by restoring meaning and planning to a life emptied by SIDS. However, the siblings of children who have been victims of SIDS need adequate support and an environment that often protects them from any manifestation of discouragement and sadness and that might set the stage for behavioral and personality change (Powell, 1991; Hutton and Bradley, 1994).

Grandparents were also considered in this study. For example, De Frain et al. (1992) study examined their experiences, feelings of guilt, tendency to relive the death of their nephew, but also the strength of their marriage and ability to rise again thanks to faith. Thuen (1997) shows that parents can access various forms of support, such as instrumental, emotional, and informational support. They may cope with the painful grieving process through the use of memorial websites (Finlay and Krueger, 2011) or through the use of transitional objects, although this experience of contact seems to be influenced by the intensity and severity of the pain experienced (Goldstein et al., 2020).

Parents also seek to authentically share detailed information about the diagnosis, which facilitates a comprehensive explanation of the death by professionals (Garstang et al., 2016).

The review also includes studies comparing SIDS to stillbirth and neonatal death, highlighting the differences in grief and mental health outcomes for those affected in their various facets (Dyregrov and Matthiesen, 1987; Boyle et al., 1996). In addition, one study has illustrated the unique situation of an indigenous people, the Māori, who are widespread mainly in New Zealand and have a high risk for SIDS deaths (Edwards et al., 2009).

In conclusion, the review provided satisfactory results at the substantive level, indicating that the topic deserves clinical attention and inspiration for further research, not only in the medical field but also in the psychological field.

3.5. Strengths and weaknesses of the analyzed literature

The strengths and weaknesses of the studies examined in the systematic review relate to both the methods used to conduct the research and the themes that guided the investigation. As can be seen from the **Table 1**, from the aspects of the strength of the literature reviewed, it can be noted that some studies have conducted a detailed investigation of the topic under investigation (Rubin, 1984; Väisänen, 1998; Edwards et al., 2009; Finlay and Krueger, 2011; Plews-Ogan et al., 2021); others have a large sample (Goldstein et al., 2018, 2020), a relatively large sample (Downey et al., 1990; Hutton and Bradley, 1994; Boyle et al., 1996; Thuen and Schlytter, 1996; Thuen, 1997), or a probability sample (Powell, 1991, 1995).

The Price et al. (1985) study provides an overview of the major issues and offers study perspectives for the future. Some studies have examined mothers' and fathers' responses separately (Williams and Nikolaisen, 1982; Powell, 1991, 1995; Irizarry and Willard, 1999), and in some cases a high degree of agreement between partners has been found (Powell, 1991). Fathers have participated less in research than mothers (Hutton and Bradley, 1994). We believe that it could be interesting to understand the clinical motivation behind this mechanism and lead research to new horizons. Some research shows that qualitative data deepen quantitative findings (De Frain et al., 1992; Dyregrov and Dyregrov, 1999; Garstang et al., 2016). Finally, some studies have: conducted perspective-taking data collection prior to infant death (Goldstein et al., 2019b), examined responses separately by death category when examining differences (Dyregrov and Matthiesen, 1987; Boyle et al., 1996; Garstang et al., 2016), placed a particular emphasis on the nuances of maternal experience (Ostfeld et al., 1993), and when method analysis identified bias, the presence of semi-structured interviews likely helped reduce the bias effect (Hutton and Bradley, 1994).

The weaknesses of the studies reviewed in some cases show weaknesses in the number or quality of the sample of the population studied (Rubin, 1981; Williams and Nikolaisen, 1982; De Frain et al., 1992; Carroll and Shaefer, 1993; Ostfeld et al., 1993; Powell, 1995; Väisänen, 1998; Dyregrov and Dyregrov, 1999; Irizarry and Willard, 1999; Edwards et al., 2009; Finlay and Krueger, 2011; Goldstein et al., 2019b; Plews-Ogan et al., 2021). In some circumstances, some studies show a high probability that estimates are lower than actual prevalence (Dyregrov and Matthiesen, 1987; Ostfeld et al., 1993; Hutton and Bradley, 1994; Thuen and Schlytter, 1996; Thuen, 1997); however, other studies haven't clarified the differences in the results obtained and the variables associated with this variation (Price et al., 1985); the exclusive presence of maternal responses when children are studied (Dyregrov and Matthiesen, 1987; Powell, 1991); the lack of pre-loss measures of mental health available (Boyle et al., 1996); the presence of selection bias; and the determination of PGD using a survey (Goldstein et al., 2018, 2020).

4. Discussion

This literature review identified 24 studies on the psychological impact of SIDS on the family system. This literature review highlighted the basic characteristics of SIDS: first, the psychological impact on mothers, fathers, couples, siblings, grandparents, and the entire family system; and second, the differences between SIDS and perinatal and neonatal loss.

4.1. Mothers

Ostfeld et al. (1993) found that mothers who had experienced SIDS recalled the initial acute grief, which was characterized by intense symptoms of sadness, difficulty concentrating, restlessness, sleep disturbances, and anger. In the six months following the loss, although sadness remained the most intense symptom, followed by anger, the others decreased markedly, giving way to anxiety, discomfort with the babies, and guilt, symptoms attributed to the cognitive rather than the somatic aspects of grief (Ostfeld et al., 1993).

Price et al. (1985) also emphasized the presence of a persistent experience of sadness and depression as major symptoms and decreasing levels of restlessness, anxiety, sleep disturbance, difficulty concentrating, discomfort with other pregnant women, less energy, less interest in social activities, loss of appetite, guilt, and work difficulties. Consistent with the psychological effects described in previous studies, Goldstein et al. (2018) highlighted interesting aspects, such as the presence of symptoms that decrease over time and symptoms that remain relatively stable, such as role confusion, anger, and distrust; these data enabled the finding that Prolonged Grief Disorder rate is 57.1% one year after loss and 41.3% after three years (Goldstein et al., 2018).

Given these findings and the shared risk factors between SIDS grief and PGD, Goldstein et al. (2019b) found an interesting association between individual pre-loss vulnerability factors and the development of PGD after SIDS, with the influence decreasing with time after loss. This study, chronologically among the most recent to be included in this review, highlights key factors that predict the characteristics of individuals who do and do not suffer from PGD (Goldstein et al., 2019b). Examination of the evolution of each risk factor in the 30 months after loss showed different trajectories for PGD: Maternal age greater than 26 years predicted higher rates of PGD symptoms; preloss depressive symptoms had an impact up to 2 years after loss; preloss anxious symptoms predicted higher levels of acute grief but not of persistent and complicated grief disorder, which cannot be diagnosed until at least 6 months after loss; women who had experienced previous losses had lower but non-significant rates of PGD than women who had not experienced a loss. In addition, the presence of other living children proved to be a risk factor, as these mothers showed a decreasing risk of PGD only up to two years after loss, followed by an increase likely due to comparison with the deceased child during bonding with the next child or upon reaching the age of the deceased child; higher alcohol consumption was consistently positively associated with PGD (Goldstein et al., 2019b). The authors strongly emphasized the risk posed by the simultaneous presence of multiple factors: more than two factors significantly predicted risk in the year after death, while four factors significantly predicted risk 2 years after the child's death.

Interviews conducted in Rubin (1984) study confirmed the distressing nature of the loss, which was primarily due to the timing of the death, i.e., in the middle of the attachment process (Rubin, 1984). Early symptoms such as depression, anxiety, and helplessness subside, whereas guilt symptoms continue to emerge years later, independent of the other symptoms. This study suggests that guilt is the main feature of SIDS tragedy: According to Rubin (1984) and Plews-Ogan et al. (2021), deep despair is triggered by the idea of not being able to protect the child, because the inability to understand the causes of death is a factor strongly associated with maternal adjustment problems. Following Parkes (1970), Rubin (1981, 1984), Finlay and Krueger (2011) and Goldstein et al. (2020) studies confirm the need to continue an activity that involves the "presence" of the deceased child in order to process the loss. Finlay and Krueger (2011) qualitative analysis examined 20 memorial websites, photos, poems, memories, and spaces for self-expression shared in personal language, in a non-professional manner, and without adherence to precise esthetic standards. These features make them particularly authentic and attest to the intention to create a sense of community, to share grief despite taboos, and thus to begin a process of healing and reconstruction of identity shattered by loss. The power of these places, also highlighted by the authors, lies in their constant accessibility, not determined by opening and closing times, without limits of permanence (Finlay and Krueger, 2011); moreover, in the work they do on two fronts, grief and recovery, in a dynamic process of oscillation, as described in the "Dual Process Model of Coping" (Stroebe and Schut, 1999). Sometimes there is a need to face the loss of a loved one and

TABLE 1 Summary table—studies about the psychological impact of SIDS on the family system.

References	Country	Methodology	Target population and sampl	Measures	Relevant results (for this review)	Strengths	Weaknesses
Williams and Nikolaisen (1982)	USA	Empirical study, quantitative study	Mothers and fathers *n* = 54 parents	*Ad hoc* questionnaire	Differences between partners were examined. Mothers described more emotional reactions in contrast to fathers; however, both considered themselves capable of expressing their feelings. fathers appeared to be less passive than mothers and more action oriented	Mothers' and fathers' responses were examined and compared separately	Small sample, limited geographic location, retrospective responses
Rubin (1984)	Israel	Empirical study, qualitative study	Mothers *n* = 15 women	In-depth interviews	Mothers who lost their infant to SIDS approximately four and a half years earlier still feel a lingering sense of responsibility and guilt for their child's death. Adjustment is complicated by the lack of knowledge about the cause of death	Detailed exploration of topics	Small sample
Price et al. (1985)	USA	Empirical study, quantitative study	Mothers *n* = 73 women	*Ad hoc* questionnaire	The age of the child at the time of death appears to be correlated with maternal adjustment. More than half of the sample reported good marital adjustment and closeness to other children after the loss. Despite doubts and uncertainties, the vast majority of mothers indicated that they wanted to have another child	At the time of the article's publication, it was considered an important source because it revealed new areas of research	Unclear variables explaining the difference between mothers with unsatisfactory adaptation and those with satisfactory adaptation
Dyregrov and Matthiesen (1987)	Norway	Empirical study, quantitative study	Mothers and fathers *n* = 117 parents	*Ad hoc* questionnaire, including: The Impact of Event Scale (IES) 20-item Goldberg General Health Questionnaire (GHQ-20) State-Trait Anxiety Inventory (STAI) Bodily Symptom Scale (BSS) - Beck Depression Inventory Short Form (BDI-SF)	Compared with the other types of infant loss, the SIDS category had higher mean scores on all measures, indicating greater stress after loss. Adjustment correlated with infant lifespan, with parents whose infant had lived longer experiencing greater difficulty	Stillbirth, neonatal and SIDS group's responses were explored separately and compared	Retrospective responses: high probability that estimates are lower than actual prevalence of bereaved parents due to non-response rate; only mother's questionnaire included questions about sibling reactions

(Continued)

TABLE 1 (Continued)

References	Country	Methodology	Target population and sampl	Measures	Relevant results (for this review)	Strengths	Weaknesses
Downey et al. (1990)	USA	Empirical study, quantitative study	Mothers and fathers *n* = 124 parents	Symptom check list-32 structured interview	Parents who blamed themselves or someone else for the death of their children were more distressed, whereas attributions to chance were unrelated to distress. The hypothesis that attributions influence subsequent adaptation is not supported	Relatively large, economically, and racially diverse sample; investigation on temporal changes in the attribution process	The interview timing could not detect changes in the dependent variables caused by independent variables
Powell (1991)	Ireland	Empirical study, quantitative study	Siblings *n* = 78 children (from *n* = 28 mothers' and *n* = 23 fathers' impressions).	Structured interview	Following SIDS, siblings show more attention-seeking behavior and regressions to earlier developmental stages. Sometimes internalizing behavior increases, while externalizing behavior is accentuated in others. Parents often find themselves unprepared to deal with children's persistent curiosity about loss	Probability sampling; each parent's responses were recorded separately; high level of agreement between partners	Children not directly involved
De Frain et al. (1992)	USA	Empirical study, mixed methods study	Grandparents *n* = 80 grandparents	*Ad hoc* questionnaire	Grandparents' grief is unique. They could also feel anger due to the lack of explanations for SIDS and tend to create their own theories about their grandchild's death. Even though they try to be strong, they admit that their own suffering also needs support	Qualitative data deepen quantitative findings	Small sample; the majority of the respondents were grandmother and on the maternal side; high probability that the estimates are lower than the real prevalence as sampling was done through support groups
Carroll and Shaefer (1993)	USA	Empirical study, quantitative study	Mothers and fathers 34 couples (*n* = 68 parents)	Structured interview SIDS Parent Coping Inventory (SPCI)	Both parents acknowledged their loss but coped with their grief in different ways. Communication and partner support were the predominant coping methods. Compared to mothers, fathers' feelings are not expressed by crying or seeking support outside their partner relationship	High internal consistency	Small and self-selected sample; exclusion of bereaved parents who no longer live together after their loss

(Continued)

TABLE 1 (Continued)

References	Country	Methodology	Target population and sampl	Measures	Relevant results (for this review)	Strengths	Weaknesses
Ostfeld et al. (1993)	USA	Empirical study, quantitative study	Mothers $n = 38$ mothers	NJSRC Parent Questionnaire	Bereaved mothers experience a reduction in all symptoms compared to the early acute pain. Single mothers experience higher grief levels both immediately and 6 months after loss; they are more likely to become pregnant and to move elsewhere. Women who were pregnant or planning another pregnancy showed lower early grief scores	The Likert scale allows you to capture the nuances of the maternal experience and provide a specific focus on maternal needs. A focus on what the mother perceived as a resource at that moment	Small sample; high probability that the estimates are lower than the real prevalence as sampling was done through a resource centre; the aspects of the couple relationship that are limiting to a better resolution of maternal pain
Hutton and Bradley (1994)	Australia	Empirical study, quantitative study	Siblings 38 children (from $n = 23$ mothers' impressions) Control group: 40 children (from $n = 30$ mothers' impressions).	Child Behavior Checklist (CBCL) Semi-structured interviews	Siblings aged between 4 and 11 showed more behavioral problems than the control group, with no significant improvement from 7 to 18 months after loss. No prototypical bereaved child was identified, but significantly higher scores were found on the subscales concerning depression, aggression, social withdrawal, and sexual problems	Semi-structured interview helps introduce data that may be biased by mothers' experiences; an attempt to help health professionals dealing with siblings' reactions after SIDS; non-participation of fathers in survey may be a question and a starting point to better understand the process of paternal grief and its expression; relatively representative sample	High probability that the estimates are lower than the real prevalence; elevation of behavior problems associated with the cot death of a sibling could be non-specific; children not directly involved; only mothers' responses were analyzed
Powell (1995)	Ireland	Empirical study, quantitative study	Nuclear family $n = 69$ parents	Structured interview	Parents who carried on another pregnancy pointed out that it was a common coping strategy during the first year after loss. The grieving process was not inevitably inhibited, indeed for many fathers the subsequent pregnancy was related to the perceived acceptance of SIDS	Probability sampling; each parent's responses were recorded separately	Small sample
Boyle et al. (1996)	Australia	Empirical study, quantitative study	Mothers $n = 194$ mothers Control group: $n = 203$ mothers.	Delusions Symptoms States Inventory/states of Anxiety and Depression (DSSI/sAD)	Mothers in the SIDS group show a higher risk of psychological distress than the control group, with higher rates of anxiety and depression in the first months after loss, slowly decreasing over time. SIDS loss appears to increase the risk for parents to develop anxiety disorders and depression, rather than stillbirth or neonatal death	Relatively large sample; comparison group of non- bereaved families; longitudinal study; stillbirth, neonatal and SIDS group's responses were explored separately	No pre-loss measures of mental health available; probable sample loss effect

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TABLE 1 (Continued)

References	Country	Methodology	Target population and sampl	Measures	Relevant results (for this review)	Strengths	Weaknesses
Thuen and Schlytter (1996)	Norway	Empirical study, quantitative study	Mothers and fathers *n* = 251 parents Control group: *n* = 973 parents.	Symptom Check List-90	Both parents experience their loss in different ways, mainly from 2 to 5 years later. Many mothers seem to show distress symptoms beyond 2 years after loss. Child's life length had no effect on parental adaptation in the present study. Individual adaptation improved over time, and it correlated between partners	Relatively large sample; comparison group of normal population	High probability that the estimates are lower than the real prevalence as sampling was done through a society which provides support and information
Thuen (1997)	Norway	Empirical study, quantitative study	Mothers and fathers *n* = 251 parents	*Ad hoc* questionnaire, including: Symptom CheckList-90 Bradburn's affect-balance scale	No significant gender differences were found in the amount of instrumental, emotional, and informational support received by couples experiencing SIDS. Instrumental and informational support are more strongly correlated with psychological adjustment (emotional support may also be included within them)	Relatively large sample	High probability that the estimates are lower than the real prevalence as sampling was done through a society which provides support and information; low response-rate
Väisänen (1998)	Finland	Empirical study, qualitative study	Mothers, fathers, siblings, and grandparents *n* = 56 individuals	Interviews and focus group	Perinatal death, neonatal death and SIDS are traumatic experiences for the family, also presenting some post-traumatic symptoms in mothers. Family bereavement is a multi-faceted process and parents try to recreate the child, in their mind, psychologically or spiritually	Detailed exploration of topics	Small sample; double orientation approach (therapist and researcher)
Dyregrov and Dyregrov (1999)	Norway	Empirical study, Mixed methods study	Mothers and fathers *n* = 25 parents	QQuestionnaire Impact of Event Scale (IES) 20-item GHQ State Trait Anxiety Inventory-State version (STAI-X1) Bodily Symptom Scale (BSS) Beck Depression Inventory Short Form (BDI-SF) Semi-structured, in-depth interviews	Parents who have experienced SIDS have similar mean scores 12 to 15 years after loss, with most fathers still at risk of psychological distress. Interviews show a strong fear of something happening to other children, especially in the post loss period and during a subsequent pregnancy	Qualitative data deepen quantitative findings	Small sample

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TABLE 1 (Continued)

References	Country	Methodology	Target population and sampl	Measures	Relevant results (for this review)	Strengths	Weaknesses
Irizarry and Willard (1999)	Australia	Empirical study, quantitative study	Mothers and fathers *n* = 61 parents	*Ad hoc* questionnaire	Following the loss, women have more intense reactions (insomnia, anxiety, lack of concentration and motivation). More women than men wanted a subsequent pregnancy soon; men reported an increase in the desire for sexual activity following the death while women reported a decrease	Mothers and fathers' responses were explored separately; respondents completed in respect of him/herself and in respect of his/her partner	Small sample
Edwards et al. (2009)	New Zeland	Empirical study, qualitative study	Fathers *n* = 9 fathers	In-depth interviews	According to Maori fathers' narratives, being treated like criminals during the investigation it's a significant stressor. Men pointed out the importance of staying busy with their own work and routines. Men are not well supported by services and social isolation and loneliness are common feelings	Detailed exploration of topic	Small sample; specific cultural context
Finlay and Krueger (2011)	USA	Empirical study, qualitative study	Mothers *n* = 20 websites	Textual analysis	Creating and developing memorial websites helps to cope with grief, fulfilling the need for self-expression, helping to rebuild identity, and giving meaning to loss	Detailed exploration of online mourning process	Small sample; social networks excluded
Garstang et al. (2016)	UK	Empirical study, Mixed methods study	Mothers and fathers 21 families (*n* = 34 parents) *n* = 27 professionals.	Hospital Anxiety and Depression Scale (HADS) Questionnaires In-depth interviews	Parents who have experienced SUDI or SIDS have a strong need to know the reason for their child's death. According to this study, sharing detailed information about baby's death is a real parent' wish and it's not related to self-blame	Qualitative data deepen quantitative findings; data from parental interviews, professional interviews, questionnaires, and case records; SUDI and SIDS group's responses were explored separately	Small sample

(Continued)

TABLE 1 (Continued)

References	Country	Methodology	Target population and sampl	Measures	Relevant results (for this review)	Strengths	Weaknesses
Goldstein et al. (2018)	USA – South Africa	Empirical study, quantitative study	Mothers $n = 356$ mothers.	Parental Bereavement Questionnaire (PBQ)	SIDS loss is associated with high levels of grief in the child's parents who are at a higher risk of developing *Prolonged grief disorder*, between 1 and 3 years after loss. The most persistent symptoms are role confusion, anger, and diminished trust	Large sample	Selection bias; determination of PGD using a survey; limited statistical power
Goldstein et al. (2019b)	USA – South Africa	Empirical study, quantitative study	Mothers $n = 50$ mothers Control Group: $n = 124$ mothers	Spielberger State-Trait Anxiety Inventories (STAI-T and STAI-S) Edinburgh Postnatal Depression Scale (EPDS) Timeline Follow-Back (TLFB) Parental Bereavement Questionnaire (PBQ)	Bereaved mother's response to SIDS is significantly determined even before the loss occurs; vulnerability factors have a cumulative effect, even if limited in time	Comparison group of non-bereaved mothers; prospective data collection before the infant's death	Small sample; limited statistical power
Goldstein et al. (2020)	USA – South Africa	Empirical study, quantitative study	Mothers $n = 294$ mothers	*Ad hoc* questionnaire, including: Parental Bereavement Questionnaire (PBQ)	According to this study, transitional objects have a potential therapeutic role for bereaved mothers. This research also illustrates Prolonged Grief Disorder as a disorder of attachment. Rather than benefiting from the restorative aspects, mothers with PGD experience distress with transitional objects which impede access to positive aspects of the relationship	Large sample	Selection bias; determination of PGD using a survey; lack of data on the attachment style in the infant-mother relationship; no data on paternal behavior; increased risk of type I error due to the number of statistical tests
Plews-Ogan et al. (2021)	USA	Empirical study, qualitative study	Mothers and father $n = 53$ parents	Semi-structured interviews	Loss involves significant changes in the parental role, from the physical to the emotional sphere, to a new meaning construction. Parents described the effects of their infant's death on how they were a parent to their other children, suggesting an intergenerational transmission of this family event	Detailed exploration of topics	Small sample; possible selection bias; high probability that the estimates are lower than the real prevalence as sampling was done through a hospital program

relive time spent together through photographs, special places, and music, but at other times people feel the need for a break to gradually return to life (Finlay and Krueger, 2011).

The presence of objects with strong adaptive potential has also been suggested: they have been referred to as transitional objects of grief (Goldstein et al., 2020). The association between Prolonged Grief Disorder (PDG) and feelings of distress in dealing with the object is clear and is also characterized by overwhelm in coping with the loss and lower frequency of visits, in contrast to the mothers who had experienced relief and comfort from the object (although the frequency did not differ significantly between the two groups). PDG is not directly related to avoidance behavior, but only when the use of the object produces stress in the presence of indicators of PDG. Clearly, these mothers not only have limited abilities to use the adaptive potential of transitional objects of grief, but their natural adjustment to loss is actually complicated lacking the oscillation necessary for a successful outcome (Goldstein et al., 2020).

4.2. Fathers

From the literature review, only one study emerged that focused exclusively on the father figure; however, given the reference sample, it cannot be considered representative of the population.

Programmes focused on prevention and reducing modifiable risk factors have led to a decrease in SIDS rates in New Zealand, although not significantly in the indigenous population (McManus et al., 2010). However, the most recent data available show that SUDI rates for Mâori and Pacific ethnic groups were significantly higher than for children of all ethnic groups in New Zealand between 2014 and 2018 (Ministry of Health, 2021). A thematic analysis of in-depth interviews by Edwards et al. (2009) identified three main themes underlying the interviews: stressors related to the timing of death, personal coping mechanisms, and sources of support (Edwards et al., 2009). Bereaved Māori fathers are not well supported by services: It is difficult to find someone who can help them cope with the loss of their SIDS child; instead, they try to find support and strength in their other children, but social isolation and loneliness are common feelings. Health services are currently tailored to the needs of women and therefore need to be designed to allow men to express their grief as well. The authors suggest activity-based support (Edwards et al., 2009).

Based on the findings, it could be noted that there is little literature on the figure of the father at the international level; moreover, in research on the grief experience of family members after a childhood loss, the mother's experience has been much studied, to the detriment of the fathers' experience (Morris et al., 2019). Therefore, further thematic knowledge is needed to better understand the experience of grieving fathers so that the life of the family as a whole is not lost after a loss.

4.3. Couples

SIDS results in a sudden change in the roles and responsibilities of both partners, which differ in terms of gender-specific grieving processes (Plews-Ogan et al., 2021): men's problem-solving ability is more action-oriented than women's (Williams and Nikolaisen, 1982).

The study by Plews-Ogan et al. (2021) provided a considerable amount of data on changes in parenting and highlighted the main difficulties related to maintaining a positive self-image as a parent. The literature clearly shows that the sudden and unexpected death of a child seriously challenges a parent's ability to provide basic functions such as safety and security; in this way, parents become aware of their own limitations as they are unable to ensure their children's survival at all costs and feel their role is severely compromised by this vulnerability (Osterweis, 1984; Duncan and Byard, 2018).

Studies examining gender differences in couples (Williams and Nikolaisen, 1982; Plews-Ogan et al., 2021) have highlighted aspects of closeness, but also those of possible misunderstanding (Williams and Nikolaisen, 1982; Carroll and Shaefer, 1993; Irizarry and Willard, 1999). On the one hand, women's feelings seem to show higher intensity and emotionality (Williams and Nikolaisen, 1982; Irizarry and Willard, 1999), but on the other hand, no differences in the ability to express their feelings were found. There were clear and significant differences in the partners' approach to problem solving, with men's problem-solving ability being more action-oriented than women's (Williams and Nikolaisen, 1982). In both Schwab (1990) and Carroll and Shaefer (1993) studies, more coping mechanisms were used by mothers than by fathers (Schwab, 1990; Carroll and Shaefer, 1993).

Irizarry and Willard (1999) found significant differences in two main ways: first, women's desire for pregnancy as soon as possible was often stronger than that of fathers, who showed a restricted desire related to fear of having another child; second, the need for sexual intimacy was increased in half of the male sample and decreased in more than half of the female sample. This is an aspect that may represent an area of psychological distress between partners, especially as it is strongly related to pregnancy (Irizarry and Willard, 1999). In contrast to studies on Penumbra Baby (Reid, 2007), Replacement child syndrome (Cain and Cain, 1964), and Vulnerable child syndrome (Green and Solnit, 1964) studies, Powell (1995) study emphasizes the benefits of subsequent pregnancy after SIDS loss. In fact, a low percentage-or lack thereof-of idealization by parents, the importance placed on subsequent children, and the absence of an overprotective attitude were observed (Powell, 1995). One of the most commonly cited grief coping strategies is social support, which is used to a significant extent by women but only to a small extent by couples (Carroll and Shaefer, 1993). Finally, studies show that for the parent couple, the presence of other living children is a protective factor and resource (Carroll and Shaefer, 1993; Irizarry and Willard, 1999). People sought more comfort from their partners, but while women were more likely to seek support from others, men seemed to seek more support within the household (Irizarry and Willard, 1999).

4.4. Siblings

The few studies that are available on siblings show that after the SIDS event, internalizing (sadness, social withdrawal, insecurity, insomnia, nightmares) and externalizing problems (aggressive and attention-seeking behavior) increase and peak about three months after the loss (Powell, 1991; Hutton and Bradley, 1994). However, the lack of studies directly involving children may lead to uncertainty in the results, which may be biased by parents' perceptions; therefore, it may be useful to involve them directly in studies designed specifically for them. According to these findings, parents have great difficulty providing explanations for the death of their little brother or sister (Powell, 1991; Hutton and Bradley, 1994). Therefore, it is necessary to promote professional support to deal with the different types of children's grief and to fill the gap with deeper knowledge. Children who lose a sibling are not only deprived of a playmate, but also temporarily deprived of parental support and attention, experiencing potential trauma on two fronts (Hogan and DeSantis, 1994; Packman et al., 2006; Avelin et al., 2014).

4.5. Grandparents

Studies that have examined the experiences of grandparents after the loss of their grandchild have highlighted one particular feature, the dual nature of the grief experience. The grief relates both to the grandchild because of his or her death and to the grandparents' own child because of the difficulties he or she faces (Rando, 1986; Gerner, 1990; Reed, 2000). The US study by De Frain et al. (1992) is the only study in the review that focuses exclusively on grandparents' experiences with SIDS. The questionnaire they were given was designed to explore not only how the loss changed their lives, but also how they processed it and used it to cope with grief (De Frain et al., 1992). Thanks to the participation of 80 grandparents who had lost their grandchildren between two months and 12 years before the study, it was possible to identify some crucial aspects. After the inconclusive results of the autopsy, many grandparents are not able to satisfy their constant need for explanations and put forward some theories about the death of their grandchild, ranging from more medical to religious theories. It was also found that 29% of respondents blame parents for their child's death, citing their own inability to understand the symptoms and their own inadequacy (De Frain et al., 1992). Some issues should also be considered by mental health professionals: 1% of this sample experienced domestic violence after the loss, 4% contemplated suicide, and 6% reported an increase in alcohol and drug use in the family. Although they reported being strengthened by this event, grandparents recognized that they needed support both immediately and afterward; indeed, 60% advocated support groups for parents and grandparents (De Frain et al., 1992). As documented by Nehari and colleagues, there is a risk of feeling isolated and having no space to express their grief (Nehari et al., 2007).

4.6. Guilt

Although not always thoroughly studied and researched, one of the recurring themes in the background of SIDS bereavement is the feeling of guilt due to the lack of a clear medical explanation, which fuels the family's ongoing search for a cause (Raphael, 1983). Following a previous study on the needs of bereaved parents (Garstang et al., 2014) and another study included in this review Thuen (1997), Garstang et al. (2016) emphasize the strong need of parents to talk to health care professionals about the causes of their baby's death, in order to understand the reason and finally feel relieved (Garstang et al., 2016). The lack of a clear explanation after long periods of time not only encouraged cause-seeking behavior, but in some cases led parents to feel that the reason for their baby's death was withheld from them (Covington and Theut, 1993), which could jeopardize their already fragile mental health. In the study by Garstang et al. (2016), four themes related to guilt were identified: self-blame, blaming others, feeling guilty, and blaming no one. Although not explicitly explored in the interviews, feelings of guilt were mentioned by parents; grieving mothers most frequently reported self-blame (after both SUDI and SIDS), but it was not related to the cause of death, modifiable risk factors, or parents' understanding of them, supporting the hypothesis that it may be a typical aspect of grief after the death of an infant. Because there is no reason to believe that self-blame is related to the factors listed, there is also no reason to discourage partners from sharing information about the infant's death with health care professionals (Garstang et al., 2016). There is no research on the topic of shame. In a paper examining emotions following perinatal loss from a transcultural perspective, we hypothesized that women in collectivistic societies that promote an interdependent self are more likely to experience shame, whereas in individualistic societies that promote an independent self, they are more likely to experience guilt (Provera and Gandino, 2022).

However, it is important to consider these data for intervention purposes, especially after the worsening of some risk factors due to the COVID -19 pandemic, particularly in women for anxiety disorders and major depression (COVID-19 Mental Disorders Collaborators, 2021).

4.7. Comparison between SIDS, stillbirth and neonatal death

Dyregrov and Matthiesen (1987) and Boyle et al. (1996) agree that the loss of a SIDS infant increases the risk for parents to develop anxiety symptoms compared with stillbirth and neonatal death. The first study showed that parents who had experienced SIDS death between 1 and 4 years earlier had a statistically significant difference in anxiety scores compared to the other two groups: Very high anxiety scores were observed in 69% of cases, compared with 27% for parents who had experienced the neonatal death and 15% for stillbirth (Dyregrov and Matthiesen, 1987). The second study examined the impact of the infant's death at 2, 8, 15, and 30 months after the loss and found higher anxiety scores and depressive symptoms in the SIDS sample at all time intervals. In contrast, mothers who were in the newborn and stillbirth group had lower scores at the last interval that were similar to those of the non-mourning control group; furthermore, anxiety symptoms in the SIDS group decreased slowly over time, with approximately 22% of mothers having anxiety symptoms at 30 months (Boyle et al., 1996).

In addition to their findings on anxiety disorders, Dyregrov and Matthiesen (1987) showed a statistically significant difference in the distress of newborn death in terms of anger, self-blame, agitation, and sleep disturbance, as well as differences from stillbirth in terms of higher labor intensity and intrusive thoughts in both groups.

In addition, the SIDS sample showed a significant difference in recovery after loss compared with the other two groups. Regarding the relationship between adjustment and sudden death, the effect of suddenness on bereavement outcomes could not be confirmed. However, it has been suggested that the particularly traumatic and destabilizing circumstances in the families of SIDS cases may explain the differences between the SIDS group and the other two groups (Dyregrov and Matthiesen, 1987).

The authors also pointed to a possible positive effect of pregnancies after the loss and a correlation between the length of the child's life and the parents' adjustment, but, in contrast to Price et al. (1985), found that a longer time spent with the child negatively affected the parents' grief response (Dyregrov and Matthiesen, 1987).

5. Conclusion

Consistent with our expectations, this analysis shows that SIDS is a tragic event that has psychological consequences at the individual, couple, and family levels. In this sense, the unexplained and sudden loss of a child in the first year of life can have profound effects on the entire family system: Indeed, each member of the family unit may suffer from the loss at both the individual and relational levels.

According to the systemic-relational paradigm, the life of a family is characterized by some crucial steps in family life, and birth is precisely an event that can change the balance and bring about changes in family relationships. Psychological perinatality is a dynamic mental process that begins at conception and continues throughout the first year of life. During this time, the psychological and relational structure of the couple and family changes, expectations of the child are raised, and eventually the couple finds a new equilibrium, moving from the marital dyad to the parental triad. In a joyful and happy moment for the couple and the family, the SIDS comes in an inexplicable way, the whole family system is covered by a cone of shadow and everyone has to deal with the consequences of the death in a different way. Unlike stillbirths, in SIDS the couple and family have been able to get to know the child and form an attachment relationship (Rubin, 1984). Instead, in SIDS, unlike neonatal losses (Dyregrov and Matthiesen, 1987), guilt and self-blame (Garstang et al., 2016) typically emerge as a major feature of the tragedy (Rubin, 1984) and complicate adjustment to the loss (Plews-Ogan et al., 2021).

According to a constructionist approach, grief is an inherently social process, and after a loss, the search for meaning encompasses the entire family and community context in which meanings of life and death emerge and take shape (Neimeyer et al., 2014). Making sense of this experience can be a difficult challenge that involves not only the family but also professionals and the community (Gandino et al., 2019). For families who have experienced a SIDS death, the grieving process can be complex and related to multiple factors: for the mother, for example, the presence of intraindividual vulnerabilities (Goldstein et al., 2019b), the timing of the loss, and the ongoing attachment process (Rubin, 1984), while others are related to the developmental stage of the family life cycle and the family relationships in place at the time of the loss (Walsh and McGoldrick, 2004, 2013).

In the process of adjustment to loss, the family system should aim to fulfill two tasks: on the one hand, to provide the opportunity to come into contact with death and share the experience of loss; on the other hand, to help the family invest in new relationships or existential goals, with the goal of supporting the griever individually but leading the family to a new internal reorganization (Walsh and McGoldrick, 2013). In addition, it is important that the pain of these couples and families be endured both in the immediate aftermath of the loss and in the long term: Indeed, it has been observed that the effects of this pain can impair future attachment relationships and lead to the emergence of "paradoxical parenting" (Warland et al., 2011). So, it would be important that new studies also be conducted on the experiences of all family members who have suffered the loss.

6. Limitations, strengths, and clinical implications

This article aims to highlight the international literature on the psychological consequences of the sudden and unexpected death of a child, not only for the mother and the couple, but also for the other family members. It was decided to approach this topic with a broader focus of attention, in order to capture the impact that these tragic losses have outside the parent couple. In this sense, it was possible to observe that not only the parents suffer this loss, but also the other family figures around them, such as the grandparents and the siblings already present.

Compared to the considerable amount of data on mothers' experiences, there is no corresponding number of studies on fathers. In fact, there is only one study focusing on male partners in the Māori population, which is also difficult to generalize due to the strong cultural and social component; other works include the father figure in studies of couples. We can say that further studies focusing exclusively on the paternal experience are needed to better legitimize the pain resulting from this loss and to provide the basis for support tailored to men's specific needs. Moreover, surveys of siblings are not based on a direct examination of their behavior, but on the impressions of parents, particularly mothers. Based on the analysis of sibling surveys, it is important to conduct *ad hoc* studies that examine the real-life experiences of siblings at specific ages and to develop guidelines to assist parents in communicating about death and grief with siblings. In addition, grandparenting and comparative studies of stillbirth, neonatal and SIDS deaths are not new. Findings about grandparenting experiences and hypotheses about differences in grief between stillbirth, neonatal death, and SIDS are based on old studies; therefore, we believe there will be an opportunity to review and update these data in light of new studies.

No medical databases were considered in the review of the literature; instead, it was decided to examine only the psychological databases. Therefore, it is advisable to deepen the investigation and consider databases from other disciplines.

The studies included in this review point to the need for an intervention that targets the needs of each family member and is tailored to the specifics of SIDS loss, rather than more generalized grief. The role of the psychologist must become more important and central in the moments following the loss to make the best use of available resources and reduce risk factors as much as possible. Until medical science finds the causes of this syndrome, clinical psychology must strive to develop programs that address the experiences of these families with continuity and competence, offering them a pair of lenses better suited to see the eclipse that has obscured their existence and preparing them to reinvest in desire and life.

Data availability statement

The original contributions presented in this study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

GG had the idea of this work and contributed to the selection of included studies. AD, AS, and EV performed the bibliographic search, created the dataset, and contributed to writing of the manuscript. CC, SF, and FV resolved the methodological doubts of possible studies and helped in the first version of this manuscript. GDF collaborated in methodological aspects of the manuscript and revised the manuscript. All authors read the manuscript and agreed with its submission.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Psychological issues in breast cancer survivors confronted with motherhood: Literature review and a call to action

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Breast cancer is currently the most common cancer among women worldwide; in 15–25% of cases, patients are premenopausal at the time of diagnosis, and 50% of women desire pregnancy after cancer diagnosis. Motherhood after breast cancer involves complex psychological challenges with long-term consequences, though it is safely pursuable with adequate support. The purpose of this mini-review is to analyze the psychological implications surrounding pregnancy and motherhood after breast cancer and promote action in addressing the challenges that might affect women facing these life events.

KEYWORDS

breast cancer, motherhood, pregnancy, psychological symptoms, breastfeeding

Introduction

Breast cancer is currently the most common cancer among women worldwide, with 2.26 million cases recorded in 2020 (WHO, 2022). In 15–25% of cases, patients are premenopausal at the time of diagnosis (De Pedro et al., 2015), in fact approximately 7 to 10% of women diagnosed with breast cancer are younger than 40 years old (Rossi et al., 2019). For women who survive cancer, fertility and reproductive problems are of the utmost importance and almost 50% of young women desire pregnancy after breast cancer diagnosis (Paluch-Shimon et al., 2017).

However, a meta-analysis shows that the pregnancy rate after breast cancer treatment was on average 40% lower than the general population pregnancy rate (Gerstl et al., 2018).

This reflects both the damage to fertility caused by cancer treatments and the concerns of caregivers and patients about a possible negative impact of pregnancy on a woman's prognosis, although there is no evidence for the latter in the literature (Hartman and Eslick, 2016; Condorelli et al., 2021).

The aim of this work is to review the available literature on psychological issues in breast cancer survivors facing motherhood to better manage the unmet needs of this group of patients.

Mood status and health concerns

Accepting cancer diagnosis, undergoing treatments, managing possible side effects, and facing an uncertain future are steps in a stressful process that can result in psychological instability and depression (Dinapoli et al., 2021).

A large percentage of breast cancer patients experience multiple concomitant psychological symptoms during the cancer treatment journey, such as distress, anxiety, cognitive impairment, and sexual dysfunction (Guimond et al., 2019).

A recent study shows that women who develop reproductive problems after anticancer treatment experience more depressive symptoms over time (Nejatisafa et al., 2020).

The dilemma regarding childbirth that young cancer survivors face is not just of a medical nature, it is also influenced by psychological factors.

Pregnancy after breast cancer comes with unique and complex psychological and relational challenges with potential long-term consequences for patients and their families. Women who have had an oncological diagnosis in the past often face uncertainty about the outcome of the disease or the discontinuation of hormone therapy, which causes ambivalent feelings about pregnancy (Alder and Bitzer, 2008; Ives et al., 2016). In fact, the most common experiences include returning to normalcy and recovering from illness, but also being concerned for the health of their children, fearing relapses, and not seeing their children grow up (Gorman et al., 2010; Kuswanto et al., 2018; Faccio et al., 2020). The systematic review of Schmidt et al. (2016) aligns with these results, revealing how pregnant women with a history of breast cancer present gestation concerns to a greater extent than women with other cancer diagnoses. These concerns were primarily associated with fear of recurrence, fear of tumor progression due to pregnancy, and misinterpreting breast changes that they may experience with pregnancy (Schmidt et al., 2016).

In the literature, some studies have demonstrated that negative emotional states elicited by the disease, such as anxiety, anguish, anger, and fatigue, increase during pregnancy (Alder and Bitzer, 2008; Henry et al., 2012; Faccio et al., 2020; Schwab et al., 2021). In contrast, the study by Mascheroni et al. (2019) found that mothers' mood state during the last trimester of pregnancy did not differ between cancer survivors and women in the control sample. However, the same study also found that these women have significantly higher levels of post-traumatic stress disorder (PTSD) symptoms and lower quality of life levels. This evidence suggests that pregnancy after breast cancer represents a moment of vulnerability deserving special attention to prevent negative consequences on parenting (Gorman et al., 2010; Kuswanto et al., 2018).

Cancer survivors are also concerned about potential health problems for their children. One of the most common concerns is that past cancer treatment could lead to having a child with a birth defect or a genetic abnormality (Schover, 2005; Ghaemi et al., 2019).

The advent of genetic testing for hereditary cancer syndromes creates a new set of dilemmas for those who want to become parents. Carrying a deleterious BRCA mutation is associated with an increased lifetime risk of breast and ovarian cancer, so it is often recommended to get pregnant at a young age, followed by risk-reducing salpingo-oophorectomy. Many BRCA-mutated women are confronted with a true reproductive decision-making dilemma as a consequence of the 50% risk of transmitting the mutated gene to their children. Technologies such as prenatal diagnosis and preimplantation genetic diagnosis, in case of conception through *in vitro* fertilization or intracytoplasmic sperm injection, identify autosomal dominant mutations known to be responsible for hereditary cancer syndromes (Peccatori et al., 2018). The advantage of the preimplantation genetic diagnosis is that only unaffected embryos are transferred, thus avoiding a pregnancy termination if the fetus carries the undesirable genetic mutation. However, only few couples use this test for inherited cancer (Mor et al., 2018; Khouri et al., 2019).

Pregnancy representation

Studies indicate that most cancer survivors have reproductive intentions 3–7 years after diagnosis and that the desire to have children is mainly associated with the desire for parenting before cancer treatment, age, and parity (Armuand et al., 2014). When these intentions are unsatisfied, high levels of emotional suffering are detected, with important consequences for psychological and social well-being (Canada and Schover, 2012; Bártolo et al., 2021). Studies evaluating the effectiveness of fertility-related interventions on patients' mental health have shown that pre-treatment fertility counseling has improved patients' physical and psychosocial quality of life (Meneses and Holland, 2014; Sigismondi et al., 2015; Ter Welle-Butalid et al., 2019).

Several aspects influence the importance that women give to motherhood after breast cancer; one example is having children before the diagnosis. In fact, the priority for these mothers is to protect the children they already have, and a new pregnancy could be considered dangerous for recurrence (Ives, 2009; Hartman and Eslick, 2016). However, this does not mean that women with children before the diagnosis do not wish to achieve a pregnancy after cancer. Indeed, pregnancy after a breast cancer diagnosis seems to represent rebirth, hope, and revenge on life (Ives et al., 2016; Ferrari et al., 2018). Creating or expanding their family means rebuilding a positive dimension with their partner and seizing their chances of redemption from the disease (Crawshaw and Sloper, 2010; Young et al., 2019). A recent study by Hsieh et al. (2018) illustrates a theoretical model according to which cancer and its treatment are considered elements that interrupt a woman's normal life and destroy its balance. Every woman tries to find new meanings in her life during and after cancer; a child could represent the restoration of the original balance.

Another aspect that has only recently been considered is mother–child prenatal interaction (Ferrari et al., 2017; Faccio et al., 2020). Cancer survivors seem to show lower levels of interaction and affiliation with their fetus compared to women without a cancer diagnosis in their life history. Prenatal interaction is fundamental for the future mother–child relationship in the postpartum period and for the development of the child's personality (Graignic-Philippe et al., 2014; Ferrari et al., 2018; Faccio et al., 2020).

Delivery and preparation

Childbirth is considered a stressful life event; between 1 and 6% of women in the first year of birth can suffer from PTSD following a difficult birth experience. In addition to the diagnosed cases, about 30% of women evaluate their experience as traumatic (Soet et al., 2003).

The presence of psychiatric problems before birth and traumatic life events has been associated with symptoms of PTSD after birth in numerous studies (Kennedy and MacDonald, 2002; Cohen et al., 2004; Cigoli et al., 2006; O'Donovan et al., 2014). A cancer diagnosis is considered by the literature as a traumatic event and for this reason a potential risk factor for the development of psychological problems following a complicated birth (Mehnert and Koch, 2007).

The effects of anxiety and stressful life events on women's health during pregnancy and their birth outcomes have been studied. Stress and anxiety may be associated with numerous adverse outcomes such as preeclampsia, prolonged labor, preterm labor, and delivering a low-birth-weight infant (Graignic-Philippe et al., 2014). A negative birth experience could adversely affect postpartum maternal mood, the mother–child bond and breastfeeding (Weisman et al., 2010; Moloney and Gair, 2015; Bell et al., 2019).

Childbirth is a multidimensional life event, and women simultaneously report both negative and positive aspects of childbirth. These include pain, anxiety, and a loss of control, as well as a sense of accomplishment and joy or satisfaction (Waldenström et al., 1996; Van Teijlingen et al., 2003; Hoffmann and Banse, 2021).

Considering the possible consequences of anxiety and distress on childbirth and of negative childbirth experience, a psychological intervention focused on the preparation and assistance to childbirth is recommended. Women should be encouraged to discuss their goals, expectations, and plans for birth. The psychologist can help women cope with difficulties during pregnancy by providing them with information about emotional reactions that are normal or expected and that may signal the need for specific interventions. Finally, women should be encouraged to process their birth experiences shortly after they occur. This opportunity may help them reconcile ambivalent feelings about the childbirth experience (Howarth et al., 2010).

Marital and family support

The decision to have a child is a shared decision for the couple and the support of the partner in determining positive psychological outcomes during the gestational period is extremely important (Webster et al., 2011; Stapleton et al., 2012; Ives et al., 2016). Studies suggest that a supportive partner can be a protective factor against depression during pregnancy and postpartum, with benefits also for the well-being of the baby (Stapleton et al., 2012). Anxiety and depression levels during pregnancy are higher in women with poor family support (Cheng et al., 2016). Moreover, poor social support from friends, family and partners is associated with a woman's lower quality of life (Webster et al., 2011; Lagadec et al., 2018).

The comparison between women without an oncological history and those who have previously had a breast cancer diagnosis highlights that the latter perceive greater support from their partners and consider them figures who can assume a protective role toward them. The support given by the partner in the evaluation of fertility conservation options at the time of diagnosis and the choice of the method and timing of conception after treatment is also relevant (Faccio et al., 2020).

These results provide the first evidence of the importance of social support for the quality of maternal life during gestation and in the first months after childbirth.

Counseling and interventions to reduce depression and improve quality of life after childbirth should focus on the mother's social support network. Ideally, these interventions should be undertaken during pregnancy following a careful evaluation of the woman's support system (Webster et al., 2011; Lagadec et al., 2018).

According to the literature and clinical experience, psychological counseling should also focus on the exploration of ambivalent and negative emotions that can develop regarding pregnancy and which can be normal in these circumstances. The evaluation and empowerment of coping strategies can help women cope with difficult situations (Florsheim et al., 2012; Kaboli et al., 2017).

Support from a mental health professional can be an important resource because, although relevant, social and family support can also have a negative impact. Family members are often emotionally close to the patient and will have their fears and worries, which might make their support less effective (Ives et al., 2016).

Breastfeeding

Scientific evidence shows that breast milk is the ideal food for both the infant and the mother because of the physical and psychological benefits associated with it (Martin et al., 2016). The use of artificial nutrition and the early cessation of breastfeeding seem to increase the risk of developing certain diseases such as obesity, gastroenteritis, otitis, respiratory infections, and type 1 and type 2 diabetes in children (Bartick et al., 2009; Gianni et al., 2019). From a psychological point of view, breastfeeding is associated with slightly better performance in cognitive development tests than those obtained by artificially breastfed babies (Gartner et al., 2005; Lopez et al., 2021).

Regarding the health of the mother, studies on the benefits of breastfeeding report: a reduction in postpartum bleeding and a faster uterine involution due to the increased concentration of oxytocin; an earlier return to the weight women had before pregnancy (Gartner et al., 2005); and a reduction in the risk of developing breast or uterus cancer and type 2 diabetes (Bartick et al., 2009; Jelly and Choudhary, 2019). A meta-analysis with 27 studies involving 13,907 breast cancer cases suggested that breastfeeding was inversely associated with the risk of breast cancer (Zhou et al., 2015).

Concerning the benefits for psychological health, natural breastfeeding promotes a greater state of general relaxation, positive emotionality, and satisfaction with the care of the baby: women who breastfeed naturally turn out to be calmer, less anxious and stressed than those who feed artificially (Groër, 2005; Krol and Grossmann, 2018).

Breastfeeding also seems to have a fundamental neuro-biological role in the formation of a good mother-baby bond: high concentrations of prolactin and oxytocin are related to a better quality of maternal behavior and post-natal attachment (Levine et al., 2007; Walter et al., 2021).

Currently, there are no reliable epidemiological data regarding breastfeeding after breast cancer. The Society of Obstetricians and Gynecologists of Canada (SOGC) guidelines indicate that women previously treated for breast cancer should be encouraged to breastfeed, as there is no evidence that this practice is risky for the health of the mother or the baby. However, a recent systematic review by Bhurosy et al. (2021) shows that breastfeeding might be challenging among breast cancer survivors. According to the authors, although breastfeeding is possible and the treated breast is able to produce milk, many breast cancer survivors experience other significant challenges such as uncertainty about breastfeeding, lack of support from physicians and family members, lack of access to an International Board-Certified Lactation Consultant (IBCLC), and nipple pain and discomfort. Nonetheless, there are several clinical and social factors associated with safe and possible breastfeeding. Social factors include being motivated to breastfeed and receiving counseling and support from a multidisciplinary team of health professionals, family members or friends. Clinical factors include the use of the contralateral breast, lactation counseling and advice from an IBCLC, frequent feedings and use of galactagogues (Bhurosy et al., 2021).

Studies on healthy women have shown that maternal psychological variables influence the choice of breastfeeding and its duration (O'Brien et al., 2008; De Jager et al., 2014; Dagla et al., 2021). In particular, it has been shown that anxiety, neuroticism as a personality trait and a body image disorder negatively affect the intention to breastfeed: the more they are present, the less the mother is willing to breastfeed (Roth, 2006; Di Mattei et al., 2016).

Body image describes the cognitive, affective, and behavioral aspects of one's body (Cash et al., 2002; Hosseini and Padhy, 2021). Negative body image is common in women who have been diagnosed with breast cancer, particularly as the breast is a symbol of femininity and sexuality in western society (Kolodziejczyk and Pawłowski, 2019). For these women, the breast becomes a potentially lethal sick organ, and for the surviving women who are experiencing pregnancy it may be difficult to re-accept that sick breast as a life-giving and nourishing organ for their baby (Hopwood, 1993; Brown et al., 2015).

The literature has shown that low self-esteem, guilt, and stigma are present in women who are unable to breastfeed (Bresnahan et al., 2020). The difficulties that women with previous breast cancer encounter in breastfeeding can cause a sense of inadequacy compared to their role as mothers because they fear that this will prevent them from building a positive relationship with their baby (Alder and Bitzer, 2008; DiPietro, 2010).

In a qualitative analysis conducted by Gorman et al. (2009), women's fears about breastfeeding after breast cancer emerged significantly. These fears included uncertainties about the possibility of breastfeeding, fear of breastfeeding with one breast and fear of not having enough milk.

Maternal counseling in pregnancy and breastfeeding is essential to prevent negative effects on the mental health of women and children and their bond. The reduced production of milk by the previously affected and irradiated breast, the adequacy of the quantity and quality of the milk are issues that must be addressed with competence and patience (Azim et al., 2009; Bhurosy et al., 2021).

Denying breast cancer survivors the opportunity to breastfeed remains unjustified in the absence of supporting evidence. Addressing this issue would help increase the perception of a return to normalcy and improve the quality of life of these women (Azim et al., 2010; Bhurosy et al., 2021).

Conclusion

The most recent trends in breast cancer epidemiology show that incidence among women aged 20–49 years is gradually increasing (Ellington et al., 2022); at the same time there is evidence that the age at first pregnancy is increasing as well (Eurostat, 2021).

This calls for action in addressing the issues that might affect women seeking and facing pregnancy after breast cancer diagnosis and treatment, which both represent challenging events for a woman. For this reason, a multidisciplinary approach is recommended since diagnosis, providing women with all the necessary tools to preserve their fertility before starting cancer treatment (Di Mattei et al., 2020, 2021) and providing adequate support throughout the pregnancy and breastfeeding journey afterwards. Receiving adequate information about fertility and the possibility of a safe pregnancy after breast cancer, while feeling supported by a multidisciplinary team including the psychologist, might promote a better adjustment to the disease and increase psychological well-being and quality of life in the long-term. Finally, involving patients' partners is crucial to promote communication and a shared path within the couple.

Author contributions

VEDM, GP, GM, FF, FAP, and MC contributed to conception and design of the manuscript. FF and GP wrote the first draft of the manuscript. PT, MM, ND, and VEDM wrote sections of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Examining the associations between difficulties in emotion regulation and symptomatic outcome measures among individuals with different mental disorders

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Background: Difficulties in emotion regulation (ER) abilities have been found to play a central role in different psychiatric disorders. However, researchers rarely compare ER across different diagnostic groups. In the current study, we examined ER and its relation to functional and symptomatic outcome among three distinct diagnostic groups: people with schizophrenia (SCZ), people with emotional disorders (EDs; i.e., depression and/or anxiety), and individuals without any psychiatric diagnosis (controls).

Methods: Participants in this study comprised 108 adults who requested psychotherapy at a community clinic in the year 2015 and between 2017 and 2019. Clients were interviewed and filled out questionnaires measuring depression, distress, and difficulties in ER abilities.

Results: Results showed that individuals with psychiatric diagnoses reported higher levels of difficulties in ER abilities than did controls. Moreover, there were very few differences in levels of ER difficulty between SCZ and EDs. Further, the associations between maladaptive ER and psychological outcomes were significant in each diagnostic group, and especially for SCZ.

Conclusion: Our study indicates that difficulties in ER abilities partially have a transdiagnostic nature, and that these difficulties are associated with psychological outcomes among both clinical populations and controls. There were very few differences in levels of ER ability difficulties between SCZ and EDs, suggesting that the two groups share difficulties in relating and responding to emotional distress. The associations between difficulties in ER abilities and outcome were more robust and stronger among SCZ than the other groups, highlighting the potential contribution of targeting ER abilities in the treatment of schizophrenia.

KEYWORDS

emotion regulation, distress, depression, schizophrenia, emotional disorders

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1. Introduction

Emotion regulation (ER) has been defined as a set of processes that people use to maintain optimal homeostatic arousal in order to facilitate goal-oriented functioning (Gross, 2015). By using these processes, one can adapt one's emotional experience and its magnitude according to the contextual requirements. Based on conceptualizations that emphasize the contextual-dependent nature of adaptive ER (Cole et al., 1994; Thompson, 1994), Gratz and Roemer (2004) suggested an integrative multidimensional assessment of individuals` typical ways of understanding, relating, and responding to emotions. They proposed six complementary yet distinctive dimensions of ER abilities that include awareness of emotional responses, clarity of emotional responses, acceptance of emotional responses, access to emotion regulation strategies perceived as effective, controlling impulses when experiencing negative emotions, and engaging in goal-directed behaviors when experiencing negative emotions.

Deficits in ER abilities are considered risk factors for the development and maintenance of multiple forms of psychopathology (Glenn and Klonsky, 2009; Gratz et al., 2015; Monell et al., 2018). In addition to research on ER abilities that focus on dimensions of adaptive vs. maladaptive ways of responding to emotional distress (Gratz and Roemer, 2004), there is increasing literature on the application of particular ER strategies to influence the experience or expression of emotions (Gross and John, 2003; Garnefski and Kraaij, 2006; Webb et al., 2012; Gross, 2015). Studies on ER strategies have found specific maladaptive strategies (e.g., rumination, avoidance, and suppression) and adaptive strategies (e.g., problem solving, acceptance, and reappraisal) that play a significant role across a range of psychopathologies (Aldao et al., 2010). Recent accounts of ER suggest that these approaches are complementary; hence, deficits in ER abilities and the use of particular ER strategies both contribute to how adaptively emotions are regulated (Gross, 2015; Tull and Aldao, 2015; Doré et al., 2016).

Research linking difficulties in ER abilities and maladaptive ER strategies with clinical disorders include mood disorders (Hallion et al., 2018; Gonçalves et al., 2019; Miola et al., 2022), anxiety disorders (Mennin et al., 2005; Salters-Pedneault et al., 2006; Kashdan and Breen, 2008; Cisler et al., 2010), psychotic disorders (Lincoln et al., 2015; Ludwig et al., 2019), personality disorders (Linehan, 1993; Lynch et al., 2007), posttraumatic stress disorder (Tull et al., 2020), eating disorders (Clyne and Blampied, 2004; Bydlowski et al., 2005), and substance-related disorders (Fox et al., 2007; Sher and Grekin, 2007; Weiss et al., 2022). The growing body of literature demonstrating that ER is a clinically-relevant construct highlights the importance of targeting ER difficulties within therapeutic interventions. Accordingly, several interventions that target ER abilities and strategies have been developed, such as emotion-focused therapy (Greenberg, 2004), dialectical behavioral therapy (Linehan, 1993), ER therapy (Mennin and Fresco, 2014; Mennin et al., 2018), acceptance therapy, and mindfulness-based therapy (Hayes et al., 2009).

Although there are theories that posit ER as a transdiagnostic mechanism underlying numerous psychiatric difficulties and maladaptive behaviors (Campbell-Sills and Barlow, 2007; Bloch et al., 2010; Gratz and Tull, 2010a,b), it is not clear whether there are specific patterns of ER difficulties that characterize distinct diagnostic groups. Research comparing difficulties in ER abilities and related clinical outcomes across distinct diagnostic groups is rare. Previous research on ER and different psychopathology manifestations is mainly based on comparing ER strategies, not ER abilities (for example, see Aldao et al., 2010; Sheppes et al., 2015). Of note, a meta-analysis comparing ER strategies across diagnostic groups showed different patterns of maladaptive strategies between disorders (Aldao et al., 2010). However, it did not assess specific dimensions of ER abilities and it did not include clients with schizophrenia spectrum disorders, limiting the ability to compare their patterns of ER with those of other diagnostic groups.

In recent decades evidence has accumulated to suggest that individuals diagnosed with schizophrenia (SCZ) have challenges in choosing adaptive ER strategies, leading to less effective ER processes (Perry et al., 2011; Ludwig et al., 2019; Lawlor et al., 2020; Opoka et al., 2021). A recent meta-analysis that assessed the use of cognitive ER strategies among SCZ found that maladaptive ER strategies are more frequently reported, and adaptive strategies are less frequently reported, compared to among non-patients controls (Ludwig et al., 2019). In addition, SCZ report greater difficulties in emotional clarity and emotional acceptance than do controls (Lawlor et al., 2020). Of note, ER maladaptive strategies have been linked to the formation and maintenance of positive psychiatric symptoms among SCZ (Ludwig et al., 2019; Kimhy et al., 2020).

Although research on ER difficulties among SCZ is growing rapidly, research on ER abilities in accordance with the Gratz and Roemer (2004) multidimensional model remains scarce. In a sample of inpatients with serious mental disorders, all of the dimensions of difficulties in ER were related to depression, anxiety, and somatization symptoms (Fowler et al., 2014). Another study that assessed difficulties in ER abilities in a subclinical sample found that impulse control difficulties were associated with persecutory ideation (Westermann and Lincoln, 2011). However, to the best of our knowledge, no systematic evaluation of different dimensions of difficulties in ER abilities and their association with clinical outcomes among SCZ has yet been conducted, nor a comparison of these patterns with patterns among individuals with emotional disorders and controls.

Previous research comparing SCZ with depressed individuals in emotional deficits has yielded mixed results: Some studies found less emotional expressiveness among SCZ than among depressed individuals (for example, Yecker et al., 1999), whereas other studies found higher levels of expressiveness among SCZ (Berenbaum and Oltmanns, 1992). Interestingly, in a study that compared SCZ with depressed individuals and controls, the two diagnostic groups exhibited more impairments in facial emotion expression than did controls, but they also differed in the type of impairments they exhibited: Depressed participants had fewer spontaneous expressions of other-than-happiness emotions, but overall they appeared more expressive (Trémeau et al., 2005). In addition, SCZ and depressed participants reported more negative emotions than did controls, but the difference between the level and type of negative emotional experiences of SCZ and depressed participants remains unclear (Trémeau, 2006). Studies on ER strategies have found that SCZ and depressed individuals differ from controls, but the two clinical groups have similar negative emotions and maladaptive ER strategies (Livingstone et al., 2009). Finally, Lincoln et al. (2015) found similar difficulties among participants with SCZ and depression in ER skills, with a tendency toward even more pronounced difficulties among SCZ. Based on the inconclusive findings regarding emotional deficits, ER strategies, and ER skills that are related to ER abilities (Trémeau, 2006), in the current study, we compared SCZ, participants with emotional disorders, and controls in their ER abilities and related outcomes.

Emotion regulation abilities seem to play a significant role both in depression and anxiety disorders (Cisler et al., 2010; Gonçalves et al., 2019). According to the unified protocol framework (Moses and Barlow, 2006), individuals diagnosed with depression and anxiety disorders can be grouped together as facing emotional disorders (EDs). The functional model of EDs suggests that both depression and anxiety share similar difficulties and usage of maladaptive ER abilities that contribute to the persistence of emotional symptoms. The core difficulty according to the model is negative reactions to strong emotions, leading to a reliance on ineffective strategies that backfire and exacerbate emotion (Campbell-Sills and Barlow, 2007). In support of the theoretical assumptions of this model, there is a high lifetime comorbidity rate between depression and anxiety disorders, which has been estimated to be as high as 75% (Kessler et al., 2005; Brown and Barlow, 2009; Wilamowska et al., 2010).

Our first aim was to compare difficulties in ER abilities among SCZ, EDs, and controls. Although difficulties in ER abilities seem to characterize different diagnostic populations (Gratz and Tull, 2010a,b; Gratz et al., 2015), studies have rarely compared ER impairments of different clinical groups. Based on a review of emotion deficits that show SCZ and EDs face more deficits in emotional abilities than do controls (Trémeau, 2006), we hypothesized that SCZ and EDs would show more difficulties in ER abilities than would controls. As the differences between SCZ and EDs in emotional expression, experience, and regulation remain unclear (Trémeau, 2006; Livingstone et al., 2009; Lincoln et al., 2015), we did not formulate a hypothesis vis a vis specific differences in their ER abilities, and thus this analysis was exploratory.

Our second aim was to explore the associations of difficulties in ER abilities with depressive and general symptoms. Based on previous research linking specific ER dimensions with symptomatic and functional outcomes (Fowler et al., 2014; Ryan et al., 2016; Hallion et al., 2018; Gonçalves et al., 2019), we hypothesized that there would be associations between ER abilities and depressive symptoms and general symptoms among the three groups. Our third aim was to compare the strength of associations between difficulties in ER abilities and outcomes across the groups. Given the lack of existing literature comparing groups in the above-mentioned associations, these investigations were exploratory.

In order to investigate our research aims, we compared difficulties in ER abilities among three distinct diagnostic groups: individuals diagnosed with schizophrenia (SCZ), individuals diagnosed with emotional disorders (EDs; i.e., depression and/or anxiety), and individuals without a clinical diagnosis (controls). Then, we calculated the correlations between each difficulty in ER ability with functional and symptomatic outcomes. Finally, we compared the sizes of the correlations between the three groups. This research is expected to contribute to the understanding of disorder-specific deficits and assist in tailoring interventions that target ER abilities most effectively.

2. Method

2.1. Participants

Participants comprised 108 adults (55 men) between the ages of 20 and 58 ($M = 38.52$, $SD = 9.47$). The sample for the current research consists of clients who requested psychotherapy at the university community clinic during the year 2015 and between 2017 and 2019. The current study's data are baseline data collected before the participants' engagement in psychotherapy. All participants were Hebrew speakers, and the data were collected using validated Hebrew versions of the measures listed. Exclusion criteria were intellectual disability, neurological disorders, substance use problems, acute psychosis, and risk for suicidal behavior, based on the intake interview. The first subsample included 36 SCZ who enrolled in a metacognitive reflection insight therapy trial (Igra et al., 2022). The second subsample included 36 other clients who signed up for psychotherapy in the clinic and were diagnosed with major depression, dysthymia, and/or anxiety disorders. All diagnoses were determined according to the Mini-International Neuropsychiatric Interview 4.5 (MINI 4.5; Sheehan et al., 1998), which is part of a baseline intake in the clinic. The last subsample also included 36 clients who signed up for psychotherapy in the clinic but did not meet the criteria for any diagnosis. All participants approached the clinic voluntarily for psychotherapy.

As age and gender have been found to influence difficulties in ER abilities and their impact on outcome (Gratz and Roemer, 2004; Orgeta, 2009; Bender et al., 2012), participants were matched in gender and age (±3 years). When more than one match was available from a subsample, we randomly assigned a matching participant from the available participants. Of note, the initial subsample of SCZ included 50 participants. However, we were unable to match 14 individuals; therefore, only 36 participants from that subsample were compared to the EDs and control subsamples. Participants from the SCZ subsample that were included in the current study did not differ from participants in the SCZ subsample that were not included due to the matching procedure in the level of difficulties in ER abilities and their general distress levels, but they had higher levels of BDI scores.

2.2. Procedure

Following the obtaining of ethical approval for the study and the signing of a consent form, and prior to their engagement in psychotherapy, clients were interviewed at the clinic and were asked to fill out questionnaires. With the SCZ subsample, the reported measures were administered on a computer in the clinic, whereas with the other subsamples, the administration of scales was done *via* participants' electronic devices at a time and place of their choosing.

2.3. Measures

2.3.1. Mini-international neuropsychiatric interview 4.5

A structured interview of Axis-I disorders of the DSM-IV-TR. The interviewers were interns in clinical or rehabilitation psychology (Sheehan et al., 1998).

2.3.2. Beck depression inventory-II

A 21-item self-report measure of depression that asks respondents to rate the severity of their depressive symptoms during the previous 2 weeks using a variable Likert-type scale (i.e., 19 items use a four-point scale, and two items use a seven-point scale; Beck et al., 1996). Individual item scores are summed to create a total severity score ranging from 0 to 63. Cronbach's α estimate of internal consistency in the current study for the depression score was 0.914.

2.3.3. Outcome questionnaire-45

A 45-item self-report, five-point Likert-type scale questionnaire, is designed to measure clients' changes in distress and functioning over the course of their mental health treatment, with higher scores representing higher symptom severity. It has been found to have adequate test–retest reliability (0.84) and a high internal consistency, Cronbach's alpha = 0.93 (Kadera et al., 1996; Lambert et al., 1996). Cronbach's α estimate of internal consistency in the current study was 0.926. In line with extensive studies, including the one on scale development (Lambert et al., 1996) that consistently showed high correlations between subscales of distress and functioning and total score, we used a total score in the current study.

2.3.4. Difficulties in ER scale

A 36-item self-report measure that assesses individuals' difficulties in ER (Gratz and Roemer, 2004). The DERS is based on a clinically multidimensional conceptualization of ER that was developed to be valid for a wide variety of psychological difficulties and relevant to clinical applications and treatment development (Gratz and Tull, 2010a,b). The DERS is composed of six dimensions reflecting potential difficulties: (a) lack of awareness of emotional responses, (b) lack of clarity of emotional responses, (c) non-acceptance of emotional responses, (d) limited access to ER strategies perceived as effective, (e) difficulties controlling impulses when experiencing negative emotions, and (f) difficulties engaging in goal-directed behaviors when experiencing negative emotions. The items are statements that are rated on a five-point Likert-type scale ranging from 1 (almost never) to 5 (almost always). After recoding the inverse items, individual item scores are summed to create a total score of difficulties in ER, or are summed for each subscale score. Higher scores indicate greater difficulties in ER. The questionnaire has been used extensively in research among clinical populations (Fowler et al., 2014; Rosenstein et al., 2018; Scoglio et al., 2018), and has good reliability and validity, including high overall internal consistency (α = 0.93) and Cronbach's alpha >0.80 for each subscale (Gratz and Roemer, 2004). Cronbach's α estimate of internal consistency for the DERS score in the current study was 0.93.

2.4. Analytic strategy

First, we used between-subjects ANOVA to examine differences between the diagnostic groups (1 = SCZ, 2 = EDs, 3 = controls) in the ER variables: (a) lack of awareness of emotional responses; (b) lack of clarity of emotional responses; (c) non-acceptance of emotional responses; (d) limited access to ER strategies perceived as effective; (e) difficulties controlling impulses when experiencing negative emotions; and (f) difficulties engaging in goal-directed behaviors when experiencing negative emotions. Second, we examined differences between the diagnostic groups in the outcome variables: (a) severity of depressive symptoms Beck depression inventory-II (BDI-II) and (b) distress Outcome Questionnaire-45 (OQ-45).

Then, in order to examine whether ER deficits and their associations with outcome would differ between the diagnostic groups, we examined Pearson correlations between ER variables and outcome variables across different diagnostic groups. After reviewing these correlations, we examined the differences between groups in Pearson correlations for each ER variable. Analyses were done using IBM SPSS (version 27; IBM Corp, 2020), and comparison of correlations was done by transforming each correlation to Fisher Z scores and performing a Z test for differences between independent correlations using the formulas in Snedecor and Cochran (1980).

As this study represents a secondary analysis of existing data, we were limited to the number of participants in the original studies. As such, we conducted a retrospective power analysis in the G*power program (Cohen, 1992) that shows that with this sample size, we had an 80% statistical power to detect medium to large effect sizes.

3. Results

3.1. Differences between groups in study variables

Table 1 shows the differences in ER variables between the diagnostic groups and *post hoc* analyses using the Scheffé *post hoc* criterion for significance. The differences in lack of awareness, lack of clarity, non-acceptance, limited access to ER strategies, difficulties controlling impulses, and difficulties engaging in goal-directed behaviors were found to be significant between the diagnostic groups. The *post hoc* analysis indicated that for the following subscales—non-acceptance, limited access to ER strategies, difficulties controlling impulses, and difficulties engaging in goal-directed behaviors—the average scores of controls were significantly lower than in the other two diagnostic groups, and the latter two groups did not differ from one another. For the lack of clarity subscale, a *post hoc* analysis showed that the average score of controls was significantly lower only than that of ED, and the two psychiatric groups did not differ from one another. A different trend was found for the lack of awareness subscale, in which a *post hoc* analysis showed that the average score of SCZ was significantly lower than that of EDs, whereas controls did not differ from either of the other groups.

Table 2 presents the differences in the outcome variables between the diagnostic groups and *post hoc* analyses using the Scheffé *post hoc* criterion for significance. The differences in OQ and BDI were found to be significant between the diagnostic groups. The *post hoc* analysis indicated that for depressive symptoms, the average score of controls was significantly lower than that of the other two diagnostic groups, whereas for the general symptoms scale the average score of controls was significantly lower only than that of EDs.

3.2. Relations between ER variables and outcome variables in each of the diagnostic groups

As can be seen in Table 3, for the most part, ER variables were found to be significantly correlated with both outcome variables (i.e., depression and the general symptoms scales in at least one diagnostic group). Of note, only for SCZ were the correlations between all ER variables and outcome variables found to be significant. The associations of the subscale of limited access to ER strategies with both outcome variables were found to be significant across all diagnostic groups. Lack of clarity, difficulties controlling impulses, and non-acceptance were found to be significantly correlated with both outcome variables for SCZ

TABLE 1 Means, SDs, and one-way ANOVA in DERS, and *post hoc* analyses using the Scheffé *post hoc* criterion.

Measure	SCZ	EDs	Controls	*F* (2, 105)	η^2	*p* values for Scheffé *post hoc* comparisons		
	M (SD)	M (SD)	M (SD)			SCZ vs. EDs	SCZ vs. Controls	EDs vs. Controls
Lack of awareness	14.66 (4.60)	17.14 (3.16)	16.24 (3.62)	3.83*	0.07	0.03*	0.22	0.61
Lack of clarity	10.97 (4.19)	12.03 (4.87)	8.91 (2.95)	5.42*	0.09	0.55	0.11	0.01**
Non-acceptance	16.36 (5.74)	17.78 (6.27)	12.15 (4.90)	9.6**	0.16	0.57	<0.01**	<0.001**
Limited access to emotion regulation strategies	24.38 (7.78)	23.08 (6.84)	16.55 (6.06)	13.21**	0.20	0.73	<0.001***	<0.01**
Difficulties controlling impulses	13.91 (6.34)	14.80 (5.07)	10.19 (4.18)	7.73*	0.13	0.78	<0.01*	<0.01*
Difficulties engaging in goal-directed behaviors	16.72 (4.16)	16.95 (4.79)	12.11 (5.18)	11.99**	0.19	0.98	<0.001**	<0.001**

DERS: Difficulties in ER Scale (Gratz and Roemer, 2004).
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

TABLE 2 Means, SDs, and one-way ANOVA in outcome variables and *post hoc* analyses using the Scheffé *post hoc* criterion for differences between the diagnostic groups.

Measure	SCZ	EDs	Controls	*F* (2, 105)	η^2	*p* values for Scheffé *post-hoc* comparisons		
	M (SD)	M (SD)	M (SD)			SCZ vs. EDs	SCZ vs. Controls	EDs vs. Controls
General symptom severity (OQ-45)	74.19 (24.72)	84.26 (19.30)	59.80 (19.79)	11.87**	0.18	0.14	0.20	<0.001***
Depressive symptoms (BDI-II)	21.86 (12.06)	24.82 (10.73)	12.14 (8.99)	13.92**	0.21	0.50	<0.001***	<0.001***

OQ-45: Outcome Questionnaire-45 (Lambert et al., 1996).
BDI-II; Beck Depression Inventory-II (Beck et al., 1996).
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

and controls, but not for EDs. Lack of awareness and difficulties engaging in goal-directed behavior were found to be significantly correlated with both outcome variables only for SCZ.

Results from the comparisons of correlations between ER variables and outcome variables from the different diagnostic groups are presented in Table 4. As can be seen, the association between the lack of clarity and difficulties in goal-directed behaviors dimensions with general symptom severity was significantly stronger among SCZ than among EDs. In addition, the association between lack of clarity and depressive symptoms was significantly stronger among SCZ than among EDs. Finally, lack of clarity and difficulties controlling impulses were associated with both outcome measures significantly more among controls than among EDs.

4. Discussion

In the current study, we examined differences in levels of ER ability difficulties and their associations with psychological outcome across different diagnostic groups. Results of the current study indicate that most ER abilities and outcome measures are more impaired in the clinical groups (i.e., SCZ or EDs) than in controls. In addition, the study emphasizes the central role of ER abilities in psychological outcome beyond specific diagnosis, as it was associated with outcome in all groups. However, the importance of ER abilities as associated with outcome seems to be especially relevant for SCZ as compared with EDs, as all dimensions of ER abilities were found to be positively related to outcome measures of depression and the general symptoms scores in this population, and as two ER dimensions (lack of clarity and difficulties in goal-directed behaviors) had significantly stronger correlations with outcome measures among SCZ than among EDs.

The finding that difficulties in ER abilities were higher in both diagnostic groups (i.e., SCZ and EDs) than in the control group is consistent with previous studies that found that emotional difficulties and ER strategy deficits were higher in clinical populations than controls (Trémeau, 2006; Aldao et al., 2010; Lukas et al., 2018; Lincoln et al., 2022). Furthermore, there were no significant differences between SCZ and EDs in difficulties in ER abilities, in line with previous literature showing similar maladaptive ER strategies and ER skills among SCZ and EDs (Livingstone et al., 2009; Lincoln et al.,

TABLE 3 Pearson correlations between DERS dimensions and outcome, across the diagnostic groups (*n* =108).

Variables	General symptom severity OQ-45			Depressive symptoms BDI-II		
	SCZ (*n* =36)	ED (*n* =36)	Controls (*n* =36)	SCZ (*n* =36)	ED (*n* =36)	Controls (*n* =36)
Lack of Awareness	0.29*	0.03	0.20	0.32*	−0.03	0.14
Lack of Clarity	0.41*	−0.01	0.38*	0.57**	0.06	0.44**
Non-Acceptance	0.50**	0.27	0.51**	0.42*	0.35*	0.59**
Limited Access to ER Strategies	0.61**	0.58**	0.37*	0.58**	0.61**	0.41*
Difficulties Controlling Impulses	0.54**	0.25	0.69**	0.48**	0.31	0.74**
Difficulties in Goal-Directed Behaviors	0.67**	0.31	0.19	0.48**	0.39*	0.42**

*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

TABLE 4 Significance of differences between the correlations of DERS and outcomes, in the three diagnostic groups.

Variables	General symptom severity OQ-45			Depressive symptoms BDI-II		
	SCZ vs. ED	SCZ vs. Controls	ED vs. Controls	SCZ vs. ED	SCZ vs. Controls	ED vs. Controls
Lack of awareness	0.14	0.36	0.24	0.08	0.22	0.25
Lack of clarity	0.04*	0.45	0.05*	<0.01**	0.24	0.05*
Non-acceptance	0.13	0.49	0.13	0.37	0.18	0.10
Limited access to ER strategies	0.45	0.10	0.12	0.43	0.18	0.14
Difficulties controlling impulses	0.08	0.16	<0.01**	0.21	0.04*	<0.01**
Difficulties in goal-directed behaviors	0.02*	<0.01**	0.47	0.34	0.39	0.44

*$p < 0.05$.
**$p < 0.01$.

2015). This finding may imply that SCZ and EDs share difficulties in relating and responding to emotional distress. Further examination is needed to extend this finding and explore its origins and broader consequences for clinical manifestations. Finally, difficulties in ER abilities were more strongly associated with outcome in the SCZ group than in the EDs group and the control group. All of the dimensions of ER abilities were associated with general symptom severity and depressive symptoms among SCZ. In addition, lack of clarity and difficulties in goal-directed behaviors were significantly more associated with outcome among the SCZ group than among the EDs group. Taken together, it seems that the type and level of difficulties in ER abilities among SCZ do not differ significantly from the type and level among EDs; nevertheless, ER abilities seem to have more robust and stronger associations with symptomatic outcomes among SCZ than among EDs and controls.

The one observed difference in ER between the two clinical groups was found in the lack of awareness subscale: Difficulties in awareness of emotional responses were significantly lower among SCZ then among EDs. Of note, individuals diagnosed with schizophrenia face deficits in broad awareness-related processes such as insight into the disorder, mentalization, and metacognition (Gilleen et al., 2011; Hasson-Ohayon and Lysaker, 2021) that differ from other psychopathologies. Thus, it might be that emotional awareness as assessed in the current study did not capture the unique challenges that SCZ face in emotional awareness. In addition, previous studies on the psychometric properties of the DERS indicated that the awareness subscale showed relatively poor psychometric properties (Bardeen et al., 2012; Osborne et al., 2017; Hallion et al., 2018). Specifically, it was found that the internal consistency was poor and the DERS as a whole was psychometrically stronger when the awareness subscale was excluded. One possible explanation is that the awareness of emotions subscale assesses a different construct that is less essential to ER (Hallion et al., 2018). Therefore, we suggest interpreting this finding with special caution and to examining more complex dimensions of emotional awareness using additional instruments in order to determine the differences in lack of awareness of emotions and its significance among SCZ and Eds.

In general, our results indicate that the associations of difficulties in ER abilities with psychological outcome is partially transdiagnostic, in line with recent accounts of ER as a transdiagnostic mechanism of change across diagnosis (Gratz and Tull, 2010a,b; Berking and Wupperman, 2012; Sloan et al., 2017). Thus, difficulties in ER abilities might impact poor psychological outcomes, or vice versa, for all individuals, beyond any specific psychiatric diagnosis, although a few dimensions of ER were found to be more strongly associated with outcome in the SCZ group than in the EDs group, in the current study. Moreover, various studies have shown that maladaptive ER abilities are not only related to symptoms and distress, but also may predict and impact them (Nolen-Hoeksema, 2000; Calmes and Roberts, 2007; Hong, 2007; Aldao and Nolen-Hoeksema, 2010; Berking et al., 2011; Rusch et al., 2012). As such, by improving ER abilities, symptoms of different psychiatric diagnoses may decrease.

Furthermore, as mentioned above, we found that the associations between maladaptive ER and psychological outcomes were especially significant for SCZ. This finding is supported by previous research that found that deficits in ER strategies among SCZ were related to maintenance and aggravation of positive symptoms (Ludwig et al., 2019; Liu et al., 2020), negative symptoms (van der Meer et al., 2009), and social functioning (Henry et al., 2008; Kimhy et al., 2012). Based on the central role of ER in determining wellness and recovery among SCZ, Bach and Hayes (2002) suggested that therapy that focuses on adaptive ER abilities, instead of on symptom reduction, would reduce these individuals' re-hospitalizations and improve their well-being. Our findings may suggest that enhancing emotional clarity and engaging in goal-directed behaviors when experiencing negative emotions might be of particular use for therapeutic interventions with SCZ.

A few of the associations between the ER subscales and the different outcomes were not significant for the EDs group. In addition, emotional clarity and impulse control had significantly stronger correlations with outcome measures among controls than among EDs. Previous findings show that ER abilities predict depressive symptoms both cross-sectionally and longitudinally, among EDs (Berking et al., 2014; Gonçalves et al., 2019). Of note, a stronger association between difficulties in ER abilities and symptoms has been found among women than men (Bender et al., 2012; Gonçalves et al., 2019), indicating the significance of taking gender into account. It could be that difficulties in ER were less associated with symptomatic outcome in our sample because it included mostly men. As the current study represents a preliminary and exploratory investigation, more research is needed in order to determine the relation of difficulties in ER with outcome among EDs. Finally, we did not find significant differences between controls and SCZ Group in part of ER abilities, specifically awareness to emotions and lack of emotional clarity. In addition, SCZ did not differ significantly from controls in general symptoms severity. It could be that the fact that our control group was based on treatment seekers affected these results, and further examination is needed to clarify that.

4.1. Limitations, implications, and future directions

Along with its contribution to the literature, the current study also had some limitations. First, its cross-sectional design does not allow for the exploration of causality between the different variables. Second, grouping together people with anxiety or affective disorders into one ED group did not allow for an observation of distinct associations between the different disorders and psychological outcomes and deficits in ER. Third, in this study—as opposed to other studies—controls were those who had sought treatment but did not have a psychiatric diagnosis. In other words, using a control group of non-treatment seekers may have yielded a pattern of results different from that yielded in the current study, which included treatment seekers. Additionally, the different patterns of correlations between SCZ, Eds, and controls could be influenced by the setting of our study that included treatment seekers in all three groups. Fourth, our hypotheses were not pre-registered. Fifth, as this is one of the first studies comparing differences between correlations of ER and outcome across groups, we used a permissive approach to the analysis of the differences between independent correlations. Future research should use a more conservative approach and apply statistical corrections to the comparisons of correlations. In addition, as our sample was relatively small and our investigations were preliminary and exploratory, further examinations with more statistical power are needed in order to determine the association of ER abilities with outcome.

Moreover, a few of the ER variables that were examined in this study (e.g., awareness and clarity of emotions) may be considered aspects of emotional processing or emotional functioning rather than of ER *per se*. Furthermore, other aspects that have been found relevant for ER in other studies, such as monitoring of ER implementation across time (Sheppes et al., 2015), were not examined in this study. In addition, in this study we only focused on two psychological outcome variables. Lastly, the use of self-report measures can cause potential reporting biases (i.e., participants may report socially desirable outcomes).

With these limitations in mind, the current study has several implications. First, difficulties in ER abilities seem to be partially transdiagnostic, as they were evident both among EDs and SCZ. It will be beneficial to systematically explore difficulties in ER abilities across additional diagnostic groups. Furthermore, future studies should assess difficulties in ER abilities *via* observational methods, in addition to self-report measures, as it has been shown that the two types of assessment are not highly correlated (Ganellen, 2007; Kivity and Huppert, 2018).

With regard to clinical implications, there seems to be a partial transdiagnostic effect in the associations of ER abilities with depressive symptoms and psychological distress and functioning. Our findings suggest that exploring ER abilities and their associations with other outcome measures longitudinally could be beneficial for detecting the dynamics of formation and maintenance of clinical symptoms across diagnoses. In addition, in line with recent research indicating the importance of ER abilities in mediating treatment outcomes (Slee et al., 2008; Axelrod et al., 2011; Berking et al., 2011; Berking and Wupperman, 2012; Khakpoor et al., 2019; Igra et al., 2022), our findings point to the potential role of ER abilities as a specific change mechanism in psychotherapy. Therapeutic interventions that emphasize ER abilities and strategies have already been developed, and our findings call for an in-depth exploration of the role of session-by-session specific ER abilities in psychological treatments for SCZ, EDs, and other conditions.

4.2. Conclusion

In summary, this study highlights the association between difficulties in ER abilities and depressive symptoms and distress.

Our results show that individuals with psychiatric disorders report more deficits in ER and higher levels of depression and distress than do individuals without psychiatric diagnoses. Moreover, there were very few differences in the levels of difficulties in ER abilities between SCZ and EDs, suggesting that SCZ and EDs share difficulties in relating and responding to emotional distress. The associations between difficulties in ER abilities and psychological outcome were found to be more robust and stronger among SCZ than among EDs and controls, suggesting the potential contribution of targeting ER abilities in the treatment of schizophrenia.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics committee of the Department of Psychology at Bar-Ilan University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

LI and SS designed and wrote the first draft of the manuscript. YK conducted statistical analyses and contributed to the first draft of the manuscript. DAS and ALR contributed to the second draft of the manuscript, to literature searches and theoretical paradigms. IHO was the supervisor of the study and contributed to study conception and design at all stages. All authors contributed to and have approved the final manuscript.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The qualitative study of intentional self-harm in Thailand: Focusing on predisposing child-rearing environments and self-harm cessation

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Introduction: Intentional self-harm in adolescents and young people, including both suicidal behaviors and non-suicidal self-injury (NSSI), is a serious issue in mental health systems. However, the majority of studies on self-harm in adolescents and young people focused on a quantitative methodology which might have limitations in explaining this complex phenomenon of intentional self-harm. Therefore, this study aimed to describe the subjective experiences of adolescents and young people who presented with intentional self-harm in order to provide a better understanding of this behavioral phenomenon.

Methods: This is an exploratory qualitative study that uses phenomenological processes and thematic analysis. Twenty subjects aged 13–29 years were included in this study.

Results: The results revealed six themes regarding predisposing child-rearing environments and nine themes regarding factors related to the cessation of intentional self-harm. Moreover, it demonstrated the important functions of self-harm as an intrapersonal strategy for emotional regulation.

Discussion: In conclusion, this study underscored the importance of understanding the developmental and cessation pathways of these complex behaviors.

KEYWORDS

self-harm, suicide, suicidal behaviors, NSSI, qualitative study

Introduction

Intentional self-harm in adolescents and young people, including both suicidal behaviors and nonsuicidal self-injury (NSSI), is a serious issue in mental health systems. It has profound impacts on individuals, families, communities, and societies. In 2019, the World Health Organization (WHO) estimated that 703,000 people died by suicide worldwide and reported that self-harm was the fourth leading cause of death among adolescents and young adults aged 15–29 years (World Health Organization, 2019). Recently, the meta-analysis showed that the global lifetime and 12-month prevalence of deliberate self-harm in children and adolescents was 13.7 and 14.2%, respectively (Lim et al., 2019). In general, girls were more likely to self-harm than boys (risk ratio 1.7) (Gillies et al., 2018). In addition, the mean age of starting self-harm was 13 years, and cutting was the most common method (45%) (Gillies et al., 2018)

Despite intentions, suicidal attempts and NSSI share some clinical presentations, such as depressive symptoms, hopelessness, and low self-esteem (Hamza et al., 2012; Hawton et al., 2012). In addition, some studies showed a complex relationship between these two conditions; for example, NSSI can predict subsequent suicidal behaviors (Castellvi et al., 2017; Knorr et al., 2019; Mars et al., 2019). Some clinicians viewed these conditions as two different manifestations of the same behavioral spectrum (Hamza et al., 2012). Unsurprisingly, some people have dynamically presented with these two different conditions of intentional self-harm over time.

Self-harm is a complex interplay between biological, psychological, psychiatric, social, and cultural factors. Some experts explained this behavioral phenomenon based on the diathesis–stress model; for instance, predisposing personality traits such as impulsivity combine with negative life events, including child maltreatment and maladaptive parenting, to develop self-destructive behaviors across the lifespan (Hawton et al., 2012). Moreover, several studies emphasized on social transmission and the contagious effect of self-harm, especially in specific populations such as adolescents (Cheng et al., 2014). Furthermore, the Internet and social media play a bigger part in providing dramatic narratives and details of methods used in self-harm than traditional media that might encourage these behaviors (Patchin and Hinduja, 2017; Biernesser et al., 2020; Wang et al., 2020).

However, the majority of studies on self-harm in adolescents and young people focused on a quantitative methodology. It was conducted in Western countries, which might have limitations in explaining this complex phenomenon of intentional self-harm. Cultural differences and different social contexts potentially affect emotional and behavioral expression. In addition, attitudes, beliefs, and perspectives regarding intentional self-harm might be different between Western and Eastern cultures. As a result, this present study aimed to describe the subjective experiences of adolescents and young people who presented with intentional self-harm, including both suicidal behaviors and NSSI in Thailand, in order to provide a better understanding of this behavioral phenomenon, especially predisposing child-rearing environments and how people stop these behaviors.

Materials and methods

This was an exploratory qualitative study that used phenomenological processes and thematic analysis. Qualitative methodology was used to identify and describe participants' perceptions and experiences regarding intentional self-harm. Twenty in-depth interviews were conducted with adolescents and young people who presented with intentional self-harm.

Sampling

Purposeful sampling, which was widely used in qualitative research, was performed in this study. The adolescents and young people who presented with intentional self-harm were recruited from the psychiatric outpatient department at the Ramathibodi Hospital, Mahidol University, Bangkok, Thailand. The inclusion criteria were as follows: (1) age 13–29 years, (2) history of intentional self-harm, (3) ability to communicate and express their experience and perception in Thai, and (4) currently mild psychiatric symptoms. The subjects who had moderate to severe psychiatric symptoms such as psychotic symptoms, acute manic symptoms, and actively suicidal ideation were excluded.

TABLE 1 Focus areas of semi-structured interviewing.

Focus areas	Samples of questions
Self-harm behaviors	• Can you tell me about methods you used for self-harm? • When did you start to (method) yourself? • Would you please tell me about your motivations for self-harm? • If you have ever stopped self-harm, how did that happen?
Antecedents	• Before you did self-harm, did you feel stressed about anything? • Before you did self-harm, did you have any academic pressure? • Have you ever learned how to do self-harm from social media or other media?
Consequences	• After you did the self-harm, how did you feel? • After you did the self-harm, would you please tell me about the reactions from your parents and friends? • Did you get any unwanted consequences after your self-harm?

Data collection

All psychiatrists in the department were informed regarding the research protocol, and they made suggestions and introduced their own clients who probably matched the study protocol to the research team. Afterward, the research team contacted the participants, performed the primary assessments, and informed consent was obtained from both adolescents and their parents in case of participants under the age of 18.

Subsequently, the research team members arranged face-to-face semi-structured interviews for each participant. The interviewers were experienced psychiatrists, including three general psychiatrists for adult participants and four child psychiatrists for participants aged 12–18 years. Each interviewing session performed by two interviewers included the primary interviewers, who mainly asked semi-structured interview questions (Table 1), and the secondary interviewers, who mainly observed non-verbal expressions, recorded and added on more questions if they were curious to find out something during the interviews. In general, the interview duration ranged from 60 to 90 min. They were audio-recorded and transcribed verbatim. All the interviews were conducted between May 2020 and March 2021. Moreover, the researcher meetings were arranged every 10 sessions of the interview to indicate whether the data was saturated.

Ethical standards

This present study procedure was approved by the Ethics Committee of Ramathibodi Hospital, Mahidol University. All participants and their parents (in the case of participants under the age of 18) gave written informed consent for the research in accordance with the Declaration of Helsinki. In addition, all interview records and documents have been anonymized, and the datasets were non-personally identifiable.

Analysis of results

The transcribed interviews were analyzed by using a thematic analysis. The analytic team included two child psychiatrists (AL, NL) and a general psychiatrist with research methodology skills (TP). First, initial coding was independently generated by the researchers who performed each interview session. Second, the data were read several times by the analytic team, who closely examined the original data in order to become familiar with the data. Third, the analytic team examined the initial coding coupled with the original data to identify themes and perform the axial coding by grouping and organizing the data into meaningful categories. Occasionally, the analytic team made the interpretation and conceptualization of the initial coding and the data in order to define the relevant themes. Finally, the labeling of themes was reviewed and discussed among all the researchers to reach an agreement. Investigator triangulation was used to provide multiple observations, perspectives, and conclusions among all researchers.

Results

Twenty subjects, 16 women and 4 men, were included in this study. The age of participants ranged from 13 to 29 years, and the age at the onset of self-harm ranged from 4 to 21 years. Regarding types of intentional self-harm, more than half of the participants ($n = 12$, 60%) reported both NSSI and suicidal behaviors; however, the rest ($n = 8$, 40%) conducted only NSSI. Therefore, there was no suicide-only subgroup in this present study. The most common method used for suicidal acts was drug overdose ($n = 7$, 35%), and for NSSI, it was cutting ($n = 19$, 95%). Most of the participants ($n = 16$, 80%) stopped their self-harm behaviors for at least 1 month; on the other hand, four participants (20%) reported ongoing self-harm. The mean duration of self-harm cessation was 5.3 months (min = 1 month, max = 12 months). In addition, the most common psychiatric diagnosis among all participants was major depressive disorder ($n = 11$, 55%). The basic characteristics of participants are summarized in Table 2. In addition, we found that large numbers of the participants experienced psychosocial adversity, as summarized in Table 3.

Regarding the functions of self-harming behaviors, we divided them into two main groups: intrapersonal functions and interpersonal functions. Focusing on intrapersonal functions, all participants ($n = 20$, 100%) reported that they used self-harm as a strategy for emotional regulation, including a way to escape unwanted mental states ($n = 20$, 100%) and a way to induce wanted mental states ($n = 12$, 60%). Moreover, some participants ($n = 5$, 25%) described self-harm as a way to self-punishment. Interestingly, the minority of participants reported other intrapersonal functions, including a substitution of suicide or a way to relate to death ($n = 3$, 15%), response to urges to self-harm ($n = 1$, 5%), and coping with unsafe feeling ($n = 1$, 5%). Focusing on interpersonal functions, four participants ($n = 4$, 20%) reported self-harm as a way to communicate with others, and six participants ($n = 6$, 30%) described self-harm as a way to influence/manipulate others, including calling for attention. In addition, most participants ($n = 17$, 85%) mentioned multiple functions of self-harm, not only one function. However, intrapersonal functions were obviously demonstrated as dominant functions in this study population (Table 4).

In addition, we reported six themes regarding predisposing child-rearing environments and nine themes regarding factors related to the cessation of intentional self-harm, which were divided into two groups: internal and external factors.

Predisposing child-rearing environments

Lack of emotional responsiveness/emotional neglect ($n = 13$)

Lack of emotional responsiveness or emotional neglect can happen in many situations. For instance, parents have not provided enough quality time for their children because they are busy with earning a living or their own emotional problems. Several participants described a silent atmosphere in their families and distance in terms of emotional involvement and communication. In addition, some participants reported that their parents/caregivers were naturally quiet or had poor communication skills.

> "I feel that our family has problems when we don't talk to each other at all." (Case 4)
>
> "Dad covers my expenses, but never supports me emotionally. He never has time." (Case 9)
>
> "There were times when my aunt (who had taken care of me) was mad, and we didn't talk for almost a year. I have no idea whom she was angry at, but she talked to no one." (Case 12)

Moreover, one participant mentioned he was preoccupied with academic and sports training activities arranged by his parents; as a result, he did not have time to connect emotionally with his parents.

> "I was preoccupied with learning. After school, I always attended extra-tutorial sessions, then I had to practice swimming until very late at night. I have rarely seen my parents." (Case 17)

Consequently, the emotional distance between parents/caregivers and children was founded in several cases. Some participants described that they had to stand by themselves in daily life activities, or even through difficult times since they were young, without emotional support from caregivers. Lack of warmth in the family atmosphere and loneliness were mentioned.

TABLE 2 Basic characteristics.

Order	Age at interview (Year)	Sex	Age at onset of self-harm (Year)	Duration of cessation	Psychiatric diagnoses	Types of intentional self-harm	Methods
1	28	Female	10	Ongoing	MDD, Anxiety disorder	NSSI + SA	Cutting, pinching, toxic ingestion, strangulation, jumping off building, car collision
2	23	Female	21	7 mo.	MDD	NSSI	Cutting, pinching, hitting herself
3	13	Female	12	1 mo.	Adjustment disorder	NSSI	Drug overdose
4	14	Female	13	Ongoing	ADHD, History of MDD	NSSI	Cutting, pinching, hitting object
5	14	Female	13	1 yr.	Bipolar I disorder	NSSI	Cutting, pinching, hitting object
6	16	Female	15	6 mo.	MDD	NSSI	Cutting
7	20	Female	15	1 yr.	MDD, ADHD	NSSI	Cutting, hitting herself, strangulation, drug overdose, car collision
8	17	Male	16	1 mo.	Dysthymia, ADHD	NSSI	Cutting, hitting object, scratching
9	18	Female	4	1 yr.	Dysthymia	NSSI + SA	Cutting, pinching, scratching, rubbing skin against rough surface, hanging, jumping off building
10	18	Female	8	Ongoing	MDD, PTSD	NSSI + SA	Cutting, hair pulling, toxic ingestion, hanging
11	15	Female	5	1 mo.	MDD	NSSI + SA	Breath holding, cutting, pinching, drug overdose
12	18	Female	16	1 yr.	MDD, Social anxiety	NSSI	Cutting, pinching
13	18	Female	14	5 mo.	Bipolar disorder	NSSI + SA	Cutting, pinching, hitting object, jumping off building
14	18	Female	15	1 mo.	Dysthymia	NSSI + SA	Cutting, hitting object, drug overdose
15	20	Male	19	1 mo.	MDD	NSSI + SA	Cutting, drug overdose
16	18	Female	16	3 mo.	MDD	NSSI + SA	Cutting, drug overdose
17	29	Male	11	3 mo.	MDD	NSSI + SA	Cutting, hitting himself, intentionally let others hit him, strangulation, toxic ingestion, jumping off building
18	14	Female	12	1 mo.	Bipolar II disorder	NSSI + SA	Cutting, drug overdose
19	14	Female	13	Ongoing	Dysthymia, PTSD	NSSI + SA	Cutting, hitting object, hanging, toxic ingestion, jumping off building
20	19	Male	12	6 mo.	MDD, ADHD	NSSI + SA	Cutting, hitting object, interfering wound healing processes, strangulation

ADHD, attention deficit hyperactivity disorder; MDD, major depressive disorder; PTSD, post-traumatic stress disorder; NSSI, non-suicidal self-injury; SA, suicidal act.

> "Home is not home. Home is a place … not nice to live. We separately live." (Case 1)
>
> "I always live by myself." (Case 8)
>
> "I feel that … he is just dad. I don't feel close to dad." (Case 13)

Negativity, criticism, and harsh punishment ($n = 12$)

Several participants reported negativity and criticism in their interaction with adults, which led to emotional pain and a negative sense of self. Blaming, looking down on, and insulting were

TABLE 3 History of psychosocial adversity and vulnerability.

History of psychosocial adversity and vulnerability	Frequency (n)	Percentage (%)
Bully victims	13	65
Multiple placements	6	30
Residences	3	15
Schools	3	15
Divorced families	6	30
Loss and grief (death of parents/attachment figures)	6	30
Maltreatment	9*	45
Sexual abuse	4	20
Emotional or verbal abuse	4	20
Physical abuse	6	30
Neglect	5	25

*6 participants experienced more than 1 types of maltreatment.

TABLE 4 Functions of intentional self-harm.

Functions	Frequency (n)	Percentage (%)
• Intrapersonal		
Emotional regulation	20	100
- A way to escape unwanted mental states	20	100
- A way to induce wanted mental states	12	60
Self-punishment	5	25
Substitution of suicide or a way to relate to death	3	15
Response to urges to self-harm	1	5
Coping with unsafe feeling	1	5
• Interpersonal		
A way to influence/manipulate others	6	30
A way to communicate to others	4	20

described by several participants. Moreover, harsh punishment was described in several contexts, including parenting, sports training, and academic activities. Some participants described that they did not understand why the adults severely reacted with violence to their minor mistakes. In addition, some participants reported that they were punished because they could not perform as well as the adults wanted them to achieve.

> "He always says things that make me feel bad. It isn't forcing, but it makes me feel like I have never done anything right. It seems like I'm not good enough. Whatever I do will never be good enough." (Case 7)
>
> "I just forgot my shoes, and then dad pulled my hair and hit me at the back." (Case 10)
>
> "He has repeated and repeated … the way he talks will make me hurt, but he chose to talk this way." (Case 19)

High academic expectations (n = 9)

Some participants reported high academic expectations originating from their families and their stress on academic performance, including getting good grades, getting into top-ranking schools/universities, and working in respected/prestigious professions such as medicine and engineering. Although these expectations and attitudes are generally initiated by parents or adults in families, some participants described that these expectations were subsequently internalized and became their own standards and expectations.

> "It was really stressful about the schoolwork because mom pushed me too hard. Mom was like 'Hey, you studied this already! You're supposed to get it right.'" (Case 4)
>
> "I had to get all A's. Can't get anywhere lower than 18 out of 20." (Case 7)

Comparison with siblings (n = 5)

Five participants mentioned about their sibling rivalry and the patterns of communication in which their parents/caregivers often compared them with their siblings. These comparisons became a source of pressure to be similar, different, or better than their siblings, especially in terms of achievement or success.

> "I want to be great like my sister. I'm a loser." (Case 10)
>
> "Since I was young, he would expect me to do better than my sister. It was such a pressure." (Case 20)

Superficial responsiveness (n = 4)

Some parents/caregivers generally responded to their children; however, their responses were superficial in terms of affective involvement. In addition, these responses lacked content that provided a sense of caring and genuine understanding of the children's situations and difficulties; as a result, the lack of depth in communication or meaningless conversations was described.

> "I told my parents that I can't let go of the stress. What I want is... I don't know... I guess it would be nice if they'd console me, but all they said was 'take it easy'." (Case 12)
>
> "When dad was here, he'd ask how I was doing, and that's it. That was all we would say to each other." (Case 13)

Enmeshment and over-involvement (n = 2)

Some participants described emotional enmeshment and over-involvement between their parents/caregivers and themselves. These close but insecure relationship patterns were unable to provide effective communication between parents/caregivers and children.

> "In fact, all my mom has is me, and all I have is her. She's concerned about everything."
>
> (When the interviewer asked for the reason why she did not communicate her difficulties with her mother, even though she had close relationship with her mother) "I didn't want my mom to worry about me. I was afraid that she wouldn't understand." (Case 13)

Factors related to the cessation of intentional self-harm

Internal factors

Negative perception of self-harm and desire to stop (*n* = 11)

After self-harming for a period of time, several participants subsequently developed negative perceptions and attitudes toward self-harm. For example, they believed self-harm was useless or caused more trouble for themselves and their parents. Some participants described negative emotional reactions of their parents when the self-harm was disclosed. These insights motivated some participants to stop self-harm behaviors.

> "I feel like hurting myself doesn't help much in the end." (Case 6)
>
> "I used to think the more I hurt myself, the better I would feel. But in fact, it only made me worse." (Case 11)
>
> "There are scars, permanently with me. When I started do it, it seemed to be addicted. Kept doing. Then, others knew and my mom saw the scene. She was sad." (Case 13)

Increase of adaptive coping (*n* = 8)

A variety of coping strategies were used among participants to cope with self-harm. For instance, using music and social media as emotional coping, intentional distraction themselves from self-harm to other activities, and having more conversation or verbal expression with other people.

> "When I'm busy with something else, I don't think about these things (self-harm)." (Case 9)
>
> "It gets easier for me to talk about this (feeling) with other people." (Case 11)

Finding life purposes (*n* = 6)

Some participants referred to the moments when they gained new insights regarding their purposes to live or the meaning of their lives. The doubt about the reasons to live and the meaning and values of their lives which was followed by the feeling of emptiness and other negative feelings often precipitated acts of self-harm. As a result, it became a relief after they found the purpose of their lives.

> "I tried to stop as soon as I realized that it didn't matter if no one loves me. I can have a good life. I can build my own future, the kind that I want, have a family that I'd like to have." (Case 9)
>
> "I have a sister I need to care for. If I'm gone, then who's going to take care of her?" (Case 20)

Improvement of psychiatric symptoms (*n* = 1)

One participant described the direct association between the improvement of psychiatric symptoms and the decreasing self-harming behaviors.

> "The feeling (urges to self-harm) just faded by itself after a while. It didn't reach the peak like it did before." (Case 17)

External factors

Supportive relationships and verbalization (*n* = 13)

Most of the participants mentioned that they stopped self-harm because of some supportive relationships, including relatives, friends, teachers, mentors, and lovers. These relationships provided not only psychological support but also the person whom the participants could ventilate with and verbalize their feelings and difficulties. Moreover, some participants clearly described that verbalization was used instead of acting out.

> "I have many good people around. People who care. I have lots of friends and they are all nice. So, it's like I do matter to someone." (Case 7)
>
> "Some of my male friends reached out and supported me. They were good to me and so I got better." (Case 9)
>
> ***If you have a chance to give suggestions to people who has self-harming, what are your suggestions? (Interviewer)***
>
> "Find the one we most trust. Better to talk. Let words express, instead of action." (Case 8)
>
> "Find people you can ventilate. Because sometimes feeling pain in your heart and when we can ventilate, we don't want to self-harm." (Case 10)

Treatments/interventions (n = 10)

The psychiatric treatments, including medications, doctor–patient relationships, psychoeducation for parents/family members, and other psychosocial interventions, showed therapeutic effects in some participants as they described.

> "This doctor prescribed me antidepressants which helped a lot. He is also very nice and actually cares. Other doctors I'd seen before only asked things and that was it. It was barely a conversation; unlike with this doctor." (Case 14)
>
> "Ever since my parents got to talk to the doctor, they tried to understand more." (Case 16)

Unwanted consequences of self–harm (n = 6)

After self-harming, some participants faced unwanted consequences such as misunderstandings with friends and negative reactions from significant others. These consequences negatively affected the participants more than self-harm *per se*.

> "I decreased because I didn't want my friends to be afraid of me." (Case 9)
>
> "I guess it was because it made my mom sad, so I quitted." (Case 13)
>
> "I don't want my friends to think I'm calling for attention." (Case 19)

Situations related to positive feelings (n = 6)

Occasionally, some situations linked with positive feelings helped the participants to experience their lives differently from the ways they used to. These experiences also facilitated new perceptions of themselves, their lives, and others. Moreover, most experiences obviously promoted social interactions such as chorus singing and outdoor activities with friends.

> "There are small kids (relatives) around. Playing with them makes me really happy." (Case 4)
>
> "One of the happy times I can think of is when I go to church. I like going to church. I enjoy singing there." (Case 18)

Behavioral control (n = 3)

Three participants reported that behavioral control by parents and teachers, such as limiting access to means of self-harm, caused reduced self-harming behaviors.

> "They got rid of every single tool (for self-harm). I thought I hid it, but somehow, they found it and took it anyway." (Case 20)

Discussion

The recruitment of 20 adolescents and young adults with a history of intentional self-harm in this present study revealed six themes regarding predisposing child-rearing environments and nine themes regarding factors related to the cessation of intentional self-harm. In addition, most participants reported multiple functions of self-harm; however, intrapersonal functions were predominantly demonstrated as all participants reported that they used self-harm as an intrapersonal strategy for emotional regulation. Focusing on the development of self-harming behaviors, child-rearing environments interplayed with various types of psychosocial adversity, such as maltreatment and bullying, tended to predispose the acts of self-harm. Moreover, various internal and external factors related to the cessation of intentional self-harm were demonstrated in this present study.

Emotional availability (EA) refers to the capacity of the dyad (caregiver–child) to share an emotionally healthy relationship which includes six components: four caregiver and two child components (Biringen et al., 2014). The caregiver components are sensitivity, structuring, non-intrusiveness, and non-hostility. The adult sensitivity component refers to the ability to have a clear perception of the child's emotional expressions and provide appropriate parental responsiveness. According to this study population, most participants ($n = 13$, 65%) described their experience regarding the lack of emotional responsiveness or emotional neglect. In addition, some participants ($n = 4$, 20%) mentioned the superficial responsiveness of their caregivers or family members. Therefore, young people with a history of intentional self-harm tended to have predisposing experiences of poor emotional sensitivity and responsiveness in their upbringing environment. Moreover, the non-hostility component of EA tended to be low in participants who reported negativity, criticism, and harsh punishment in their interactions with caregivers. In addition, a non-intrusiveness component of EA, which refers to qualities such as lack of interference and over-protection, tended to be low in participants who reported enmeshment and over-involvement between their parents/caregivers and themselves. In general, caregiver components of EA in many participants tended to be poor; however, the interplay between caregiver components and child components, which are the child's responsiveness to the caregiver and the child's involvement in the caregiver, should be considered. The finding of this present study supports the link between intentional self-harm and poor emotional development. Congruently, Tao et al. (2020) conducted the study, which included 662 junior high school students in China. They found that father–child and mother–child attachment of the students could both directly and negatively influence self-injury behaviors. Moreover, this study demonstrated negative emotion and emotional coping styles as mediators in mother–child and father–child attachment models.

However, understanding the importance of emotional development and interpersonal and intrapersonal factors is not enough to explain the complexity of the phenomenon of intentional self-harm. Several sociocultural factors might involve with this phenomenon. In this present study, we found some participants reported high academic expectations originating from their families associated with their self-harming behaviors. The evidence showed that the parents' own backgrounds, hopes, and expectations could influence their children's future occupations (Irwin and Elley, 2013). In addition, stress on academic performance has been common in the educational system in Thailand and other Asian countries (Tan and Yates, 2011). For example, admission to high-quality schools/universities is a highly competitive situation in Thailand. As a result, high academic expectations as sources of stress tended to stimulate the emotional system and precipitate self-harming behaviors.

In recent years, a few studies focused on how people with intentional self-harm stop their behaviors. In 2017, Mummé et al. (2017) conducted a systematic review that included eight studies regarding the cessation of non-suicidal self-injury. They reported both intrapersonal and interpersonal factors influenced the cessation of self-harm, including family support, self-esteem, emotional regulation, and professional help. In this study, we similarly found supportive relationships, both from families and non-families, and professional treatments were parts of the cessation processes. Moreover, we demonstrated that verbalization in a safe and supportive atmosphere was an important process that helped several participants feel relieved and promoted emotional regulation. Some participants clearly described that verbalization was used instead of acting out self-harm. In addition, we similarly demonstrated the increase in adaptive coping, especially for emotional regulation or emotional coping, related to the cessation of self-harm. On the other hand, we did not demonstrate that self-esteem was directly associated with the cessation of self-harm. However, we found the situations related to positive feelings, which were probably related to self-esteem associated with the cessation of self-harm. We hypothesized that the increase in self-esteem, self-worth, and self-acceptance might embed in these positive situations.

In addition, Brennan et al. (2022) conducted a systematic review and a meta-synthesis of 56 studies regarding what helps people to reduce or stop self-harm. They reported two meta-themes that were breaking the chain of self-harm and building a new foundation for change. First, breaking the chain emphasizes the immediate strategy to break the link between a person's current psychological or social state and the act of self-harm. At the same time, they were building a new foundation for change, referred to a longer-term strategy and actions that strengthened the separation between self-harm and a person's way of life, including arriving at a positive view of self, reassessing place in the social world, and re-orienting to a more positive future. Congruently, this study described finding life purposes as an internal factor related to the cessation of self-harm. It tended to be one way to re-orient to a more positive future, as reported by Brennan et al. (2022). Moreover, Rissanen et al. (2013) studied the factors contributing to the cessation of self-cutting among 13–18-year-old Finnish adolescents by using self-rating questionnaires and asking the participants to write their own descriptions of how they had been able to stop self-cutting. Realizing uselessness, irrationality, stupidity, unhelpfulness, and unattractiveness of self-cutting was reported as the factors associated with self-cutting which contributed to the cessation of self-cutting. Consistently, this study reported negative perceptions of self-harm, such as uselessness and unhelpfulness, and unwanted consequences of self–harm as factors related to the cessation of self-harm. It was possible that young people who lacked experience and lacked skills for emotional regulation tried to use self-harm as a solution for their emotional disturbance; however, they consequently found the opposite side of this strategy.

The strengths of this study included qualitative research methods which emphasized on human experiences and provided the understanding and rationale behind participants' behaviors. As a result, this study supported the link between intentional self-harm and poor emotional development embedded in predisposing parent–child interactions and child-rearing environments. In addition, the in-depth interviews in this present study performed by experienced clinicians included both general psychiatrists and child psychiatrists. Therefore, the sensitive study population was professionally handled by experienced clinicians, and sensitive issues such as abusive history, violence, and emotional disturbance could be appropriately explored. Moreover, developmental framework and perspectives were applied in this study; therefore, the study population included both adolescents and young adults as a continuum. However, this study has several limitations. First, the study population was a clinical population recruited from tertiary care; moreover, it was predominately female. This specific study population might affect the generalizability of this study. Second, sociocultural factors demonstrated in this study might be unable to apply to other societies; however, they might be similar and might be applied in some societies, such as societies with high academic competition. Finally, the duration of the self-harming cessation defined in this study was quite short (1 month) because we intended to focus on the starting points of cessation or decrease of self-harming behaviors. Therefore, the results from this study might not demonstrate the permanent cessation of these self-harming behaviors.

Conclusion

This qualitative study revealed six themes regarding predisposing child-rearing environments and nine themes regarding factors related to the cessation of intentional self-harm. This study underscored the importance of viewing self-harm as a complex phenomenon, and it is essential to understand the developmental pathways and the pathways to the cessation of these complex behaviors. Moreover, various internal and external factors related to the cessation of intentional self-harm were demonstrated, and verbalization in a safe and supportive atmosphere tended to be an important process to promote the cessation or decrease of intentional self-harm.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the Ethics Committee of Ramathibodi Hospital, Mahidol University. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

NL: planned and conducted the study, interviewing, coding, thematic analysis, drafted, and revised the final manuscript. AL: conducted and managed the study, interviewing, coding, thematic analysis, and read the manuscript. TP: planned the study, interviewing, coding, thematic analysis, and revised the final manuscript. TT: interviewing, thematic analysis consultation, and revised the final manuscript. PL, MT, and PW: interviewing and coding. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Clinical intuition in psychology through the prism of personalized psychiatry

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1. Introduction

The concept of personalization in medicine dates back to the 1940s, when some theorists' attempts to find alternatives to the biomedical paradigm were already underway. Based on these early developments, the foundations of the biomedical paradigm can be traced back to personalism, developed by Mounier in the 1930s, to Balint (1969) person-centered approach, or to Mezzich et al. (2011) person-centered integrated diagnosis. Personalized medicine was initially presented as a model of comprehensive, holistic and systemic medicine (Topol, 2014; Lemoine, 2017a), whilst the current term of personalized medicine first appeared in 1999 as part of a genetic consortium. The popularity of the concept of personalized medicine in clinical practice, health policies and public discourse is therefore a relatively recent phenomenon—largely stimulated by advances in genomics and molecular biology (Lemoine, 2017a,b).

Whilst these different approaches give various definitions of personalized medicine, it is classically defined as treating "the right patient with the right treatment at the right time". This definition is reflected in the "5R rule": the right patient, the right medicine, at the right dose, in the right way, at the right time (Giroux, 2017). A consensual definition of the National Research Council defines personalized medicine as "the adaptation of medical treatment to the individual characteristics of each patient" [National Research Council (US) Committee on a Framework for Developing a New Taxonomy of Disease, 2011]. Finally, other proposals suggest that personalized medicine could be considered as a kind of "4P medicine": personalized, preventive, predictive, participatory (Hood and Flores, 2012; Jakovljevic and Jakovljevic, 2019).

In psychiatry, various paradigms aligned with the principles of personalized medicine can be identified. These approaches include the emergence of new nosologies (e.g., Research Domain Criteria or Hierarchical Taxonomy of Psychopathology), and the structuring of research around biomarkers, endophenotypes, molecular signatures, as well as neuroscience and computational psychiatry (Cuthbert and Insel, 2013; Kotov et al., 2017). From these recent developments, numerous critiques of personalized psychiatry have emerged, e.g., as a regime of (exaggerated) promises, redistribution of financial support, reductionism around big data and biomarkers, potential lack of solidarity in access to health care and patient empowerment, imbalance between the (precise) individual and (potentially neglected) populational levels. In addition, questions have been raised about the benefit of individualized treatment ("How far?") and its triviality ("Is not all care already personalized?")—this last point constituting a key axis of the following developments.

Based on the potential contributions of personalized psychiatry and considering these criticisms, in this Opinion article intended to encourage constructive discussions on these cross-topics, we aim to explore the similarities between the fuzzy concept of clinical intuition (as an embodied clinical model) and the model offered by the framework of personalized psychiatry. Specifically, we will show that the embodied model carried out by the clinician in his/her daily practice does not substantially differ from the model proposed by the apparently innovative personalized psychiatry. We aim to show that this demonstration has profound implications for both understanding of personalized psychiatry and clinical practice in psychology. These involvements allow research and clinical practice to mutually join in a translational perspective centered around clinical intuition and personalized psychiatry.

2. Triviality of the personalization as the core of care

Within medicine, and even more in clinical psychology, the interest in personalization has a long history, and continues to constitute an integral part of the psychological and psychiatric disciplines today. How could one imagine the establishment of a therapeutic relationship without natural personalization? Can we imagine a caregiver who does not essentially offer personalization in terms of diagnosis and care? Is the clinical intuition of the caregiver not *always* dedicated to the personalization of care?

These kinds of questions are whether the addition of the term "personalized" to the term of "medicine" (or "psychiatry" or even "psychology")—with all the conceptual commitments of this association—could in reality be no more than a pleonasm (triviality), or form a tautology (reinforcement)? A pleonasm implies that using these two terms would be redundant (i.e., it is using more words as necessary), while a tautology consists of associating two terms (i.e., medicine and personalization) to mutually reinforce their common sense (i.e., say similar thing twice). In this Opinion article, we will sustain both the two possibilities: the term (and its concepts) of personalized psychiatry should be certainly considered as a pleonasm; however, it is also a tautology if we consider it as a model for clinical intuition. We will develop below the relations between personalized psychiatry and psychological clinical intuition.

3. Modeling and clinical intuition

Psychiatry is historically and intrinsically personalized (Gurwitz and Weizman, 2004; Ozomaro et al., 2013). However, the paradigm of personalized psychiatry has differences with psychiatry. What are these differences? Our answer is based on understanding of *clinical intuition* (or "clinical internal model"), allowing caregivers to naturally personalize care (Kim and Ahn, 2002; Aboraya, 2007; Bhugra et al., 2011; Demazeux, 2019). Clinical intuition can be defined as the embodied model of a clinician (i.e., as an internal psychological, theoretical or conceptual model), belonging to the clinician, and allowing him/her to act in clinical practice (Minsky, 1965). Clinical intuition is a fuzzy concept, which groups together a set of variables, parameters, theories, backgrounds, chances, serendipities, as well as contingencies and laws (Cartwright, 1999; Sadegh-Zadeh, 2000; Kendler, 2005).

At least three perspectives have sought to identify clinical intuition. The first comes from clinical psychology, and in particular from a set of criteria proposed by Professor Paul Everett Meehl, a well-known clinical psychologist. According to Meehl, clinicians would perform certain unique and unduplicable functions that literally have no competitor. The art of clinical decision-making would be absolutely specific to clinicians because of the existence of the following six factors: open-endedness (i.e., clinical predictions are based on open questions), unanalyzed stimulus-equivalences (i.e., clinical predictions are based on perceptual Gestalts), empty cells (i.e., clinical predictions are possible even in the absence of explicit relevant factors), theory mediation (i.e., clinical predictions are based on hypothetical and non-formalizable mental constructs), insufficient time (i.e., clinical predictions must be reached within a very short time) and highly configured functions (i.e., clinical predictions are subject to extremely fine discrimination) (Meehl, 1959, 1967). These unduplicable functions performed by clinicians show some of the specificities of clinical intuition.

The second perspective seeking to identify clinical intuition comes from medical pedagogy. It refers to the different steps necessary for the development of such a clinical intuition, understood as a clinician's embodied model. These steps have been rigorously distinguished into four steps: (i) clinicians collect clinical variables (e.g., feature selection, labeling or relationships between variables), (ii) according to their individual theoretical background (e.g., Evidence-Based Practice or personality of the clinician), (iii) continually training their internal model (e.g., through theoretical or encountered clinical cases), (iv) this internal model being itself subject to uncontrollable factors (e.g., cost, time, or institutional pressures) (Spitzer, 1983; Bhugra, 2008; Bhugra et al., 2010; Martin et al., 2022).

The third perspective seeking to better understand clinical intuition comes from cognitive psychology, and in particular from the literature on cognitive biases specific to the clinical intuition of psychiatrists. A huge immense literature is interested in the bias of clinical intuition and reasoning, shedding the light on its functioning, with five main types of biases: availability biases (i.e., a tendency to give priority to clinical events that are easily accessible in memory, because they are frequent), biases confirmation (i.e., a tendency to favor clinical information that confirms the clinicians' prior beliefs), anchoring biases (i.e., a tendency to rely on initial clinical information to assess subsequent information), projection (i.e., a tendency to assume that patients share the same motivations and perspectives as clinicians) or a halo effect (i.e., a tendency to assess a patient based on initial impressions or a single aspect) (Blumenthal-Barby and Krieger, 2014; Ehrlinger et al., 2016; O'Sullivan and Schofield, 2018; Ozdemir and Finkelstein, 2018; Acciarini et al., 2020).

These three perspectives seeking to define clinical intuition underline the difficulty of giving it a precise definition. Nevertheless, this difficulty in explaining and defining clinical intuition, which ranges from clinical meaning to gestalt recognition, seems necessary for the clinician to be able to verbalize his/her choices and decisions, for pedagogy in psychology and medicine, as well as for research in psychology.

We propose that the intimate specificity of the current term of personalized psychiatry could offer an operational modeling of this clinical intuition. In other words, the core of personalized psychiatry would correspond to the vaguely conceptualized notion of clinical intuition. Personalized psychiatry could thus allow to refine clinical intuition.

Subsequently, we will explain clinical intuition modeling. What are the elements to be modeled? Should we integrate environmental, social, or cultural factors with physiological and semiological factors? Should we integrate clinician and patient subjective factors, in order to pluralistically consider both individual, mechanistic and environmental elements? To answer these questions, we propose a framework for understanding clinical intuition around the issues of precision and stratification.

4. Discussion

4.1. Personalization is modeling

Within current research practice, the question of whether personalized psychiatry should integrate both individual, mechanistic and environmental factors can be split according to two methods. Both of these methods constitute sub-parts of personalized psychiatry (Fernandes et al., 2017; Arns et al., 2021; Zanardi et al., 2021; Passos et al., 2022): precision and stratification. We will see that the two methods from personalized psychiatry can strongly support and refine the understanding of clinical intuition.

Thus, first, some research communities in personalized psychiatry tend to embrace a logic of precision, which aims to identify biomarkers, and especially physiological factors (Fernandes et al., 2017). In parallel, other research communities tend to adhere to a stratified psychiatry, which aims to create the most refined and homogeneous subgroups of patients (Arns et al., 2021). This method is based on the logic of stratification.

These methods are intimately complementary: stratification requires identifying biomarkers (i.e., relying on precision) to differentiate its subgroups, and precision requires the creation of subgroups (i.e., relying on stratification) in order to study biomarkers (Gauld et al., 2020).

4.2. Clinical intuition is precision and stratification

These two methods of stratification and precision could precisely constitute the heart of the internal models of clinicians, i.e., of their clinical intuition. In terms of precision, clinicians' main goals are to be precise and detect the most specific behavioral elements (i.e., difference-makers) for a given patient (i.e., to increase *inter*-class variance). In this way, clinicians model each of the characteristics of his/her patients according to a set of data (information gathering), his/her theoretical background, the adaptation of his/her model and its dynamic corrections, as described in literature on clinical decision-making in medical education (Bhugra et al., 2011). He/she looks for the most precise and objective elements available, or, in other words, performs precision modeling. Through this effort of precision, clinical intuition is thus integrated into idiographic thinking, i.e., which considers the most relevant specificities of a given patient.

However, in parallel and regarding stratification, clinicians aim to consider the associated smallest homogeneous subgroup for which a diagnosis or a treatment is recognized (i.e., to decrease *intra*-class variance). They would rely on their diagnostic, predictive, prognostic and therapeutic heuristics, based on their capacity to conceptually understand a given patient based on perceived similarities in other patients previously encountered. This ability to generalize is offered by the possibility of stratifying patients. To stratify, clinicians utilize their previous experiences or their educational background (Meehl, 1967; Bhugra et al., 2011). In this way, clinical intuition is not only the result of individual, idiographic modeling, coming from the minds of clinicians, isolated from any theoretical support, reference group or nomothetic framework (i.e., sets of laws). As in the logic of stratification, which is based on subgroups

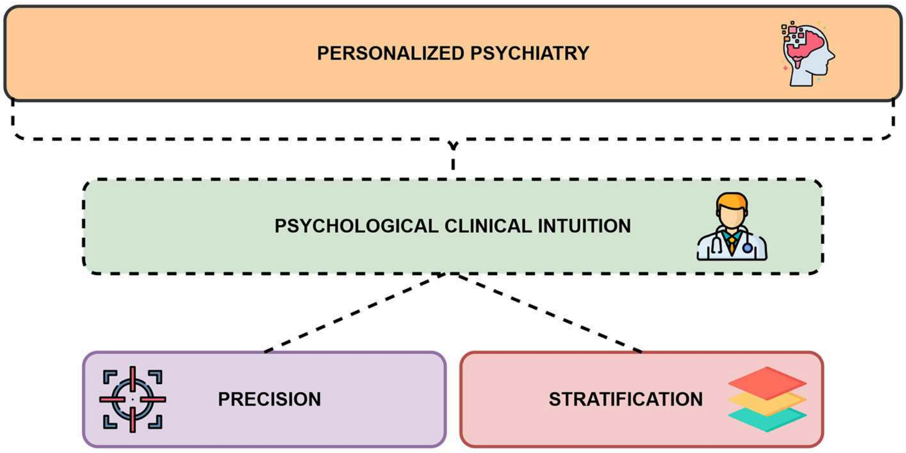

FIGURE 1
A framework for understanding personalized psychiatry and psychological clinical intuition together.

of patients, clinicians base themselves on their own reference groups previously integrated into their internal model. The internal logic of policies and research programs based on stratification is therefore found in the clinician's nomothetic logic. Figure 1 shows the intricacies between personalized psychiatry and psychological clinical intuition, between precision and stratification.

5. Conclusion

To conclude, beyond its limits, personalized psychiatry could refine the process of modeling of a fuzzy clinical intuition in psychology. Such a modeling fits with two reasoning methods already intuitive for the clinician, aka the necessity to detect both the most precise elements of a given patient (precision) as well as define the finest subgroups to which he/she belongs (stratification). In this way, clinical intuition can be defined as a back-and-forth process between the precise targeting of data from clinical interviews and the clinician's use of subgroups of patients integrated during his/her learning and experience into his/her internal model. This explanation of clinical intuition, offered by the framework of personalized psychiatry, could be integrated into the already rich field of study of pedagogy in psychology, and enrich studies on decision-making.

In parallel, understanding personalized psychiatry as a challenge of precise and stratified clinical modeling could shed light on its practice in return. In addition to being useful for understanding clinical intuition in psychology, the interest of personalized psychiatry in rigorous and systematic modeling of clinical practice constitutes a truly original first step in the history of psychiatry and will certainly be an important future challenge for research and public health.

Author contributions

CG: original draft preparation, writing, and conceptualization. YM: visualization, supervision, and final approval. PF: conceptualization, reviewing, and validation. All authors agree to be accountable for the content of the work. All authors contributed to the article and approved the submitted version.

Conflict of interest

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Videoconferencing analytic psychodrama in treating young adults' psychological suffering: preliminary results

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The study aims to explore the effects that videoconferencing Analytic Psychodrama (AP) has on the psychological wellbeing and emotional competence of young adults who are suffering from mental health problems. Twenty-two undergraduate students, asking for help at the Psychological Counselling Service of the University of Bologna for anxiety-depressive problems, took part in the three online groups that met weekly from October 2020 to July 2021. The Clinical Outcomes in Routine Evaluation Outcome Measure, the Trait Emotional Intelligence Questionnaire Short Form, the Toronto Alexithymia Scale, the Interpersonal Reactivity Index, and the Group Climate Questionnaire were used as test–retest questionnaires for clinical outcomes, emotional competence, and group climate evaluations. There was a statistically significant difference between the pre-test and 10-month scores for patients in clinical outcomes. Alexithymia significantly decreased and emotional intelligence and group engagement increased post-intervention. Videoconferencing AP sounds promising for alleviating psychological problems and to improve young adults' emotional competence.

KEYWORDS

alexithymia, analytic psychodrama, emotional intelligence, empathy, online psychotherapy, young adults

1. Introduction

Since the outbreak of COVID-19, the Psychological Counseling Service for Young Adults of the University of Bologna (Italy) adopted the solution to continue mental health care by providing interventions at a distance *via* videoconferencing psychotherapy. Online therapy is not a new practice in the mental health field, having been around for at least 20 years (Lambert et al., 2013), often practiced in specific situations, such as with patients living in isolated areas. Studies indicated that videoconferencing psychotherapy is feasible, has been used in a variety of therapeutic setting and with different psychological disorders, and has been found to have similar clinical outcomes to traditional face-to-face psychotherapy (Backhaus et al., 2012; Carrillo de Albornoz et al., 2022). Over recent years, research has highlighted the fact that online psychotherapy shows promising results for anxiety-depressive disorders (Berryhill et al., 2019 for a systematic review), and outcomes of internet interventions on mental health have become evidence-based (e.g., Karyotaki et al., 2018). Since the pandemic, the research and practice of online psychotherapy has increased exponentially (Weinberg, 2020). Despite the widespread use of online psychotherapy, studies on online group therapy remain still scarce (Weinberg, 2021), especially for psychoanalytically oriented group practices.

Among the individual and group treatments that the Counseling Service offered, Analytic Psychodrama (AP) is a model of group psychotherapy that is psychoanalytically oriented which recently documented evidence of efficacy (Biolcati et al., 2017; Orkibi and Feniger-Schaal, 2019). In the COVID-19 pandemic scenario, AP—considering the "body in action" as one of the core components of the intervention—proved to be quite challenging to convert online. Nevertheless, some psychotherapists trained in psychodrama working in the Counseling Service, through some technical adjustments, experienced the first videoconferencing sessions with their in-person groups to overcome the physical distancing of lockdown. From the favorable impression experienced in these first scenarios, the psychodramatists decided to propose three novel psychodrama groups entirely on videoconference to test their effects. This pilot study attempts to provide new insights and directions on the efficacy of online AP in clinical practice. A previous qualitative study (Biancalani et al., 2022) with a nonclinical group of adolescents found that tele-psychodrama was perceived by participants as helpful in improving their well-being in terms of self-awareness, self-confidence, relationships, and future perspective. However, to the best of our knowledge, this is the first study that aims to explore the effects of videoconferencing Analytic Psychodrama on the psychological wellbeing and the emotional competence of young adults who are suffering from anxiety-depressive disorders.

1.1. In-person analytic psychodrama

AP is based on a psychoanalytic perspective (Lemoine and Lemoine, 1973). This post-Freudian clinical model, while operating within Moreno's role-playing tradition (Moreno and Rosati, 1985), is a different model from the Morenian one. Its first applications date back to 1956 in the treatment of children and adolescents with various problems (Anzieu, 1979). Later developments have indicated its efficacy on several psychopathological symptoms in young adults (e.g., Biolcati et al., 2017). AP aims to increase awareness about the unconscious mental contents from which suffering originates. At the same time, with the help of the group, it tends to create more functional patterns of behavior and communication. In the AP, patients' repetition compulsion finds in the play and its enactment a basis for interrupting itself. Psychodramatic techniques include free association, role-play, role-reversal, doubling, a solo, and observation with feedback at the end of each session. In addition, the psychodynamic approach promotes attention to devices, such as dreams and lateral and vertical transference interpretations. An AP session begins with patients sitting in a circular configuration. The psychotherapist invites them to express what they are thinking, with free associations. From the narratives or dreams reported by the patients, the psychotherapist chooses a content (a real situation or a dream) that will be enacted, dramatized. The staging takes place right in the center of the patients' circle. In addition to the protagonist of the scene, other members of the group, the so-called "auxiliary egos," also participate in the staging. Their role is to play the role of significant others in the protagonist's life (Karp and Farrall, 2014). During role-playing, the conductor may decide to interrupt the associative flow and reverse (one or more times) the roles of protagonists and auxiliary egos. Through the role-reversal technique, the protagonist has the opportunity to observe his/her own projections, to see his/her own relational scripts from the outside, and to understand the way he/she is seen by others. In this way, the protagonist has the chance to become familiar with his/her antagonist. In addition, during role-playing, the therapist and/or the patients can position themselves behind a character to voice feelings, thoughts, intentions, and needs that the protagonist may not be aware of or may not give voice to. This working technique, called "doubling," when carried out by the therapist, takes on the meaning of a real analytic intervention. With a solo technique, the protagonist verbally expresses his or her thoughts and emotions after the role-playing. Psychodramatic play, symbolizing a real situation or a dream, brings out insights and new alternatives for thinking. Analytic psychodrama is a group psychotherapy that combines psychodramatic play with a psychoanalytical reading of "unconscious relational scripts." Through role-playing, role-reversal, doubling, and a solo, psychodrama encourages getting in touch with emotions, whether it be one's own or others'. If psychodrama works properly, in addition to improving symptomatology, the psychodramatist expects the patient to increase their ability to recognize and verbalize their emotions, increase their ability to put himself/herself in the other's place, and to improve their ability to relate to others.

1.2. Analytic psychodrama working with young adults. Emotional intelligence, alexithymia, and interpersonal reactivity as target of intervention

During young adulthood, each individual has to face the delicate phase of transition from the family of origin and school context to the roles and responsibilities of adult life (Arnett, 2000; Masten and Cicchetti, 2010). This can sometimes result in a stressful condition that can precipitate the onset or recurrence of mental health problems (Blanco et al., 2008), such as anxiety and mood disorders, which are some of the most experienced problems in young adulthood (Pedrelli et al., 2015). University counseling services play a key role in preventing college students' mental health problems from worsening, as they can readily take care of their psychological distress (Stallman, 2012). In this regard, from 1985 up to the present, the University of Bologna in Italy has offered a free counseling service for young adults, aimed at providing psychological support (Monti et al., 2013a,b).

Young adults need to stabilize emancipation from the family of origin and become protagonists in their own lives, improving the ability to regulate emotions and engage with significant others. Indeed, at this stage of life, although the individual's responsibilities are increasing, the risk of poor psychosocial adjustment is greater because his or her emotional competence is still being consolidated (Hallam et al., 2014). The literature has shown that higher levels of social–emotional competence are associated with greater future well-being and lower risk of externalizing and internalizing problems (Bornstein et al., 2010; Jones et al., 2015). In itself, AP has demonstrated the potential to achieve positive change in group members and is considered an effective form of psychotherapy (Kipper and Ritchie, 2003). In addition, AP can be a useful treatment for dealing with difficulties peculiar to early adulthood. Recent evidence has shown the effectiveness of AP in reducing anxiety-depressive symptoms in young adults (Biolcati et al., 2017).

As it is psychoanalytically oriented, AP works on the underlying meanings of symptoms rather than focusing on symptoms themselves. In this way, it indirectly enables significant reduction in anxiety-depressive symptoms and personal distress (Biolcati et al., 2017). AP works with emotions, helping to recognize them appropriately in oneself and in others, and formulating the ability to put oneself in another's shoes. The ultimate goal of psychodrama is not cathartic, but transformative. Group psychotherapy attempts to modify the profound aspects of the individual, such as certain ways of representing oneself and others. The change is more structural and concerns the most stable characteristics, such as the personality traits, of the patient and his/her way of "being in the world." Starting with these theoretical considerations and driven by clinical practice, psychodramatists have chosen assessment tools based on "what they expected to change if the group well worked."

1.2.1. Trait emotional intelligence

Trait emotional intelligence (trait EI) addresses our perceptions of our emotional abilities; that is, how good we believe we are in terms of understanding, regulating, and expressing emotions in order to adapt to our environment and maintain well-being (Petrides et al., 2016). Trait EI emerges as an important individual difference variable and is composed of a constellation of emotional self-perceptions (often assessed through self-report questionnaires and rating scales) that constitute a person's emotional attitude (Petrides et al., 2007). Several studies have investigated the influence of trait EI across the life span and, in particular, its impact on health (for a review, see Andrei et al., 2016), showing that trait EI is a strong positive predictor of well-being and mental health (Martins et al., 2010; Tolsa and Malas, 2022). Direct effects on general health were observed for trait EI in university students (Johnson et al., 2009). Moreover, low perceived EI has been inversely associated with anxiety and depression (Pettit et al., 2010; Shi et al., 2022).

1.2.2. Alexithymia

While EI can be considered a protective factor for general health, alexithymia has, on the contrary, been identified as a potential risk factor related to mental health (Biolcati et al., 2021). Alexithymia (Nemiah and Sifneos, 1970) encompasses a cluster of cognitive and affective characteristics of which the main one is an inability to describe and/or recognize one's own emotions (Brewer et al., 2015). Difficulty in identifying and describing feelings has been found to be negatively correlated with emotional well-being and overall health (Myles and Merlo, 2021). Furthermore, alexithymia was found to be indirectly associated with affective disorder symptoms *via* emotion regulation difficulties (Preece et al., 2022). The emotions of alexithymic individuals are relatively diffuse, poorly differentiated, and not psychically represented well (Naghavi et al., 2010). For example, in group psychotherapy settings, for several psychological problems (such as anxiety disorders and other mental disorders) alexithymia levels tend to decrease when clinical symptomatology improves (Fukunishi et al., 1997; Hemming et al., 2019).

1.2.3. Empathy

Empathy is conceived as a multidimensional structure involving the perception, understanding, and sharing of others' emotional states. It concerns the ability to look at events from one's own perspective while putting oneself in the perspective of others in terms of thoughts, emotions, and behaviors (Dökmen, 2009). Empathic individuals tend to look at events from different points of view, put themselves in the other person's perspective and resolve conflicts in a more positive way. Being the basis of communication, empathy is crucial in interpersonal relationships (Dogan, 2018). Young adults' ability to resolve conflicts with empathy can have beneficial consequences for their well-being (Şimşek et al., 2020). Previous studies reported that empathy is positively related to mental health (Shanafelt et al., 2005) and quality of life in young adults, suggesting that empathy plays an important role in improving psychological well-being. However, the relationship between psychological well-being and different dimensions of empathy (i.e., perspective taking, fantasy, empathic concern and personal distress,) remains unclear. For example, empathic concern has been shown to be positively related to quality of life (Thomas et al., 2007), but not to mental health (Shanafelt et al., 2005); psychological well-being is positively predicted by perspective taking, but negatively predicted by personal distress.

1.2.4. Group climate

Group climate (MacKenzie, 1983) is an indicator of the group's atmosphere, and it was considered an important multidimensional construct. It includes participant's perception of other members' engagement with the group, avoidance of important issues or concerns, and conflict among group members (Gullo et al., 2015). A favorable group climate fosters the development of other positive therapeutic processes and, in general, is an important construct to review when evaluating the progress of group therapies (MacKenzie, 1998).

1.3. Aims and hypotheses

Starting from these premises, the present study aims to explore the effects that videoconferencing AP has on the psychological wellbeing and emotional competence of young adults who are suffering from anxiety-depressive problems.

Assuming that online psychodrama works as well as in-person psychodrama, at the end of 38 weekly sessions, the psychodramatists could expect:

1. a decrease in psychopathological symptoms;
2. a decrease in subjective distress;
3. an increase in trait EI (considered as a protective factor of psychological wellbeing);
4. a decrease in alexithymia (intended as a psychopathological risk factor);
5. an increase in empathy (intended as a positive interpersonal and pro-social capability); and
6. a more favorable group climate.

2. Method

2.1. Working method, frame and technical adjustments

Videoconferencing AP is an online, time-limited setting of group psychotherapy conducted by psychodramatists with a specialization in group psychotherapy at the Confederations of Italian Organizations for Analytic Research on Groups (COIRAG), and members of the Italian Society of Analytic Psychodrama (SIPsA).

The online setting consisted of weekly 90-min group sessions conducted on a web platform. (i.e., Zoom). The groups involved about seven to eight members of both genders and lasted 10 months. Each treatment included 38 sessions.

The setting was defined and shared with group members during the first session: privacy and confidentiality rules were stated, and agreement was reached about shared responsibility for the online setting.

The weekly online sessions began with free associations elicited by the psychotherapist. The "shared mental space" (necessary to bring out the symbolic games to be played) was characterized by being "all in the same place," i.e., in the virtual room, reducing distractions as much as possible, with the help of the steady voice of the psychodramatist directing the session. Of course, in the role-reversal, the exchanges were only imaginative and verbal ones. During role-playing, the patient did not act as if he/she was in the other's place but thought and spoke in place of the other without taking action. With the help of the therapists' guidance, the imaginative role-playing forced group members to feel their emotions and transform them into words and symbolic play. Keeping the body still prevents the patients from being distracted from their emotions, unlike in acting, and makes the dialogue engaging. The imaginative ability to impersonate other roles allows the game of "as if." The choice the protagonist makes about which members of the group will play the various characters in the scene has a symbolic meaning, which, for the analyst, is a valuable aspect to interpret.

Forgoing analytic abstinence to some extent, psychodramatists have been more direct in online sessions than in-person ones, to prevent distractions that might have been more insidious on the platform. Some useful guidelines included:

- Using Gallery view to see all of the patients who were hiding their self-view to avoid distractions;
- Clearly explaining the role-playing scripts, and avoiding confusion by introducing few characters and role-reversals;
- Encouraging doubling during and after the psychodramatic play to keep all participants within the "shared mental space";
- Helping the participant to verbally express his or her emotions immediately after dramatizing a specific role;
- Speaking in a steady tone of voice to act as a supportive guide and transmit emotional closeness;
- Encouraging the sharing of dreams. The online platform precludes real movement, but the imagination, no longer restrained by the action of the body, generates dreams that are narrated;
- The way in which each participant uses technology can be a useful object of interpretation by the psychotherapist.

2.2. Design and procedure

The present study adopted the one-group pretest-posttest design. The study involved university students seeking help at the Counseling Service of the University of Bologna (Italy) (Vescovelli et al., 2017). After a four-session psychological consultation and a diagnostic assessment, the psychotherapist, supported by the staff, decided whether the patient needed further individual or group intervention. Patients who were referred for group psychotherapy and attended the three AP groups in videoconference from October 2020 to July 2021 were included in the study.

Ethical approval of this study was obtained from the Research Ethics Committees (REC) of the Department of Psychology of Bologna University. Those students who required psychological support at its Counseling Service and who voluntarily participated to the consultation, the psychotherapy and to the study, provided their informed consent. Each patient was asked to complete a set of self-report questionnaires before and after each online group intervention in order to evaluate the clinical outcomes of videoconferencing AP.

2.3. Participants

The original sample included 22 undergraduate students (13 females and 9 males) aged 20 to 28 years old (mean = 23.9, SD = 2.0), suffering from anxiety and depressive symptoms and seeking help at the Counseling Service of the University of Bologna (Italy). Since four patients dropped out before the end of the psychotherapy, the final sample was composed of 18 patients. Descriptive statistics of the final sample and the dropout group are shown in detail in Table 1.

2.4. Tools

The Clinical Outcomes in Routine Evaluation Outcome Measure (CORE-OM; Evans et al., 2002), a self-report questionnaire designed to evaluate the effects of psychological therapies, was used to measure the baseline levels and outcomes of the online AP groups. The questionnaire is composed of 34 items with a 5-point Likert scale response (from "not at all" to "almost all the time"), assessing subjective Well-being (four items), Problems (12 items), Functioning (12 items), and Risk (four items for the risk of self-harm; two items for the risk of harm to others). A mean score ranging from 0 to 4 can be calculated for each domain, for the Total score, and for the Total score-risk items. Lower scores indicate better clinical outcomes. A clinical score ranging from 0 to 40 can be calculated in order to provide a classification of the symptoms/distress as "Severe" (≥25), "Moderate Severe" (≥20 – <25), "Moderate" (≥15 – <20), "Mild" (≥10 – <15), "Low Level" (≥6 – <10), and "Healthy" (0 – <6). In the present study, the CORE-OM showed good internal consistency, both in the first testing session and in the second testing session, for the total score subscale (Cronbach αpre = 0.88, Cronbach αpost = 0.81).

The Toronto Alexithymia Scale (TAS-20; Bagby et al., 1994) was used to assess alexithymia. It includes 20 items, rated from 1 (strongly disagree) to 5 (strongly agree) and evaluates the difficulty in identifying feelings (seven items), the difficulty in describing feelings (five items), and externally oriented thinking (eight items). A higher score implies worse levels of alexithymia. Scores that are ≤51 indicate no alexithymia, scores from 52 to 60 indicate possible alexithymia, and scores ≥61 indicate a condition of alexithymia. The TAS-20 internal consistency was good in both the first testing session (Cronbach α = 0.83) and in the second testing session (Cronbach α = 0.77).

TABLE 1 Comparison between completers and dropouts.

		Final sample (n=18)	Dropouts (n=4)	Comparison test	
Gender					
Males	N (%)	6 (67)	3 (25)	^{a}2.35	$p = 0.125$
Females	N (%)	12 (33)	1 (75)		
Age					
	Mean (SD)	24.2 (1.9)	22.5 (2.1)	^{b}−1.53	$p = 0.141$
Bachelor					
Bachelor of art	N (%)	13 (72.2)	4 (100.0)	^{a}1.16	$p = 0.281$
Bachelor of science	N (%)	4 (22.2)	0 (0.0)		
Missing	N (%)	1 (5.6)	0 (0.0)		
ICD-9 Diagnosis N (%)					
300. Neurotic disorders	N (%)	7 (38.9)	2 (50.0)		
301. Personality disorders	N (%)	4 (22.2)	1 (25.0)	^{a}1.12	$p = 0.771$
309. Adaptive reactions	N (%)	4 (22.2)	0 (0.0)		
313. Emotional disorders	N (%)	3 (16.7)	1 (25.0)		
CORE-OM					
Well-being	Mean (SD)	2.43 (0.74)	2.06 (0.63)	^{b}0.09	$p = 0.370$
Problems	Mean (SD)	2.01 (0.74)	2.31 (0.42)	^{b}0.77	$p = 0.452$
Functioning	Mean (SD)	1.86 (0.55)	2.13 (0.45)	^{b} 0.03	$p = 382$
Risk	Median (IQR)	2.05 (1.42–2.57)	2.23 (1.78–2.58)	^{c}−0.384	$p = 0.774$
Total	Mean (SD)	1.69 (0.50)	1.86 (0.42)	^{b}0.55	$p = 0.530$
Total-risk	Mean (SD)	2.00 (0.58)	2.20 (0.42)	^{b}0.50	$p = 0.547$
TAS-20					
Total	Mean (SD)	52.33 (12.01)	56.75 (10.21)	^{b}0.68	$p = 0.505$
TEIQue-SF					
Well-being	Mean (SD)	4.08 (1.02)	3.83 (0.98)	^{b}−0.44	$p = 662$
Self-control	Mean (SD)	3.49 (0.93)	3.25 (1.36)	^{b}−0.43	$p = 0.670$
Emotionality	Mean (SD)	4.73 (0.73)	4.44 (0.33)	^{b}−0.77	$p = 0.453$
Sociability	Mean (SD)	3.78 (1.03)	3.92 (0.55)	^{b}0.26	$p = 0.798$
Total Trait EI	Mean (SD)	4.01 (0.73)	3.89 (0.35)	^{b}−0.31	$p = 0.761$
IRI					
Fantasy	Median (IQR)	25.50 (23.75–29.25)	27.00 (15.25–33.50)	^{c}−0.214	$p = 0.837$
Perspective taking	Mean (SD)	26.83 (4.23)	27.00 (3.74)	^{b}0.07	$p = 0.943$
Empathic concern	Mean (SD)	27.89 (3.50)	24.00 (3.92)	^{b}−1.98	$p = 0.062$
Personal distress	Mean (SD)	24.44 (5.59)	21.75 (4.99)	^{b}−0.89	$p = 0.386$
GCQ					
Engagement	Mean (SD)	20.17 (3.82)	22.00 (4.24)	^{c}46.00	$p = 0.404$
Conflict	Mean (SD)	8.06 (2.65)	9.00 (2.83)	^{b}64	$p = 0.530$
Avoidance	Mean (SD)	9.06 (2.82)	9.75 (1.71)	^{b}0.47	$p = 0.644$

CORE-OM, Clinical Outcomes in Routine Evaluation-Outcome Measures; TAS-20, Toronto Alexithymia Scale; TEIQue-SF, Trait Emotional Intelligence Questionaire-Short Form; IRI, Interpersonal Reactivity Index; GCQ, Group Climate Questionnaire-Short Form. $^{a}\chi^{2}$-test; ^{b}Independent samples t-test; ^{c}Z standardized Mann–Whitney U-test value.

The Trait Emotional Intelligence Questionnaire Short Form (TEIQue-SF; Petrides, 2009) was used to measure emotional intelligence. It is composed of 30 items with a 7-point Likert scale response (from 1 = Completely Disagree to 7 = Completely Agree). In addition to a global emotional intelligence mean score (ranging from 1 to 7), a mean score for each factor (Well-being, Self-control, Emotionality, and Sociability) can be obtained. The TEIQue-SF internal consistency was good for the Total Trait EI dimension (Cronbach αpre = 0.88, Cronbach αpost = 0.85).

The Interpersonal Reactivity Index (IRI; Davis, 1980) was used to measure the multifaceted aspects of empathy. Specifically, the tendency to strongly identify with fictional characters in books, movies, and plays (Fantasy subscale); the tendency to adopt the point of view of others (Perspective taking subscale); the other-oriented feelings of warmth, compassion, and concern (Empathic concern subscale); and the self-oriented feelings of discomfort and anxiety whilst witnessing the negative experiences of other people (Personal distress subscale). The tool is composed of 28 items, scored on a 5-point Likert scale ranging from "Does not describe me well" to "Describes me very well." Four distinct total scores can be obtained for each of the IRI subscales. Internal reliability was acceptable for the Fantasy subscale (Cronbach αpre = 0.83, Cronbach αpost = 0.72) and the Personal distress subscale (Cronbach αpre =0.78, Cronbach αpost = 0.73). The Perspective taking subscale (Cronbach αpre = 0.69, Cronbach αpost = 0.54) and the Emphatic concern subscale (Cronbach αpre =0.57, Cronbach αpost = 0.52) showed a slightly lower internal reliability.

The Group Climate Questionnaire (GCQ; MacKenzie, 1983) was used to evaluate the group's therapeutic environment according to the members' perceptions. It included 12 items rated on a 7-point Likert scale (from "not at all" to "extremely"), which evaluates the Engagement (the perception of constructive therapeutic work, atmosphere, and group processes), the Avoidance (the tendency to avoid a constructive involvement in the group processes), and the Conflict (the perception of interpersonal anger, distancing, distrust, and tension within the group). A total score for each subscale can be calculated. In the present study, Cronbach alpha levels of the first and second tests for the subscales of the GCQ were 0.78 and 0.72 for Engagement; 0.16 and 0.55 for Avoidance; and 0.57 and 0.37 for Conflict.

2.5. Statistical analysis

Statistical analysis was performed using SPSS 26.0 (IBM Corp, 2019). Descriptive statistics were calculated. The normality assumption was verified through the visual inspection of histograms and Q-Q plots, and the Shapiro–Wilk test. As four individuals dropped out, after having verified the homogeneity of variances with the Levene's test, a set of inferential statistics were performed to compare the completer's group and the dropout's group based on gender, age, kind of bachelor, diagnosis, and the baseline levels of CORE-OM, TAS, TEIQue-SF, IRI, and GCQ. Specifically, a chi-square test was used to compare the groups based on the categorical variables (gender, kind of bachelor, and diagnosis); independent-sample *t*-test was used to compare the groups based on the quantitative and normally distributed variables (age, CORE-OM mean scores of well-being, problems, functioning, total score, and total score-risk; TAS-20 total score; all TEIQue-SF factors mean scores; all IRI subscales scores; and GCQ Avoidance and Conflict), whereas the Mann–Whitney *U*-test was used to compare the groups based on quantitative and non-normally distributed variables (CORE-OM risk; IRI Fantasy).

Based on the variables' distribution, a set of paired-sample t-test and Wilcoxon Rank sum test was used to compare pre- and post-scores at CORE-OM, TAS-20, TEIQue-SF, IRI, and GCQ. Within these analyses, only the scores of participants who completed all of the online AP group sessions were included ($N = 18$).

3. Results

The final sample included 12 females and six males aged 21–28 years old who completed all the psychodrama group sessions. As can be observed in Table 1, no statistically significant differences between the dropouts' group and the completer's group were found in age, gender, type of bachelor, and diagnosis. Moreover, no significant differences between the dropouts' group and the completer's group were found in the baseline levels of CORE-OM, TAS-20, TEIQue–SF, IRI, and GCQ.

As can be observed in Table 2, significant differences between the pre- and post-evaluation scores were found in all of the domains' CORE-OM mean scores, except for the Risk subscale, thereby showing an improvement in levels of Well-being and Functioning, a decrease in the level of problems, and a general improvement in both the total score and the total score-risk subscales. Figure 1 displays the overall levels of symptoms and distress before and after the intervention, according to the CORE-OM's clinical cut-off.

Levels of alexithymia, as measured by the total scores at TAS-20, significantly decreased. Considering clinical cut-offs, before the intervention, 28% of patients showed alexithymia, 28% showed possible alexithymia, and 44% did not show alexithymia. After the videoconferencing AP groups, only 6% of patients showed alexithymia, 33% showed possible alexithymia, and 61% did not show alexithymia.

For that which concerns the Trait EI, the total score at the TEIQue-SF was found significantly higher at the final evaluation. Moreover, a significant increase was observed in the Well-being and Emotionality factors. No significant differences between the pre- and post-scores emerged in the Self-control and Sociability factors.

For that which concerns empathy, there were significant differences between the scores of the first and final evaluations in the IRI Fantasy subscale, but not in Perspective taking, Empathic concern, and Personal distress subscales.

Lastly, regarding the perception of the therapeutic environment as measured by GCQ, we observed at the final evaluation a significant increase in the Engagement subscale and a significant decrease in the Conflict subscale. No significant differences were found between the pre- and post-scores of the Avoidance subscale.

4. Discussion

The pilot study investigating the effects of videoconferencing AP on the psychological well-being, emotional intelligence, alexithymia, and empathy of young adults with psychological disorders provided encouraging results. Our findings showed a significant improvement in patients' levels of Well-being and Functioning, and a decrease in the Symptoms domain. The study results reinforce research that has found video-based groups to be feasible and have resulted in outcomes similar to in-person groups (Biolcati et al., 2017; Gentry et al., 2019; Weinberg, 2020). Additionally, levels of alexithymia significantly decreased and the Total Trait EI was found significantly higher at the final evaluation. Then, the Fantasy dimension of empathy and group Engagement increased, with a significant decrease in group Conflict.

Even if many psychodynamic psychotherapists considered online therapy "sacrilegious" before the pandemic (e.g., Essig, 2020) and thought it was not a type of "real therapy," many of these individuals have since adjusted to the new situation, understanding that

TABLE 2 *T*-test and Wilcoxon signed-rank test results of pre- and post-videoconferencing analytic psychodrama groups.

		Pre	Post	Statistic	*p* value
CORE-OM					
Well-being	Mean (SD)	2.43 (0.74)	1.72 (0.52)	[a]3.80	**0.001**
Problems	Mean (SD)	2.01 (0.74)	1.40 (0.58)	[a]4.98	**<0.001**
Functioning	Mean (SD)	1.86 (0.55)	1.35 (0.42)	[a]4.21	**0.001**
Risk	Median (IQR)	2.05 (1.42–2.57)	1.36 (1.12–1.76)	[b]−1.61	0.107
Total	Mean (SD)	1.69 (0.50)	1.19 (0.35)	[a]5.94	**<0.001**
Total-Risk	Mean (SD)	2.01 (0.58)	1.43 (0.41)	[a]5.93	**<0.001**
TAS-20					
Total	Mean (SD)	52.33 (12.01)	47.11 (10.22)	[a]3.15	**0.006**
TEIQue-SF					
Well-being	Mean (SD)	4.08 (1.02)	4.44 (0.79)	[a]−2.26	**0.038**
Self-control	Mean (SD)	3.49 (0.93)	3.60 (0.82)	[a]−0.71	0.486
Emotionality	Mean (SD)	4.73 (0.73)	5.01 (0.79)	[a]−2.48	**0.024**
Sociability	Mean (SD)	3.78 (1.03)	3.81 (0.82)	[a]−0.30	0.770
Total Trait EI	Mean (SD)	4.01 (0.73)	4.15 (0.68)	[a]−2.78	**0.013**
IRI					
Fantasy	Median (IQR)	25.50 (23.75–29.25)	28.00 (26.00–29.25)	[b]−2.36	**0.018**
Perspective taking	Mean (SD)	26.83 (4.23)	27.72 (2.82)	[a]−1.23	0.235
Empathic concern	Mean (SD)	27.89 (3.50)	27.39 (3.40)	[a]0.59	0.560
Personal distress	Mean (SD)	24.44 (5.59)	23.00 (4.92)	[a]1.85	0.082
GCQ					
Engagement	Mean (SD)	20.17 (3.82)	25.06 (2.98)	[a]−6.14	**<0.001**
Conflict	Mean (SD)	8.06 (2.65)	6.56 (2.12)	[a]3.17	**0.006**
Avoidance	Mean (SD)	9.06 (2.82)	8.83 (2.94)	[a]42	0.679

CORE-OM, Clinical Outcomes in Routine Evaluation-Outcome Measures; TAS-20, Toronto Alexithymia Scale; TEIQue-SF, Trait Emotional Intelligence Questionaire-Short Form; IRI, Interpersonal Reactivity Index; GCQ, Group Climate Questionnaire-Short; [a]paired sample *t*-test, with 17 df; [b]*Z* standardized Wilcoxon signed-rank value. Bold values indicate $p < 0.05$, two-tailed.

videoconferencing group psychotherapies are now a necessary fact needing research and evaluation.

Several considerations arose from this experience. From the point of view of clinical practice, many obstacles, and doubts about the online adaptation of the method of work remained; in the transition from the "physical circle" to the screen, the impossibility of bodily interaction in online groups can be regarded as the main obstacle, as previously observed by Biancalani et al. (2022). The therapist must make a greater effort to establish a strong therapeutic alliance, boosting group cohesion and developing an online presence that can overcome the lack of body-to-body interaction. Role-playing sometimes risks being "artificial" if one does not immerse oneself in the online space, making sure to avoid distractions and make an important mental effort to identify and empathize with the roles played. Inevitably, the meanings of the relationships of proximity to distance of the bodies in the dramatization and much of the non-verbal behaviors are also lost. In contrast, facial expressions become very important as does tone of voice. As Weinberg suggested (2020), to increase the therapist's presence in online settings, he/she can make greater use of imagination, inviting group members to do the same. Specific training for improving a therapist's self-confidence to conduct online group therapy is recommended.

As far as the empirical results, the findings are encouraging and inviting to persevere in future research. At the present time, there are no research data on the same constructs—namely EI, alexithymia, and empathy—for comparison between online psychodrama and in-person psychodrama outcomes. However, the findings of the present study suggest a reduction in symptoms and improved functioning for patients, even in the absence of bodily and physical proximity.

In addition to improving well-being, more structural factors such as Trait EI and alexithymia also changed after the online treatment. The findings showed a significant improvement in Well-being, Emotionality, and Total EI after intervention. The findings of this study show similarities with research that has addressed the issue of enhancing Trait EI through psychological interventions or creative programs (Ruttledge and Petrides, 2012; Tiabashvili et al., 2018; Sambol et al., 2022). Moreover, a recent overview of the literature (see Hemming et al., 2019) suggests that therapeutic interventions can partially modify alexithymia. In particular, interventions focused on alexithymic symptoms tend to show significant reductions in alexithymia scores when compared with psychological interventions not focused specifically on alexithymia, which show more inconsistent results. Our results suggest that videoconferencing AP and working with emotions decreases the alexithymic trait in young adults and increases EI.

Interestingly, Fantasy is the only dimension of empathy that changed in a statistically significant degree after treatment. There has been growing

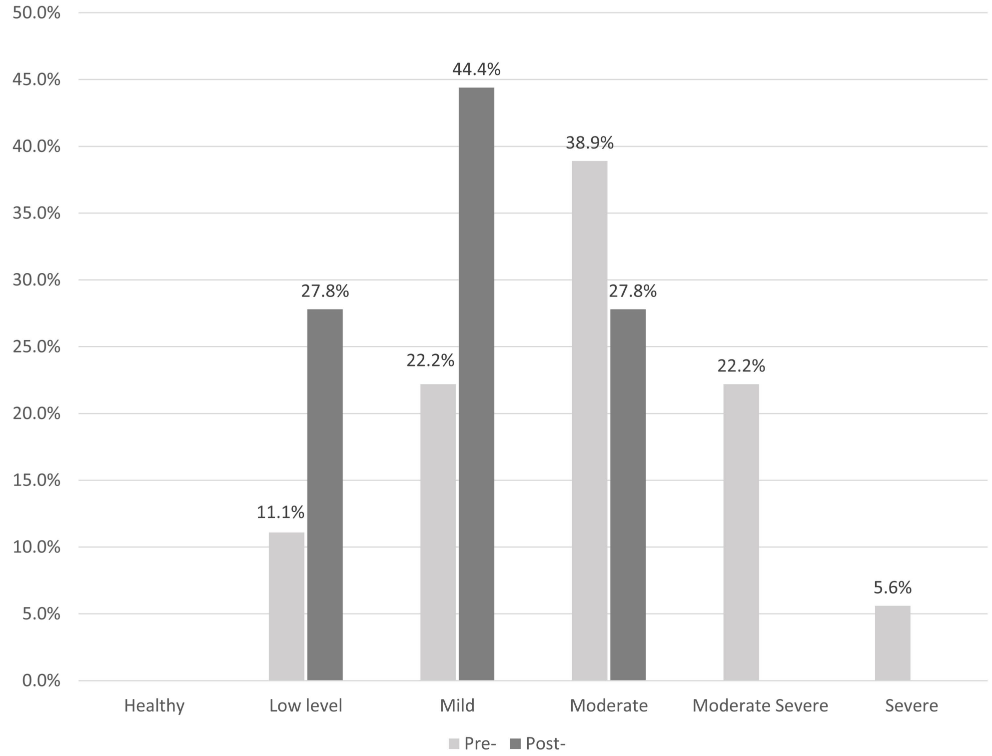

FIGURE 1
Pre- and post-intervention levels of symptoms and distress, based on CORE-OM clinical cut-offs.

acceptance of the view that empathy can best be considered a multidimensional phenomenon encompassing both cognitive and affective elements (Davis et al., 1994; Davis, 2004). When using the IRI questionnaire, many scholars combine Perspective taking and Fantasy as "cognitive empathy" and empathic concern and Personal distress as "affective empathy" (Yan et al., 2021). Unlike expected, Perspective taking - the ability to adopt another's perspective or point of view – although increasing has not significantly changed. Instead, the only significant change concerns Fantasy - the scale more difficult to characterize (Gilet et al., 2013) referring to the propensity to identify with fictitious situations, such as characters from books, movies or plays. The Fantasy dimension measures people's ability to be imaginatively transported by fictional material. This makes us hypothesize that the screen could make the dramatizations live at a more imaginary level (like in a movie) than in real life and this could be a specific effect of being online. Indeed, it is not excluded that the two-dimensional screen leads to increase of the person's empathic ability to identify with virtual characters as if they were not real. But these are inferences to be further investigated in future studies. However, previous research (Nomura and Akai, 2012) indicated that empathic processes addressed to real and fictional characters are similar and, therefore, suggested revising the IRI's fantasy subscale, which is restricted to fictional situations. Additionally, the non-significant increase in affective empathy post-treatment may not be a negative sign, as it might sometimes constitute one of the risk factors for depression, and higher affective empathy might mean more vulnerability to depression (Yan et al., 2021).

As far as group climate, the Engagement is one dimension that increased significantly in our sample. It measures the sense of closeness, group members´ attempts to understand the meaning of behavior, the importance of the group for its members, a willingness to challenge one another, and self-disclosure (MacKenzie, 1983). This group-level process has been predictive of successful group and individual outcomes (Strauss et al., 2008; Arrow et al., 2021).

5. Limits and conclusion

Research on videoconferencing group therapy is still relatively young and lacks clear theoretical and practical guidelines for determining its efficacy. First, control group design with random assignment is needed to confirm the favorable impression of videoconferencing AP effectiveness in treating young adults' suffering. Secondly, the small number of patients and the lack of a long-term follow-up allowed only an initial exploration of the topic and so conclusions should be handled with caution. Future lines of research should also investigate the differences in outcomes between online and in-person psychodrama by using the same constructs to better discriminate the effects that body presence has on emotional competence and clinical outcomes. Finally, the reliability of some scales such as group climate is quite low. The low reliability of the group climate subscales is reported in several studies; nevertheless, the literature suggests including findings of these measures to make comparisons to a large body of research that has used the GCQ (Bìlcan and Mceneaney, 2018).

Despite the aforementioned limits, online psychodrama is a useful resource that young adults could draw on, not only in an emergency, but also in other circumstances during which they need psychological care. Studies suggest that online psychotherapy might also be advantageous for individuals who have difficulty moving or suffer economic constraints, and/or for patients in acute crisis with no access to in-person encounters (Biancalani et al., 2021). In addition, young people have a lot of experience with electronic devices and utilizing the Internet, and the videoconferencing psychotherapy could be an opportunity for expression and sharing of feelings, emotions, and suffering behaviors. Indeed, some patients, such as those with social phobia, may benefit from the videoconferencing setting, as in this context, they may find it easier to manifest openness and talk about their fears, concerns, and feelings. Online psychotherapy, therefore, could be particularly useful for young adults with high levels of social anxiety (Yen et al., 2012) and depression (Lira and Martínez, 2022).

In conclusion, this study contributed to extant literature on the positive effects of online AP for young adults on psychological symptoms, functioning, well-being, and emotional competence; furthermore, it adds new insight to studies on psychological interventions on the Internet.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical approval of this study was obtained from the Research Ethics Committees (REC) of the Department of Psychology of Bologna University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

RB: conceptualization, methodology, investigation, data curation, writing – original draft preparation, and writing – reviewing and editing. FA: methodology, formal analysis, validation, and writing – reviewing and editing. AA: formal analysis, and reviewing and editing. GS: conceptualization, methodology, and supervision. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The reviewer GM declared a past co-authorship with the author RB to the handling editor.

Publisher's note

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The influence of COVID-19-related resilience on depression, job stress, sleep quality, and burnout among intensive care unit nurses

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The COVID-19 pandemic has placed immense pressure on healthcare workers, in particular, Intensive Care Unit (ICU) nurses, who are at the forefront of managing critically ill COVID-19 patients. This has led to increased stressors and workload, which are associated with negative mental health outcomes such as depression, job stress, sleep disturbances, and burnout. However, COVID-19-related resilience may have mitigated these negative effects. ICU nurses with higher levels of COVID-19-related resilience may be better equipped to manage the stress and job demands during the pandemic, leading to improved mental health outcomes. Therefore, this study aimed to comprehensively explore the factors influencing the resilience of ICU nurses and provide baseline knowledge for future studies to develop interventions that promote COVID-19-related resilience. With shift work and COVID-19 experience with adult patients from hospitals across three regions of South Korea. The questionnaire included scales/measures of nurses' depression, job stress, sleep quality, and burnout. Results confirmed that resilience was negatively correlated with depression and burnout, and that ICU nurses' relative levels of resilience strongly influenced their experience of burnout. The findings of this study make a significant contribution to the literature because they focus on resilience, specifically in the context of ICU nursing in South Korea, which has become more challenging and demanding due to the pandemic.

KEYWORDS

burnout, COVID-19, nurse, resilience, job satisfaction

1. Introduction

In the context of the prolonged COVID-19 pandemic, medical staff continue to provide frontline patient care in hospitals. Among them are nurses, who play a key role in limiting the spread of the pandemic (Fawaz et al., 2020). Nurses take on additional tasks, such as infection-prevention education for patients, guardians, and caregivers; monitoring the symptoms of patients and caregivers; infection control; caregiver management; and record keeping (Chen et al., 2020). Additionally, their workload has increased since the advent of the pandemic due to additional infection-control tasks, such as managing isolation rooms and wearing protective gear (Bernard et al., 2009; Corley et al., 2010).

COVID-19 has significantly impacted healthcare workers, particularly those working in intensive care units (ICUs) (Chen et al., 2020). High-flow nasal cannulas, mechanical ventilation, extracorporeal membrane oxygenation (ECMO), continuous renal replacement therapy, prone position, and nursing interventions are required for severely ill patients infected with COVID-19 (The Korean Society of Critical Care Medicine, 2020). Accordingly, the government has designated a hospital dedicated to infectious diseases, which provides a negative pressure isolation room to treat patients with COVID-19 (The Korean Society of Critical Care Medicine, 2020).

The COVID-19 pandemic has placed immense pressure on healthcare workers, particularly those working in ICUs. Consequently, ICU nurses may experience a range of negative psychological and physical outcomes, including depression, job stress, poor sleep quality, and burnout (Nie et al., 2020; Sun et al., 2020). Their physical and mental stress and fatigue accumulate due to additional tasks such as cleaning and arranging the ICU environment, resulting in severe mental distress and lack of sleep (Zhuo et al., 2020). An overseas study reported that nurses who took care of patients with COVID-19 wore personal protective equipment for hours at a time, resulting in pressure sores on the body; some nurses experienced hypoglycemia and oxygen deprivation due to physical fatigue (Buheji and Buhaid, 2020). Nurses experienced facial pain, had communication difficulties because they could not hear properly, and felt severe fatigue because of problems such as excessive work when wearing personal protective equipment while working (Maben and Bridges, 2020).

ICU nurses have been at the forefront of managing critically ill COVID-19 patients, which has led to increased work demands and stressors. However, COVID-19-related resilience might play a significant role in mitigating these negative effects. Resilience is an individual's ability to successfully adapt to adversity (Eoh et al., 2019). Long-term exposure to the ICU environment can lead to poor sleep quality, stress, and depression, all of which can affect nurses' resilience. Resilience is a key factor that can help ICU nurses cope with stressors associated with the COVID-19 pandemic. Resilience refers to an individual's ability to adapt and recover from adversity or stress. Resilient ICU nurses may be better equipped to cope with the challenges of their jobs, may experience fewer negative outcomes and have improved mental health outcomes (Cooper et al., 2020). Previous studies have reported that nurses with low resilience lack the ability to deal with stress, resulting in negative consequences such as burnout or job turnover (Kang and Lim, 2015; Ryu and Kim, 2016; Kwon et al., 2017). Conversely, highly resilient nurses can overcome difficulties and demonstrate improved abilities by actively utilizing their internal and external resources (Kwon et al., 2017). Highly resilient nurses also had lower turnover intention (Kim and Park, 2010). However, not everyone experiences emotional pain from traumatic experiences, and those who experience trauma can overcome it with resilience (Tusaie and Dyer, 2004; Eoh et al., 2019).

According to a meta-analysis of factors affecting resilience among Korean nurses, empathy satisfaction, nursing performance, job satisfaction, organizational socialization, social support, and organizational commitment are protective factors that have a positive effect on resilience (Kwon et al., 2017). In contrast, stress response, burnout, turnover intention, workplace bullying, empathic fatigue, job stress, and post-traumatic stress disorder are risk factors that negatively affect resilience (Kwon et al., 2017). There are limited studies focusing on the resilience of ICU nurses during the COVID-19 pandemic, including general characteristics, job characteristics, depression, job stress, sleep quality, and burnout. Therefore, research that comprehensively explores factors that influence ICU nurses' resilience is needed.

Overall, COVID-19-related resilience may have significantly influenced the mental health outcomes of ICU nurses during the pandemic. Nurses who possess higher levels of resilience may be better equipped to manage the stress and demands of their job, leading to improved mental health outcomes, such as reduced depression, job stress, sleep disturbances, and burnout. It is essential to develop interventions that promote COVID-19-related resilience among ICU nurses to mitigate the negative impact of the pandemic on their mental health. Thus, in this study, depression, job stress, sleep quality, and burnout levels were assessed in ICU nurses who had cared for patients with COVID-19. The impact of these factors was identified and analyzed to promote resilience among nurses. This study aimed to provide basic data for increasing the competency of nursing personnel and the quality of their services by improving the quality of their professional lives and work intentions.

2. Materials and methods

2.1. Purpose

This descriptive study investigated the factors that influence ICU nurses' resilience during COVID-19, specifically in terms of depression, job stress, sleep quality, and burnout. This study intends to provide basic data for improving the quality of life and work intention of nursing personnel by promoting resilience among ICU nurses.

2.2. Participants

Convenience sampling was used for the recruitment. This study was conducted among ICU nurses working at different university hospitals in three regions across South Korea. Written consent for voluntary participation was obtained after explaining that participants could withdraw from the study without facing any disadvantages. The inclusion criteria were as follows: (1) ICU nurses with shiftwork experience and (2) nurses who nursed patients with COVID-19 in adult ICUs. G*Power 3.1.9.4 was used to calculate the minimum sample size required for linear multiple regression analysis to identify the factors influencing resilience. Based on a significance level (α) of 0.05, power of 0.95, effect size of 0.15, and four predictors (depression, job stress, sleep quality, and burnout), the minimum sample size was calculated as 129 for the analysis. Considering a dropout rate of 20%, 155 questionnaires were distributed. Finally, 131 (84.5%) questionnaires were used for the analysis; questionnaires with missing responses were excluded.

2.3. Instruments

2.3.1. Depression

The Center for Epidemiologic Studies Depression Scale (CES-D) developed by Radloff (1977) was adapted and validated, and the integrated Korean version of the scale developed by Chon et al. (2001) was used to measure depression. This tool consists of 20 items rated on a scale ranging from 0 ("not at all") to 3 ("very much so"). A score of 21 indicates mild depression, and a score of 21 or higher indicates severe depression (0–15 indicates no depression, 16–20 indicates mild depression, and 21 and above indicates severe depression). Cronbach's α in the study by Chon et al. (2001) and in this study were 0.91 and 0.92, respectively.

2.3.2. Job stress

A questionnaire developed and used by Oh (2016) to investigate MERS-related stress among medical staff in 2015 and modified by Song and Yang (2021) was used to measure COVID-19-related job stress. Among the stress emotions, the questionnaire included six items on fear (items 2, 3, 4, 7, 8, and 11), four on alienation (items 1, 6, 9, and 10), and one each on betrayal (item 5) and anger (item 12). Each item is scored on a 5-point Likert scale (1 = "not at all," 2 = "no," 3 = "normally," 4 = "yes," and 5 = "very much"). Cronbach's α in Song and Yang's (2021) study and in this study were 0.88 and 0.90, respectively.

2.3.3. Sleep quality

The Pittsburgh Sleep Quality Index (PSQI) developed by Buysse et al. (1989) is the basis of the Korean version (PSQI-K) translated by Sohn et al. (2012). The PSQI-K measures the subjective sleep quality over the past month and consists of seven domains: subjective sleep quality, sleep latency, sleep duration, usual sleep efficiency, sleep disturbance, use of sleeping pills, and daytime dysfunction. It consisted of 19 items. A score of 0—3 was assigned to each domain, with a total score ranging from 0 to 21 points. Higher scores indicate poorer sleep quality, and a score of 5 or more indicates poor sleep. The Cronbach's α in the study by Buysse et al. (1989) and in this study was 0.83 and 0.65, respectively.

2.3.4. Burnout

Burnout was measured using the Korean version of the Maslach Burnout Inventory (MBI) (Shin, 2003) developed by Maslach and Jackson (1981). This 22-item tool consists of three sub-domains: dehumanization (five items), low self-achievement (eight items), and emotional exhaustion (nine items). On a 7-point Likert scale, higher scores indicated higher levels of burnout. Items on low self-achievement, which were positive statements, were reverse-scored. Cronbach's α in the study by Maslach and Jackson (1981) and in this study were 0.76 and 0.85, respectively.

2.3.5. Resilience

As a tool for measuring resilience, the Conner-Davidson Resilience Scale (CD-RISC) developed by Connor and Davidson (2003) was adapted and validated by Baek et al. (2010) and the Korean Version of the scale was used in this study. At the time of development, the tool consisted of 25 items with five sub-factors: tenacity (nine items), persistence (eight items), optimism (four items), sustaining power (two items), and spirituality (two items). The items are rated on a 5-point scale ranging from 0 (not at all) to 4 (very much); the total scores range from 0 to 100, with higher scores indicating higher levels of resilience. Cronbach's α was 0.90 in the study by Connor and Davidson (2003) and was 0.95 in this study.

2.4. Data collection

This study was approved by the institutional review board of H University (HIRB-2022-055). The study period was from August 12 to September 12, 2022. The researcher personally visited the departments and distributed envelopes containing an explanation of the study, consent form for participation, and questionnaire. Considering that the training period for new nurses in the ICU was 6 weeks, the target sample consisted of nurses with more than 2 months of ICU experience who understood the content and responded to the questionnaire. The questionnaire required 20–30 min to complete.

2.5. Data analysis

Statistical data, such as descriptive statistics, independent *t*-test, one-way ANOVA, Pearson's correlation coefficients, and multiple linear regressions, were analyzed using SPSS WIN 29.0.

3. Results

3.1. General characteristics, including participants' and COVID-19-related job characteristics

The average age of the participants was 28.71 (±5.49) years; most (68.7%, $n = 90$) were in their 20s, more than 90% ($n = 118$) were women, and 67.2% ($n = 88$) did not subscribe to any religion (Table 1). The highest educational level was an undergraduate degree at 83.2% ($n = 109$), and 84.7% ($n = 111$) were unmarried. Regarding the number of cohabitants, 40.5% ($n = 53$) lived alone, 21.4% ($n = 28$) lived with one other person, 21.4% ($n = 28$) lived in households with four or more people, and 16.8% ($n = 22$) lived in three-person households. Of the nurses who lived with others, 68.7% ($n = 90$) lived with their immediate families.

The average total clinical experience of nurses was 65.15 (±63.62) months; 42.0% ($n = 55$) had less than 36 months, followed by 26.0% ($n = 34$) with 61–120 months. Among them, nurses who were currently working in the ICU had an average of 42.37 (±41.10) months of clinical experience and 58.8% ($n = 77$) had 36 months or less of ICU experience. By department, 30.5% ($n = 40$) were medical ICU (MICU) nurses and 30.5% ($n = 40$) worked in the surgical ICU (SICU), followed by 15.3%. in the smart ICU and nervous system ICU, 13.0% ($n = 17$) in the cardiovascular ICU (CCU), and 10.7% ($n = 14$) in the emergency ICU.

Of the ICU nurses in this study, 58.8% ($n = 77$) desired to be assigned to their current workplace; however, 41.2% ($n = 54$) did not. A majority were general nurses (96.2%, $n = 126$) and less than half were very satisfied or satisfied with their work (48.1%, $n = 63$). This was followed by 45.0% ($n = 59$) who had neutral feelings about it. Regarding nurses' satisfaction with the workload in the current workplace, 56.5% ($n = 74$) answered neutral, 22.9% ($n = 30$) were very dissatisfied or dissatisfied, and 20.6% ($n = 27$) were very satisfied or satisfied. The average number of patients assigned to the nurses was 2.98 (±0.74), with more than 70% ($n = 92$) having three patients, 19.8% ($n = 26$) having less than three, and 9.9% ($n = 13$) having four or more. Of the nurses, 74.0% ($n = 97$) had never changed their workplace and 26.0% ($n = 34$) responded that they had experienced switching jobs.

Regarding COVID-19-related work, 64.1% ($n = 84$) answered that there was an increase in workload during the pandemic, 18.3% ($n = 27$) reported a sharp increase in their duties, and 13.0% ($n = 17$) reported having the same workload as before. Approximately 60%

TABLE 1 General characteristics of the participants (N=131).

	Categories	*N* (%)	M±SD (min-max)
General characteristics			
Age (years)	<30	90 (68.7)	28.71 ± 5.49 (22–52)
	≥30	41 (31.3)	
Sex	Male	13 (9.9)	
	Female	118 (90.1)	
Religion	Yes	43 (32.8)	
	No	88 (67.2)	
Educational level	Community college degree	7 (5.3)	
	Bachelor's degree	109 (83.2)	
	Attending Gradate school or master's degree	15 (11.5)	
Marital status	Unmarried	111 (84.7)	
	Married	20 (15.3)	
Number of households	Alone	53 (40.5)	
	Two	28 (21.4)	
	Three	22 (16.8)	
	More than four	28 (21.4)	
Residence type	Immediate family	90 (68.7)	
	Extended family	41 (31.3)	
Job related characteristics			
Total clinical experience (month)	≤36	55 (42.0)	65.15 ± 63.62 (4–365)
	37 ~ 60	24 (18.3)	
	61 ~ 120	34 (26.0)	
	>120	18 (13.7)	
Clinical experience at the ICU (month)	≤36	66 (50.4)	52.66 ± 47.97 (4–252)
	37 ~ 60	24 (18.3)	
	61 ~ 120	28 (21.4)	
	>120	13 (9.9)	
Current department experience (month)	≤36	77 (58.8)	42.37 ± 41.10 (1–240)
	37 ~ 60	25 (19.1)	
	61 ~ 120	23 (17.6)	
	>120	6 (4.5)	
Types of ICU	Medicine	40 (30.5)	
	Surgical	40 (30.5)	
	Cardiovascular	17 (13.0)	
	Nervous System	6 (4.6)	
	Smart ICU	14 (10.7)	
	Emergency ICU	14 (10.7)	
Assigned to the current workplace	Volunteer	77 (58.8)	
	From the hospital	54 (41.2)	
Position	Registered nurse	126 (96.2)	
	Charge nurse or higher	5 (3.8)	
Satisfaction with current workplace	Dissatisfied	9 (6.9)	
	Neutral	59 (45.0)	
	Satisfied	63 (48.1)	

(Continued)

TABLE 1 (Continued)

	Categories	*N* (%)	M±SD (min-max)
Satisfaction with workload at current workplace	Dissatisfied	30 (22.9)	
	Neutral	74 (56.5)	
	Satisfied	27 (20.6)	
Number of patients	<3	26 (19.8)	2.98 ± 0.74 (1–6)
	3	92 (70.3)	
	>3	13 (9.9)	
Turnover experience	Yes	34 (26.0)	
	No	97 (74.0)	
Work characteristics related to COVID-19			
Workload Work intensity (Difficulty)	Same as before	20 (5.3)	
	Increased	84 (64.1)	
	Greatly increased	27 (20.6)	
	Same as before	29 (22.2)	
	Increased	78 (59.5)	
	Greatly increased	24 (18.3)	
Salary satisfaction	High	11 (8.4)	
	Low	120 (91.6)	
Experience of receiving education for infected patients	Yes	68 (51.9)	
	No	63 (48.1)	
Availability of resources	Have	43 (32.8)	
	Not have	88 (67.2)	
Quarantined experience due to infection	Yes	98 (74.8)	
	No	33 (25.2)	

(*n* = 78) responded that their work intensity had increased, and over 90% (*n* = 120) were dissatisfied with the benefits or rewards they received during COVID-19 nursing care. Slightly over half (51.9%, *n* = 68) of the nurses had received education on responding to infectious diseases. A total of 67.2% (*n* = 88) had not received sufficient resources during the COVID-19 pandemic, and 74.8% (*n* = 98) responded that they had quarantine experience due to COVID-19.

3.2. Degree of depression, job stress, sleep quality, burnout, and resilience

Participants' average depression score was 15.50 (±9.02) out of a total possible score of 60; 55.7% (*n* = 73) of participants had no depression, 25.2% (*n* = 33) had severe depression, and 19.1% (*n* = 25) had mild depression (Table 2).

Participants' COVID-19-related work stress had an average score of 2.52 (±0.73) out of a maximum of 5. In the sub-categories, fear had the highest score at 2.85 (±0.76), followed by alienation at 2.24 (±0.82), betrayal at 2.15 (±1.07), and anger at 2.08 (±1.12) points.

The average score for sleep quality was 5.29 (±2.56) out of a total score of 21. Approximately 60% (*n* = 78) had poor sleep quality, and two-fifths (38.9%, *n* = 51) had good sleep quality.

Participants' average score for burnout was 61.16 (±17.57) points out of a total score of 132. Emotional exhaustion had the highest score at 24.39 (±11.09), followed by a decreased sense of self-achievement at 21.89 (±9.26), and dehumanization at 10.56 (±6.53) points. According to the 27-point cutoff score, approximately six out of ten (58.0%, *n* = 7) had a low burnout level and 42.0% (*n* = 55) had a high burnout level.

Their average resilience score was 56.72 (±14.07) points out of a total score of 100. In the sub-categories, toughness had the highest score of 19.76 (±5.58), followed by 18.44 (±5.09) points for persistence, 8.91 (±2.90) for optimism, 6.00 (±1.38) for supportiveness, and 3.61 (±1.37) for spirituality.

3.3. Differences in the resilience according to the general characteristics of the participants

There were significant differences in resilience by participants' gender ($t = 2.053$, $p = 0.042$), religion ($t = 2.596$, $p = 0.011$), educational level ($F = 3.906$, $p = 0.023$), position ($t = 2.347$, $p = 0.020$), and past experience in COVID-19 response training ($t = 2.660$, $p = 0.009$) (Table 3).

Male nurses had higher resilience levels than female nurses (2.57 ± 0.43 and 2.24 ± 0.57, respectively). In terms of religiousness, those who subscribed to a religion (2.45 ± 0.50) had higher resilience levels than those who did not (2.18 ± 0.58). Regarding educational level, those who were enrolled in or completed graduate school (2.64 ± 0.68) had significantly higher resilience than those who had associate or bachelor's degrees (2.21 ± 0.62 and 2.22 ± 0.53, respectively). General registered nurses (2.24 ± 0.55) had lower resilience levels than charge nurses (2.79 ± 0.72). Lastly, participants who received

TABLE 2 The level of depression, job stress, sleep quality, burnout, and resilience of the participants (N=131).

Variables	Categories	N (%)	Mean±SD
Depression	Normal (≤15)	73 (55.7)	15.50 ± 9.02
	Mild (16~20)	25 (19.1)	
	Moderate (≥21)	33 (25.2)	
Job stress	Fear		2.85 ± 0.76
	Isolation		2.24 ± 0.82
	Betrayal		2.15 ± 1.07
	Anger		2.08 ± 1.12
	Sub-total		2.52 ± 0.73
Sleep quality (n = 129)	GOOD (<5)	51 (38.9)	5.29 ± 2.56
	BAD (≥5)	78 (59.5)	
Burnout	Emotional exhaustion		2.71 ± 1.23
	Decreased of self-fulfillment		2.74 ± 1.16
	Dehumanization		2.11 ± 1.31
	Sub-total		2.78 ± 0.80
Resilience	Toughness		2.20 ± 0.62
	Persistence		2.31 ± 0.64
	Optimism		2.23 ± 0.73
	Bearing capacity		3.00 ± 0.69
	Spirituality		1.81 ± 0.69
	Sub-total		2.27 ± 0.56

TABLE 3 Differences in resilience according to general characteristics (N=131).

	Categories	Resilience	
		Mean±SD	t or F (p) Scheffe's test
Gender	Male	2.57 ± 0.43	2.053* (0.042)
	Female	2.24 ± 0.57	
Religion	Yes	2.45 ± 0.50	2.596* (0.011)
	No	2.18 ± 0.58	
Educational level	Community college degree	2.21 ± 0.62^a	3.906* (0.023) b < c
	Bachelor's degree	2.22 ± 0.53^b	
	Attending Gradate school or master's degree	2.64 ± 0.68^c	
Position	Registered nurse	2.24 ± 0.55	2.347* (0.020)
	Charge nurse or higher	2.79 ± 0.72	
Experience of receiving education for infected patients	Yes	2.39 ± 0.56	2.660** (0.009)
	No	2.14 ± 0.54	

*$p < 0.05$, **$p < 0.01$.

COVID-19 response training (2.39 ± 0.56) had higher resilience levels than those who did not receive any related education (2.14 ± 0.54).

3.4. Correlations between factors affecting resilience

Resilience was significantly and negatively correlated with depression ($r = -0.352$, $p < 0.001$) and burnout ($r = -0.510$, $p < 0.001$) (Table 4). Hence, the lower the degree of resilience, the more severe the degree of depression and burnout.

3.5. Predictors of participants' resilience

Analysis found that the tolerance limit was greater than 0.10, and the variance inflation factor to confirm multicollinearity between independent variables was 1.802 or less than 10, indicating

TABLE 4 Correlation between depression, job stress, sleep quality, burnout, and resilience of participants (N=131).

	Depression (Fawaz et al., 2020) *r* (*p*)	Job stress (Chen et al., 2020) *r* (*p*)	Sleep quality (Corley et al., 2010) *r* (*p*)	Burnout (Bernard et al., 2009) *r* (*p*)	Resilience (The Korean Society of Critical Care Medicine, 2020) *r* (*p*)
1					
2	0.505*** (<0.001)				
3	0.394*** (<0.001)	0.236** (0.007)			
4	0.667*** (<0.001)	0.578*** (<0.001)	0.307*** (<0.001)		
5	−0.352*** (<0.001)	−0.113 (0.200)	−0.165 (0.062)	−0.510*** (<0.001)	

$^{**}p < 0.01$, $^{***}p < 0.001$.

TABLE 5 Factors affecting resilience (N=131).

Variables	*B*	S.E	*β*	*T*	*p*	VIF
	81.53	3.967		20.551	<0.001	
Depression	−0.032	0.159	−0.021	−0.202	0.840	1.802
Burnout	−0.398	0.082	−0.496	−4.866	<0.001	1.802

$R^2 = 0.510$ Adju-$R^2 = 0.261$, $F = 22.55$, $p < 0.001$, Durbin-Watson 2.008.

that there was no problem with multicollinearity (Table 5). In addition, the Durbin-Watson value was 2.008, indicating no autocorrelation between the independent variables. The analysis showed that burnout had a statistically significant effect on resilience ($\beta = -0.496$, $p < 0.001$), but the effect of depression was insignificant ($\beta = -0.021$, $p = 0.840$). That is, the goodness-of-fit of the regression model was statistically significant for burnout level and showed an explanatory power of 26.1% %in the multiple regression analyses on resilience. These findings indicate that when nurses' burnout levels decreased, the predicted resilience level increased.

4. Discussion

This study assessed depression, job stress, and sleep quality levels of nurses in ICUs who had taken care of patients with COVID-19 and analyzed the impact on resilience to improve nurses' resilience and the quality of their professional lives. This study aimed to improve the quality of nursing services by increasing the quality of nursing personnel, their competency, and their intention to stay in their position at work.

In this study, the average depression score of the participants was 15.50 (±9.02) out of 60; 58 nurses (44.3%) had depression scores of 16 or higher, indicating that they had mild or high levels of depression. According to a study by Gong and Kim (2022) the depression level of nurses who took care of critically ill patients at university hospitals was relatively higher than that of nurses who took care of mildly ill patients at medical centers. Therefore, during the COVID-19 pandemic, it is necessary to monitor, intervene, and manage depression in ICU nurses, who have a relatively high psychological burden.

In this study, participants' COVID-19-related occupational stress score was an average of 2.52 (±0.73) out of five points. Using the same job-stress tool as this study to investigate nurses at infectious disease hospitals, Song and Yang (2021) and Kim (2020) reported scores of 3.05 (±0.67) and 3.09 (±0.67) points, respectively, which are higher than those of this study. Among them, as a subdomain of COVID-19-related job stress, the average value of the fear domain was the highest at 2.85 (±0.76) points. This was similar to Song and Yang (2021) and Kim's (2020) study of infectious disease hospital nurses and Cho's (2021) study of emergency room nurses, in which the mean value of the fear domain was the highest. These results indicate that anxiety about being directly or indirectly exposed to infection while nursing patients with COVID-19 and concerns about risk factors that may occur while doing so acted as stressors.

In this study, the average sleep quality score was 5.29 (±2.56) out of a total score of 21, indicating a low sleep quality. Good sleep quality supports optimal immune function to prevent infection during direct contact with patients (Connor and Davidson, 2003). Poor sleep quality may lead to medical and safety accidents that could harm nurses' health and affect their work performance (Baek et al., 2010). According to previous studies on sleep deprivation in nurses, deterioration of sleep quality due to shift work among nurses is not only related to individual health problems such as activation of the sympathetic nervous system, increased susceptibility to infection, cognitive impairment, emotional changes, and physical pain, but also nurse turnover (Hong, 2015; Jeong and Gu, 2016; Yang et al., 2017; Yeong and Ock, 2018). Poor sleep quality has also been reported to reduce the accuracy and efficiency of nurses' work, thereby increasing the risk of errors in medication administration, patient identification, medical device operation, and needle injury, affecting patients' health and life (Hong, 2015; Jeong and Gu, 2016; Yang et al., 2017; Yeong and Ock, 2018).

The average burnout score in this study was 61.16 (±17.57) points out of 132 points. This result is higher than the average score (56.90 ± 20.20) reported by Shin (2003) who measured burnout in ICU nurses who cared for critically ill patients with COVID-19. This study may be different depending on the timing of the study in that it was conducted right after the surge in COVID-19 patients. For nurses, burnout causes frequent absenteeism and increases the possibility of medical accidents and turnover rates (Eo, 2015). Therefore, support measures should be developed to manage burnout among ICU nurses. Regarding the subcategories of burnout, emotional exhaustion was the highest (24.39 points), followed by decreased self-achievement (21.89 points) and dehumanization (10.56 points). This result is consistent with those of previous studies (Shin, 2003; Chen et al., 2020; Kim, 2020).

In this study, the average resilience score was 2.27 (±0.56) out of the 5. This was lower than Cho (2021) (3.28 points) and Yang et al. (2017) (3.30 points), who studied nurses in hospitals dedicated to COVID-19 using the same tool. In addition, Jeong and Gu (2016) who studied ICU nurses' resilience during non-epidemic periods, reported scores of 2.43 points, which is higher than the results of this study. This suggests that the resilience of nurses in ICUs decreases when dealing with infectious diseases. Therefore, the resilience of ICU nurses who nursed critically ill COVID-19 patients was lower. Social support systems such as mentoring or counseling are needed to improve resilience.

There was a significant difference in the degree of resilience according to participants' gender, religion, educational level, position, and experience of receiving education about the COVID-19 response. According to a study by Woo (2022) during the pandemic, resilience was significantly higher when nurses had a high educational level and rank, which is similar to the results of this study. Similarly, Lee (2022) found that resilience was significantly higher when the nurse in charge was older, religious, and held a higher position. In other words, resilience increased when work experience increased. Therefore, it is necessary to create an environment that promotes nurses' retention by developing and implementing programs to increase resilience. Additionally, resilience was high among those who received education on how to respond to infectious diseases, suggesting that nurses should be provided with information on how to respond to infectious diseases.

Regarding COVID-19, ICU nurses' resilience negatively correlated with depression and burnout. The more severe the degree of depression and the higher the burnout, the lower is the resilience. A previous study reported that the higher the depression, the lower the resilience of shift nurses (Jeong and Young, 2019) and another study of ICU nurses showed that the lower the resilience, the higher the depression (Mealer et al., 2012). In addition, previous studies reported that the higher the resilience of nurses at public medical centers who care for patients with COVID-19, the lower their burnout (Yeong and Ock, 2018). Nurses with low resilience have a low ability to effectively control or manage stress, so burnout and turnover are high (Tusaie and Dyer, 2004). Therefore, it is necessary to consider measures to reduce ICU nurses' burnout in future infectious disease situations and develop interventions to enhance resilience. Further research is needed to fully contextualize the situation in South Korea and compare it with other countries.

5. Contributions and limitations

This study provides basic data for interventions that promote COVID-19-related resilience among ICU nurses and aim to mitigate the negative impact of the pandemic on their mental health. The findings revealed that ICU nurses with high levels of depression and burnout experienced low resilience. This was significantly affected by burnout. Therefore, it is necessary to develop and implement support measures to manage burnout among ICU nurses and promote their resilience. Furthermore, the study found that the resilience of ICU nurses decreased depending on general characteristics such as gender, religion, education level, position, and experience of receiving education for infected patients. Social support systems, such as mentoring or counseling that consider individuals' general characteristics, may be beneficial in improving the resilience of ICU nurses.

This study has some limitations that should be considered when interpreting the results. First, it used convenience sampling and had a relatively small sample size compared with previous research on clinical nurses, which limits its generalizability to a broader population in South Korea. Therefore, future research should use a larger and more diverse sample to confirm whether these findings replicate with more representative South Korean populations. Second, the study focused mainly on nurses currently working in university hospitals, which limits the applicability of the findings to other groups. Nurses employed in diverse hospitals should also be surveyed to draw definitive conclusions regarding ICU nurses' resilience. Third, longitudinal studies are needed to identify other significant predictors of resilience toward infectious diseases. Future research should also consider other sociodemographic variables beyond country, age, and sex, which may contribute to non-invariant results. Finally, the potential for self-report errors was considered. Although self-reported measures are commonly used in research, they may not always provide a complete or accurate picture of an individual's experiences or behaviors. Thus, future study is needed including an alternative research methodology that could address this concerns such as qualitative and/or mixed-method.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Hallym University's institutional review board (HIRB-2022-055). The patients/participants provided their written informed consent to participate in this study.

Author contributions

SJH and JML contributed in conception and design, provision of study materials or participants, data collection and intervention implementation, data analysis and interpretation, manuscript writing, and revision of the manuscript. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Dissociating cognitive and affective empathy across psychopathy dimensions: The role of interoception and alexithymia

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This study examined the associations between psychopathy dimensions (triarchic phenotypes and classical factors), empathy domains (cognitive and affective), and interoception (interoceptive attention and accuracy) while accounting for the putative role of alexithymia. A community sample (*n*=515) completed an online survey encompassing: Triarchic Psychopathy Measure (boldness, meanness, disinhibition); Levenson Self-Report Psychopathy Scale (primary and secondary psychopathy); Body Perception Questionnaire (interoceptive attention); Interoceptive Accuracy Scale; Toronto Alexithymia Scale. Hierarchical linear regression models were implemented for hypothesis-driven analyses examining the associations between psychopathy, empathy, and interoception while controlling for sex, age, and alexithymia. Exploratory path models were employed to investigate alexithymia and/or cognitive empathy as mediators between interoception and psychopathy. Our results largely confirmed the postulated empathy profiles across psychopathy dimensions, as meanness and primary psychopathy displayed a broad empathy impairment, while disinhibition and secondary psychopathy were only associated with diminished cognitive empathy. Importantly, boldness displayed a unique pattern (enhanced cognitive empathy and reduced affective empathy), further reinforcing its importance within the constellation of psychopathy traits. Contrary to our hypotheses, self-perceived interoceptive attention and accuracy were not associated with either psychopathy dimension after controlling for alexithymia. However, interoceptive accuracy and alexithymia were associated with cognitive empathy, while alexithymia was also positively related to all psychopathy dimensions (as expected), despite the unexpected strong and negative association with boldness. Exploratory analyses suggested significant indirect effects (mediation) between interoceptive accuracy and psychopathy *via* alexithymia and/or cognitive empathy. These mediating effects must be interpreted with caution and future studies should be designed to formally test this model.

KEYWORDS

psychopathy, personality, empathy, social cognition, interoception, interoceptive attention, interoceptive accuracy, alexithymia

1. Introduction

Psychopathy is a multidimensional personality structure encompassing a wide constellation of traits that complexly interact with each other and with several psychologically meaningful constructs (Skeem et al., 2011; Lilienfeld, 2018; Sellbom and Drislane, 2021). This view is vastly consensual nowadays, as psychopathy traits are considered to be continuously distributed across the population, with each subject displaying a unique multidimensional profile of features. The specific subdimensions underlying psychopathy are far from being consensual, although two major conceptual models are currently discussed. The classical 2-factor model (Hare et al., 1990; Levenson et al., 1995; Hare and Neumann, 2008) considers that psychopathy encompasses two independent (yet correlated) dimensions, namely interpersonal-affective traits (*Factor 1/primary psychopathy*—superficial charm, manipulation, callousness, absence of remorse, shallow affect) and impulsive-antisocial features (*Factor 2/secondary psychopathy*—impulsivity, lack of behavioral control, criminal versatility, recidivism). Criminal behavior presents a central role within this model, as psychopathy traits are considered to be intrinsically linked to antisocial manifestations from a genetic and longitudinal standpoint (Hare and Neumann, 2008). Despite the important contribution of this model to psychopathy research, the centrality of criminal behavior has been somewhat questioned. The strong focus on behavioral traits can arguably make the psychopathy construct overinclusive and non-specific, as impulsive and antisocial tendencies also co-occur with several externalizing disorders (Krueger et al., 2002, 2007; Nelson and Foell, 2018). Furthermore, these factors were originally proposed within criminal samples, likely leading to an over-inclusion of maladaptive traits vs. under-inclusion of adaptive expressions of psychopathy (Cooke and Michie, 2001; Skeem et al., 2011). These adaptive manifestations, described since the early descriptions of psychopathy (Cleckley, 1941, 1976), are presumably observed in the now-named "successful psychopath," defined as an individual who displays high levels of psychopathy but is still capable of sustaining normal daily functioning (Gao and Raine, 2010; Steinert et al., 2017; Gao et al., 2020; Bronchain et al., 2021).

To address these caveats, the triarchic model emerged as an alternative multidimensional framework that proposed the exclusion of antisociality and the inclusion of adaptive traits within the psychopathy personality structure (Patrick et al., 2009; Patrick and Drislane, 2015). The triarchic model proposes three dissociable (despite interrelated) phenotypic dispositions, namely *boldness* (fearless-dominant proclivities - low-stress reactivity, social dominance, persuasiveness, venturesomeness), *meanness* (callous-aggression tendencies—deficient empathy, lack of affiliative capacity, predatory exploitativeness, empowerment through cruelty), and *disinhibition* (externalizing proneness—impulsivity, impaired emotional regulation, lack of planning, hostility). Within this model, antisocial behavior is not included as a core feature of psychopathy, although meanness and disinhibition capture features considered proximal to antisociality. Hence, psychopathy is viewed within a hierarchical framework, where interpersonal-affective traits may (or may not) constitute a risk factor for antisocial behavior contingent on the influence of other individual and contextual factors (Cooke and Michie, 2001; Cooke et al., 2006; Skeem et al., 2007; Patrick et al., 2009; Skeem and Cooke, 2010). Despite the contribution of the triarchic model to foster research on the etiological and neurobiological pathways underlying psychopathy dimensions (Patrick et al., 2012), it has also faced some criticism regarding the importance of boldness-related traits within the construct (Miller and Lynam, 2012; Marcus et al., 2013) and the reliability of its 3-factor structure (Roy et al., 2021).

The role of antisocial behavior within psychopathic personality is still a matter of discussion and division nowadays. Importantly, the classical 2-factors and the triarchic phenotypes provide distinct operationalizations of the interpersonal, affective, and behavioral manifestations of psychopathy. This divergence should be accounted for when producing evidence examining how psychopathy dimensions interact with other psychological constructs.

1.1. An overview of empathy within psychopathy traits

Empathy, historically a hallmark of psychopathy, is also widely considered a multidimensional construct across most conceptualizations (Eklund and Meranius, 2021). Despite the ongoing debate regarding its specific subdomains and underlying processes, nowadays it is safe to argue that most models (e.g., Reniers et al., 2011; Zaki and Ochsner, 2012; Dvash and Shamay-Tsoory, 2014; de Waal and Preston, 2017) converge on the fact that empathy encompasses at least two major interconnected domains: *cognitive empathy*, defined as the ability to infer the mental states (with or without affective content); *affective empathy*, conceptualized as the capacity of being sensitive to and vicariously experiencing the emotional states felt by others. Recent functional neuroimaging meta-analyses have provided further robust evidence for the existence of two brain networks that separately (although interactively) support cognitive or affective empathic processing (Kogler et al., 2020; Schurz et al., 2021).

The putative differential role of cognitive and affective processes on social behavior has been discussed since the early descriptions of psychopathy. Cleckley (1941, 1976) described the so-called emotion paradox, suggesting that highly psychopathic individuals were able to effectively understand emotional information despite their inability to use this information to guide their behavior. This dual-process route for processing social–emotional information has been largely confirmed by meta-analytical evidence indicating intact explicit cognitive processing of other's distress in psychopathy, despite the co-occurring impairment in affective responsivity at the automatic-visceral level (Hoppenbrouwers et al., 2016). Similarly, other authors have proposed that reduced affective empathy is a core feature observed across all psychopathy dimensions, although interpersonal traits might be associated with intact or even enhanced cognitive empathy (Gao and Raine, 2010; Gao et al., 2020).

The broad empathy impairment within the callous-affective traits of psychopathy has been meta-analytical confirmed (Northam and Dadds, 2020; Waller et al., 2020), but until recently there was no comprehensive evidence examining the interplay between all psychopathy dimensions and empathy domains. Burghart and Mier (2022) reported scale-specific analyses assessing how specific empathy subprocesses (e.g., empathic concern, perspective-taking, personal distress) interact with several psychopathy questionnaires, reporting a broad empathy impairment in primary and secondary psychopathy, contrasting with complex empathy profiles across triarchic-based questionnaires. Meta-analytical evidence from

Campos et al. (2022) indicated that classical 2-factors were negatively related to both empathy domains (effect sizes larger for primary psychopathy), while triarchic phenotypes presented three distinct empathy profiles. Meanness was associated with a clear and broad empathy impairment, while disinhibition displayed smaller effect sizes for both empathy domains. Contrastingly, boldness was unrelated to cognitive empathy, despite the negative association with the affective domain. These recent meta-analyses provided extremely important contributions, despite still having the limitation of not being able to evaluate how empathy domains interact with different psychopathy conceptualizations within the same sample. Moreover, available evidence still relies largely on the Interpersonal Reactivity Index (Burghart and Mier, 2022; Campos et al., 2022), an empathy questionnaire that has been somewhat questioned lately regarding its factor structure, construct validity of its specific subscales (e.g., Personal Distress), and its suitability to adequately operationalize cognitive and affective empathy (Chrysikou and Thompson, 2016; Murphy B. A. et al., 2020; Wang et al., 2020).

Altogether, existing conceptual and meta-analytical evidence suggests a broad empathy impairment within the affective dimension of psychopathy, while empathy does not seem to be reliably associated with behavioral traits (secondary psychopathy and disinhibition). Conversely, enhanced cognitive empathy within interpersonal traits (e.g., social dominance, manipulate behavior) may allow to compensate for affective empathy deficits within this dimension. Importantly, the triarchic model clearly dissociates interpersonal and affective traits (boldness and meanness phenotypes, respectively), while these dimensions are clustered together within primary psychopathy in the classical 2-factor model. Ultimately, there is still a demand for studies assessing how competing conceptualizations of psychopathy dimensions interact with empathy measures that effectively dissociate cognitive and affective empathy.

1.2. Interoception: The missing link between psychopathy and empathy?

Recent proposals addressing the underlying mechanisms of social cognition could also provide additional insights regarding the complex interplay between psychopathy and empathy. Interoception, broadly defined as the perception of internal bodily stimuli, may be a putative candidate to further explore this. The boundaries and conceptual frameworks for interoception measurement are still not universally accepted, but recently Murphy et al. (2019) proposed a 2 × 2 factorial framework that provides a solid and testable tool for measuring individual differences in interoception. Within this model, the first factor targets which construct is being measured, namely *interoceptive accuracy* (the ability to accurately perceive interoceptive signals) and *interoceptive attention* (the degree to which interoceptive signals are the object of attention). The second factor addresses how the previously described constructs are being measured, that is, self-reported beliefs vs. objective performance measures. Importantly, there has been recent evidence from several countries highlighting specific self-report questionnaires that can index beliefs regarding either interoceptive attention or accuracy (Murphy J. et al., 2020; Campos et al., 2021; Brand et al., 2022; Gabriele et al., 2022; Tünte et al., 2022).

The link between interoception and empathy has been driven by compelling meta-analytical results indicating the convergence of the neural correlates associated with interoception, emotion, and social information processing (Adolfi et al., 2017). Behavioral studies have been somewhat inconsistent, despite increasingly suggesting that interoceptive accuracy is associated with cognitive empathy (Handford et al., 2013; Ainley et al., 2014; Tajadura-Jiménez and Tsakiris, 2014; Grynberg and Pollatos, 2015; Shah et al., 2017; Shaw et al., 2020; Baiano et al., 2021). Contrastingly, evidence addressing the role of interoceptive attention within empathic processing is much scarcer and more limited (Morganti et al., 2020). Regardless, it is growingly accepted that interoception may be connected not only to self-related affective processing but also to our ability to perceive and share the emotional states of others (Ainley et al., 2016; Barrett, 2016; Ferreira-Santos, 2016; Seth and Friston, 2016; Fotopoulou and Tsakiris, 2017; Ondobaka et al., 2017; Marshall et al., 2018).

With this in mind, it is feasible to postulate that interoception variations within specific psychopathy dimensions may modulate the ability to perceive somatic sensations that signal emotional valence within social interactions (Hoppenbrouwers et al., 2016; Gao et al., 2019). Importantly, several neurobiological models have implicated key interoception-related brain regions within the core network underlying the emotional processing deficits associated with psychopathy (Fowles and Dindo, 2009; Patrick et al., 2012; Blair, 2013). So far, there have been only a handful of studies exploring the link between psychopathy and interoception (Nentjes et al., 2013; Zwets et al., 2014; Lyons and Hughes, 2015; Lamoureux and Glenn, 2021), and the existing evidence presents several limitations. First, most of these only provided findings regarding offenders, which is not ideal for fully capturing the dimensional nature of psychopathy. Secondly, none of the studies included the triarchic model, consequently neglecting the more adaptive expressions of psychopathy. Thirdly, none of the authors applied a formal theoretical framework to measure individual differences in interoception such as the previously described 2 × 2 factorial model.

1.3. The putative confounding role of alexithymia, age, and sex

When discussing the psychopathy-empathy-interoception tripartite interaction, it is important to consider the putative role of additional confounding variables. Within this scope, alexithymia emerges as an important subclinical construct that should be accounted for. Alexithymia can be broadly described as difficulties to identify, describe, and interpret one's own emotional experiences combined with externally-oriented thinking (Bagby et al., 1994a,b). Importantly, alexithymia has been systematically linked to the core constructs of the current work. A recent meta-analysis indicated that alexithymia is positively associated with total psychopathy scores as well as with the classical interpersonal-affective and impulsive-antisocial factors of psychopathy (Burghart and Mier, 2022). Pisani et al. (2021) conducted a comprehensive systematic review that suggests that alexithymia is related to an impaired ability to infer the emotional states of others. Finally, there is also meta-analytical evidence suggesting that self-reported interoceptive attention is positively associated with alexithymia, while the opposite pattern is observed when considering self-reported interoceptive accuracy

(Trevisan et al., 2019). The robust evidence highlighting the role of alexithymia within psychopathy, empathy, and interoception strongly suggests that this variable should be accounted for when examining the interaction between these three constructs.

Additionally, sex- and age-related effects should also be accounted for when considering the psychopathy, empathy, and interoception interplay. The enhanced prominence of psychopathy in males vs. females has been meta-analytically validated, even after controlling for other personality traits (Muris et al., 2017; Sanz-García et al., 2021). Sex-empathy interaction is far more intricate, as current evidence suggests that sex differences may (or may not) arise from a complex interaction between methodological (self-report vs. experimental tasks), biological, and environmental factors (Konrath et al., 2011; Christov-Moore et al., 2014; Warrier et al., 2018; Abramson et al., 2020; Rochat, 2022; Zhao et al., 2022). Recent meta-analytical evidence also indicated that male subjects display enhanced cardiac interoceptive accuracy, despite findings being consistent with other interoceptive modalities (Prentice and Murphy, 2022). Finally, there is also comprehensive evidence suggesting small (but significant) larger alexithymia scores in male subjects (Levant et al., 2009). Regarding the putative confounding role of age, several authors have reported a decrease in psychopathy traits across the life span, although interpersonal-affective traits remain more or less stable across time within offender samples (Harpur and Hare, 1994; Huchzermeier et al., 2008; Gill and Crino, 2012; Maurer et al., 2022). Similarly, there is also evidence indicating that empathy domains (cognitive vs. affective) seemingly display different development patterns across the lifespan (Sun et al., 2018; Beadle and de la Vega, 2019; Main and Kho, 2020). Ultimately, age-related decline in both self-perceived and objectively measured interoceptive abilities has also been suggested by several authors, despite findings seemingly being contingent on the selected assessment procedures (Khalsa et al., 2009; Murphy et al., 2018; Nusser et al., 2020; MacCormack et al., 2021). Altogether, these findings provide robust evidence for the need to account for sex and age within the context of the current work.

1.4. Study goals and hypothesis

Considering the previously described gaps in the field, the overarching goal of this study is to investigate the complex interplay between psychopathy, empathy, and interoception. More specifically, the current work aims to examine how psychopathy dimensions, as conceptualized by two major theoretical frameworks (triarchic model—boldness, meanness, and disinhibition vs. classical factors—primary and secondary psychopathy), are differentially associated with specific empathy domains (cognitive and affective) and interoception measures (self-reported interoceptive attention and accuracy). Furthermore, we will also investigate how cognitive and affective empathy are related to interoceptive attention and accuracy. Importantly, considering the previously described putative confounders, the current study will also examine whether the associations between psychopathy, empathy, and interoception are retained after controlling for sex, age, and alexithymia.

Below, we provide an overview of the preregistered hypotheses for the current study. According to the previously described conceptual and meta-analytical evidence, we postulated three distinct empathy profiles for the triarchic phenotypes of psychopathy. Meanness ought to be associated with a broad empathy impairment, in contrast with boldness and disinhibition which should display specific negative associations with affective and cognitive empathy, respectively. Importantly, cognitive empathy should be enhanced in the boldness phenotype, with disinhibition being positively associated with the affective domain. Contrastingly, the fine-grained empathy domain dissociation was not hypothesized for the classical 2-factors, as both cognitive and affective empathy should be impaired in primary and secondary psychopathy.

Differential associations were also postulated between empathy domains and interoception measures. As previously described, existing evidence suggests that interoceptive accuracy is positively related to cognitive empathy. Despite the scarce evidence regarding interoceptive attention, we argue for its positive association with affective empathy, as the enhanced allocation of attentional resources to interoceptive stimuli should also increase the proneness to detect the bodily signals triggered by the observing the emotional experiences of others, thus maximizing the likelihood of affective sharing.

The specific interaction between empathy domains and interoception measures consequently guided our hypotheses regarding the role of interoception across psychopathy dimensions. As interoceptive accuracy has been linked to enhanced cognitive empathy, it should also be positively related to boldness, while being negatively associated with meanness, disinhibition, and both classical psychopathy factors. Conversely, interoceptive attention (postulated to be linked to affective empathy) should thus be enhanced in disinhibition, while being impaired across boldness, meanness, primary and secondary psychopathy.

Although univariate analyses and formal correlation comparisons will be first conducted to examine the previously described hypotheses, further analyses accounting for putative confounders will also be implemented. Firstly, partial correlations will be used to control for alexithymia, as we postulated that this construct should be negatively associated with cognitive empathy and interoceptive accuracy while being positively related with interoceptive attention and several psychopathy dimensions (meanness, disinhibition, primary and secondary psychopathy). Secondly, as several sex differences (females with enhanced empathy and interoceptive attention; males with higher interoceptive accuracy, alexithymia. and psychopathy traits—except for disinhibition) and age-related effects (negative association with cognitive empathy, interoception measures, primary and secondary psychopathy) were expected, multivariate models were implemented to account for these variables, as well as for alexithymia and the covariance between the predictors. We postulated that the previously described associations between psychopathy dimensions, empathy domains, and interoception measures should be retained after controlling for sex, age, and alexithymia. Lastly, as this was the first study to formally examine how specific measures targeting self-reported interoceptive attention and accuracy interact with psychopathy and empathy, exploratory mediation analyses (contingent on results from confirmatory testing) were also conducted to check for possible mediation effects between the previously described constructs.

2. Method

The current study was preregistered and full methodological details can be found at https://osf.io/5jhcw. Datasets and full outputs from the analyses are available at https://osf.io/zyf4e/.

2.1. Participants

A community sample of 515 subjects aged between 18 and 72 ($M_{age} = 30.74$; $SD = 10.52$; 59.61% female) was recruited (without any compensation for participation) using a non-list based, non-probability sample (social media advertising and personal contacts for snowball sampling) to maximize the sociodemographic heterogeneity of participants (Callegaro et al., 2015). Within this approach, sample recruitment is spread as broadly as possible, using several recruitment channels to target different communities. Summary statistics for sociodemographic data were accessed periodically to screen whether recruited participants were heterogeneous regarding several variables (e.g., sex, age, educational level). This allowed for subsequent advertising strategies to target specific communities of participants (e.g., in-person contacts to reach older subjects who are less represented on social media). Table 1 presents the characteristics of the participants included in the current study.

TABLE 1 Sample characteristics (including descriptive statistics of questionnaires scores).

	M (SD)	Min–Max
Age	30.74 (10.52)	18–72
Education (years)	15.03 (2.99)	1–25
TriPM Boldness	28.18 (8.13)	2–49
TriPM Meanness	9.47 (6.6)	0–35
TriPM Disinhibition	15.25 (7.01)	1–40
TriPM Total	52.9 (14.68)	15–105
LSRP Primary	27.02 (5.92)	16–46
LSRP Secondary	20.74 (4.43)	11–36
LSRP Total	47.76 (8.33)	30–77
QCAE Cognitive	58.98 (7.37)	35–76
QCAE Affective	33.1 (5.11)	17–44
QCAE Total	92.08 (10.09)	64–120
BPQ Body Awareness	78.02 (22.38)	33–130
IAS	85.01 (10.92)	55–105
TAS	50.2 (11.22)	25–82
	***n* (%)**	
Sex		
Females	307 (59.6%)	
Males	208 (40.4%)	
Education (categorical)*		
Elementary School	2 (0.4%)	
Middle School	21 (4.1%)	
High School	129 (25.0%)	
Undergraduate Degree	243 (47.2%)	
Master's Degree	116 (22.5%)	
Doctoral Degree	4 (0.8%)	
Psychiatric history	89 (17.3%)	
Neurological history	12 (2.3%)	
Non-native speakers	6 (1.2%)	

*158 subjects (30.7%) were college students at the time of survey completion.

2.2. Instruments

2.2.1. Triarchic Psychopathy Measure

The Triarchic psychopathy measure Triarchic Psychopathy Measure (TriPM) was developed to assess psychopathy dimensions according to the triarchic model (Patrick, 2010), including 19 items for *boldness*, 19 for *meanness*, and 20 for *disinhibition*. Each item is scored on a 4-point Likert scale (True, Somewhat True, Somewhat False, False) with larger scores indexing higher psychopathy traits. This scale was adapted and psychometrically tested for Portuguese (Vieira et al., 2014; Paiva et al., 2020). In the current sample, each phenotype subscale displayed good internal consistency (boldness $\omega_{categorical} = 0.852$; meanness $\omega_{categorical} = 0.879$; disinhibition $\omega_{categorical} = 0.829$), with an excellent value observed for the total score ($\omega_{categorical} = 0.922$).

2.2.2. Levenson Self-Report Psychopathy Scale

Developed by Levenson et al. (1995) and adapted to Portuguese by Barbosa et al. (2014), the Levenson Self-Report Psychopathy Scale (LSRP) was developed to assess the 2-classical factors of psychopathy in non-forensic samples (16 items for *primary psychopathy*; 10 items for *secondary psychopathy*). Each item is rated on a 4-point Likert scale ranging from strongly disagree (1) to strongly agree (4), with larger scores representing higher psychopathy traits. Primary ($\omega_{categorical} = 0.821$) and total psychopathy ($\omega_{categorical} = 0.839$) presented good reliability, while secondary psychopathy scores were somewhat questionable within our sample ($\omega_{categorical} = 0.692$).

2.2.3. Questionnaire of Cognitive and Affective Empathy

Self-report measure that considers the multidimensional nature of empathy, namely the cognitive and affective empathy domains (Reniers et al., 2011). The Questionnaire of Cognitive and Affective Empathy (QCAE) was selected as it provides the most suitable alternative to index cognitive and affective empathy accordingly to more contemporary frameworks. From a conceptual standpoint, the QCAE was developed to clearly dissociate the ability to infer the emotional states of others (cognitive empathy) vs. being sensitive to or vicariously experiencing those feelings (affective empathy). Moreover, neuroimaging evidence suggests that QCAE scores are differentially associated with the core brain networks typically associated with cognitive and affective empathy (Eres et al., 2015). The European Portuguese version of the QCAE (Queirós et al., 2018) includes 30 items answered on a 4-point Likert scale (strongly agree, slightly agree, slightly disagree, and strongly disagree), with higher scores indicating greater empathy. The questionnaire includes 19 items for *cognitive empathy*, which can be further subdivided into *perspective-taking* (10 items) and *online simulation* (9 items), and 11 items for *affective empathy*, which encompasses the *emotion contagion*

(4 items), *proximal responsivity* (4 items), and *peripheral responsivity* (3 items) subscales. In our sample, the internal consistency was excellent for cognitive ($\omega_{categorical} = 0.956$), affective ($\omega_{categorical} = 0.908$), and total empathy scores ($\omega_{categorical} = 0.991$). Concerning the 5 subscales, both perspective-taking ($\omega_{categorical} = 0.874$) and online simulation ($\omega_{categorical} = 0.850$) presented good internal consistency, with adequate values observed for emotion contagion ($\omega_{categorical} = 0.734$) and peripheral responsivity ($\omega_{categorical} = 0.791$), while proximal responsivity was questionable ($\omega_{categorical} = 0.658$). Regardless, only cognitive and affective empathy scores were used for confirmatory analyses in the current work (see Supplementary material 1 for zero-order correlations pertaining to 5-factor subscales).

2.2.4. Body Perception Questionnaire - Body Awareness

Developed by Cabrera et al. (2018), this questionnaire includes 26 items that can be used to measure interoceptive attention, as suggested by Murphy et al. (2019), with higher scores indicating that subjects consider that interoceptive inputs are often the target of their attention. The Body Perception Questionnaire (BPQ) includes a second domain (BPQ Autonomic Reactivity) that was not used for the purpose of the current study (see Supplementary material 1 for exploratory analyses). It is also important to highlight that, although Cabrera et al. (2018) used the binary scoring system (0 or 1 for each item) for the psychometric analysis of the BPQ, scoring for the current study was completed using the full-item responses (5-point Likert scale ranging from Never to Always), which was originally recommended to allow larger sensitivity for individual differences (Porges et al., 1993/2015). The data collected here was also used to validate the Portuguese version of the BPQ which also provided further evidence for using full-item response instead of binary scoring (Campos et al., 2021). Within the current sample, BPQ Body Awareness and BPP Autonomic Reactivity both displayed excellent internal consistency ($\omega_{categorical} = 0.978$ and 0.944, respectively).

2.2.5. Interoceptive Accuracy Scale

This scale includes 21 items (5-point Likert scale, ranging from strongly agree to strongly disagree) to assess self-reported interoceptive accuracy, with higher scores implying enhanced accuracy in perceiving interoceptive signals (Murphy J. et al., 2020). The Interoceptive Accuracy Scale (IAS) was also validated in European Portuguese using data stemming from the current study (Campos et al., 2021), displaying excellent internal consistency ($\omega_{categorical} = 0.970$).

2.2.6. Toronto Alexithymia Scale

Self-report scale assessing alexithymia, comprising 20 items rated on a 5-point Likert scale ranging from strongly agree (5) to strongly disagree (1). Within the current work, only the total alexithymia score was used for confirmatory analyses (higher scores indicate greater alexithymia traits), despite this scale encompassing three subscales, namely difficulty *identifying feelings* (7 items), *difficulty describing feelings* (5 items), and *externally-oriented thinking* (8 items). This questionnaire was originally developed by Bagby et al. (1994a,b) and adapted to Portuguese by Prazeres et al. (2000). In the current study, Toronto Alexithymia Scale (TAS) total score displayed good internal consistency ($\omega_{categorical} = 0.847$). Within the three subscales, only identifying feelings and difficulty describing feelings presented at least acceptable consistency ($\omega_{categorical} = 0.847$ and 0.797, respectively), while externally-oriented thinking displayed a blatantly unacceptable score ($\omega_{categorical} = 0.493$). Within the scope of our hypothesis-driven analyses, only total alexithymia scores were used, although exploratory correlational analyses with subscale scores are reported in Supplementary material 1.

2.3. Procedures

This study was approved by the institutional Ethics Committee and Data Protection Officer. The data was collected online through LimeSurvey v3.22.18 + 200,603. Participants read an online briefing about the study and completed an electronic consent form before starting the survey. Instruments were presented in a randomized order (after the consent form and sociodemographic questions) to prevent order effects.

2.4. Statistical analysis

The previously reported categorical omega coefficients ($\omega_{categorical}$), more suitable for ordered-categorical items (Kelley and Pornprasertmanit, 2016), were computed as measures of internal consistency for questionnaire scores. Internal consistency was classified as suggested by Kline (2016): < 0.50 unacceptable; ≥ 0.50 and < 0.60 poor; ≥ 0.60 and < 0.70 questionable; ≥ 0.70 and < 0.80 adequate/acceptable; ≥ 0.80 and < 0.90 good; ≥ 0.90 excellent. Regarding assumption testing, the normality assumption was formally defined using threshold criteria for skewness and kurtosis—less than $|2.0|$ and $|9.0|$, respectively (Gignac, 2019). Homogeneity of variance was tested using Levene's F test (parametric or non-parametric version, contingent on data distribution—Nordstokke and Zumbo, 2010; Nordstokke et al., 2011). For regression models, the following assumptions were examined, as recommended by Gignac (2019): linearity (visualization of residual plots), normally distributed residuals (previously described skewness and kurtosis criteria), influential cases (Cook's distance > 1), homoscedasticity (Koenker test; Daryanto, 2020), collinearity ($r > 0.95$ considered problematic), and multicollinearity (variance inflation factor > 10).

Confirmatory statistical testing included independent samples *t*-tests (Welch tests for heterogeneity of variances), zero-order and partial correlations, and hierarchical linear regression models. Independent-samples t-tests (or Welch tests) were used for sex comparison, with effect sizes computed using Hedges' g (Glass' Δ for Welch test) and classified as suggested by Cohen (1988): small = $|0.20|$, medium = $|0.50|$ and large = $|0.80|$. Zero-order correlation coefficients were utilized to examine the associations between psychopathy, empathy, interoception, alexithymia, and age. Hypothesized differences between the correlations were formally tested using Steiger's Z-test for dependent correlations (Steiger, 1980) *via* the quantpsy web implementation (Lee and Preacher, 2013). Partial correlations were used to check whether the associations between psychopathy, empathy, and interoception were retained after controlling for alexithymia. Correlation coefficients were classified as small, $r \geq |0.10|$, medium, $r \geq |0.20|$, and large, $r \geq |0.30|$, as suggested by Gignac and Szodorai (2016).

Hierarchical linear regression models (10 models) were used to test several hypotheses regarding the interplay between psychopathy, empathy, and interoception. Importantly, the putative confounding role of sociodemographics (sex and age) and alexithymia was accounted for by always including these variables in the first and second block of each model, respectively. Firstly, specific models were implemented to examine the association of psychopathy dimensions (triarchic phenotypes or classical factors—included in the last block of each model) with either cognitive empathy (Models 1 and 2) or affective empathy (Models 3 and 4). Within these models, psychopathy dimensions were included as predictors to account for the covariance between triarchic phenotypes (Models 1 and 3) or between primary and secondary psychopathy (Models 2 and 4). Secondly, Models 5 and 6 were employed to specifically evaluate how interoception measures (interoceptive attention and accuracy—inserted in the final block of each model) predicted either cognitive or affective empathy, respectively. The last set of models examined how psychopathy traits (triarchic phenotypes or classical factors—included in the last block of each model to account for their covariance) predict either interoceptive attention (Models 7 and 8) or interoceptive accuracy (Models 9 and 10). Across these models, wild bootstrapping was used to estimate p-values if the assumption of homoscedasticity was not met.

In addition to confirmatory testing, exploratory analyses were implemented using path models to examine the interplay between all variables of interest. The specific direct and indirect effects were proposed by combining the preregistered hypotheses with existing theoretical knowledge and the results stemming from confirmatory analyses (detailed rationale in the Results section). Path models were estimated using maximum likelihood estimation and bootstrapping with 5,000 resamples. Effects were thus computed with 99% bias-corrected confidence intervals (significance threshold 0.01). Univariate normality was assessed using the previously described skewness and kurtosis threshold, while multivariate normality was evaluated using multivariate kurtosis (values > 5 indicative of departure from normality). The following indicators were used to describe the absolute model fit: Chi-squared goodness-of-fit statistic (significance); Comparative Fit Index (CFI; ≥ 0.90 acceptable fit; ≥ 0.95 good fit); Tucker Lewis Index (TLI; ≥ 0.90 acceptable fit; ≥ 0.95 good fit); Root Mean Square Error of Approximation (RMSEA; ≤ 0.08 acceptable fit; ≤ 0.06 with 90% CIs ≤ 0.10 good fit). Relative model fit (model comparison) was assessed using the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC)—lower values indicating better fit. Further exploratory endeavors included correlation analyses using the QCAE and TAS subscale scores as well as the BPQ Autonomic Reactivity—see Supplementary material 1.

Statistical analyses were implemented using SPSS Statistics and AMOS v28 with alpha set at 0.01. Categorical omega coefficients and the confidence intervals for partial correlations were computed using R packages (*MBESS* and *bigstatsr*, respectively). All the previously described statistical procedures were replicated (control analyses) excluding: careless respondents ($n = 8$), identified using a response time cut-off criterion (less than 3 s per item on at least two of the completed questionnaires) to exclude unrealistically fast respondents that produce poor data quality (Huang et al., 2012; Maniaci and Rogge, 2014; Niessen et al., 2016); univariate outliers ($n = 1$), screened using the 3 interquartile range criteria due to the large sample size; multivariate outliers ($n = 1$), detected using Mahalanobis distance and only observed in the path models; possible confounders (non-native speakers, psychiatric and/or neurologic disorders; $n = 99$), which were mainly due to subjects with self-reported psychiatric disorders ($n = 89$).

3. Results

3.1. Sex comparison and correlational analyses

Full univariate results can be found in Tables 2, 3. Additionally, formal comparisons between correlations and partial correlations can be found in Tables 4, 5, respectively. Regarding sex comparison, male subjects displayed larger psychopathy traits on all total and subscale scores (all $p < 0.001$, $g = [0.394, 0.748]$, $\Delta = [0.328, 0.943]$),[1] except on LSRP Secondary, $t = -0.043$, $p = 0.966$, $g = 0.004$. Female participants displayed higher scores on QCAE Affective, $t = 7.216$, $p < 0.001$, $g = 0.647$, QCAE Total, $t = 4.893$, $p < 0.001$, $g = 0.439$, and BPQ Body Awareness, $t = 3.173$, $p = 0.002$, $g = 0.285$. Considering age-related effects, negative correlations were found with LSRP Primary and total scores, QCAE Affective, and BPQ Body Awareness, although effect sizes were small (all $p \leq 0.008$, $r = [-0.157, -0.117]$). Hence, although the previously described sex- and age-related hypotheses were only partially supported, evidence from univariate analyses indicates that these sociodemographic variables are associated with psychopathy, empathy, and/or interoception, as should thus be accounted for in multivariate models.

The triarchic phenotypes covaried as expected, with meanness and disinhibition largely correlated, $r = 0.519$, $p < 0.001$, while boldness displayed opposite associations with meanness, $r = 0.234$, $p < 0.001$, and, disinhibition, $r = -0.142$, $p < 0.001$. Primary and secondary psychopathy were positively correlated, $r = 0.284$, $p < 0.001$, as well as cognitive and affective empathy, $r = 0.284$, $p < 0.001$. Cognitive empathy, interoceptive accuracy, and all psychopathy subscales were associated with alexithymia scores (all $p \leq 0.001$, $r = [-0.414, 0.458]$), reinforcing the need to control for this construct in the regression models. Here it is important to highlight that alexithymia was positively related to all psychopathy dimensions (all $p \leq 0.001$, $r = [0.140, 0.458]$), except for the strong negative correlation with boldness, $r = -0.414$, $p < 0.001$.

Correlational analyses also indicated different empathy profiles across psychopathy dimensions. Within the triarchic model, meanness was associated with reduced cognitive, $r = -0.376$, $p < 0.001$, and affective empathy, $r = -0.419$, $p < 0.001$. Boldness displayed a small positive correlation with cognitive empathy, $r = 0.190$, $p < 0.001$, while presenting a medium negative association with affective empathy, $r = -0.269$, $p < 0.001$. Conversely, disinhibition was only negatively associated with cognitive empathy, $r = -0.314$, $p < 0.001$, while being unassociated with the affective domain, $r = 0.010$, $p = 0.822$. In the classical 2-factor model, cognitive empathy was negatively related with both primary, $r = -0.234$, $p < 0.001$, and secondary psychopathy, $r = -0.283$, $p < 0.001$, while affective empathy was only diminished within primary psychopathy

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[1] TriPM meanness, disinhibition, and total scores displayed heterogeneity of variances.

TABLE 2 Sex comparison—independent samples *t*-tests (Welch's tests for heterogeneity of variances).

	Age	TriPM Boldness	TriPM Meanness	TriPM Disinhibition	TriPM Total	LSRP Primary	LSRP Secondary	LSRP Total
Female ($n = 307$) *Mean (SD)*	29.00 (9.98)	25.87 (7.68)	7.40 (5.32)	14.22 (6.25)	47.50 (12.36)	25.72 (5.57)	20.73 (4.47)	46.46 (8.12)
Male ($n = 208$) *Mean (SD)*	33.30 (10.79)	31.59 (7.56)	12.53 (7.12)	16.77 (7.77)	60.89 (14.21)	28.94 (5.91)	20.75 (4.39)	49.69 (8.29)
Mean Diff. *99% CIs*	−4.30 [−6.69, −1.90]	−5.72 [−7.49, −3.95]	−5.13 [−6.55, −3.71]	−2.55 [−4.15, −0.95]	−13.39 [−16.45, −10.34]	−3.21 [−4.54, −1.89]	−0.02 [−1.05, 1.01]	−3.23 [−5.13, −1.33]
t	−4.640	−8.344	−8.852	−3.945	−11.054	−6.273	−0.043	−4.394
p	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.966	< 0.001
Hedges *g* **Glass' Δ*	0.416	0.748	0.721*	0.328*	0.943*	0.562	0.004	0.394

	QCAE Cognitive	QCAE Affective	QCAE Total	BPQ Body Awareness	IAS	TAS
Female ($n = 307$) *Mean (SD)*	59.46 (7.11)	34.37 (4.74)	93.83 (9.61)	80.57 (21.36)	84.49 (11.25)	50.62 (11.35)
Male ($n = 208$) *Mean (SD)*	58.27 (7.70)	31.22 (5.05)	89.49 (10.25)	74.25 (23.35)	85.77 (10.39)	49.6 (11.01)
Mean Diff. *99% CIs*	1.18 [−0.53, 2.89]	3.16 [2.03, 4.29]	4.34 [2.05, 6.63]	6.32 [1.17, 11.47]	−1.29 [−3.82, 1.25]	1.02 [−1.58, 3.62]
t	1.790	7.216	4.893	3.173	−1.312	1.012
p	0.074	< 0.001	< 0.001	0.002	0.190	0.312
Hedges *g* **Glass' Δ*	0.160	0.647	0.439	0.285	0.118	0.091

traits, $r = -0.279$, $p < 0.001$. After controlling for alexithymia, all the significant psychopathy-empathy associations were retained ($p < 0.001$ for all), except for the relation between boldness and cognitive empathy, $r_{\text{partial}} = 0.067$, $p = 0.128$. Importantly, Steiger's Z-tests for dependent correlations further reinforced the postulated distinct empathy profiles across psychopathy dimensions (see Table 4). The correlation of cognitive empathy with boldness was significantly different from the correlations of this empathy domain with the remaining triarchic phenotypes (meanness and disinhibition) as well as with primary and secondary psychopathy ($p < 0.001$ for all). Moreover, the disinhibition-affective empathy correlation was significantly divergent from the association of affective empathy with boldness, meanness, and primary psychopathy ($p < 0.001$ for all). Within classical factors, cognitive empathy was similarly correlated (as postulated) with both primary and secondary psychopathy, $Z = 0.892$, $p = 0.372$, despite the unexpected difference within the affective empathy domain, $Z = -7.306$, $p < 0.001$.

Regarding interoception measures, the dissociation between the IAS and BPQ has been reported elsewhere (Campos et al., 2021), but it is important to highlight the unexpected positive association between these measures, $r = 0.204$, $p < 0.001$. However, the IAS and BPQ were differentially associated with alexithymia, with a negative correlation for the IAS, $r = -0.291$, $p < 0.001$, while the BPQ did not display a significant correlation, $r = -0.030$, $p = 0.500$, suggesting that these instruments are indeed measuring different interoception-related constructs. Interoception measures were also differentially associated with empathy domains. A strong positive association was observed between cognitive empathy and interoceptive accuracy, $r = 0.335$, $p < 0.001$, even after controlling for alexithymia, $r_{\text{partial}} = 0.267$, $p < 0.001$. Contrastingly, interoceptive attention was not significantly associated with either cognitive, $r = 0.081$, $p = 0.068$, or affective empathy, $r = 0.103$, $p = 0.019$. Steiger's Z-tests further reinforced these results, as the correlation of the IAS with cognitive empathy was significantly different from the correlation of this interoception measure with the affective empathy domain $Z = 6.608$, $p < 0.001$, and from the correlation of interoception attention with cognitive empathy, $Z = 4.754$, < 0.001. Finally, there were no significant associations between BPQ Body Awareness and any of the psychopathy scores ($p > 0.01$ for all), although several small correlations were found for the IAS, as boldness was positively associated with interoceptive accuracy, $r = 0.133$, $p = 0.002$, while meanness, disinhibition, and secondary psychopathy were negatively correlated with this construct, $p < 0.008$ for all, $r = [-0.149, -0.117]$. However, neither of these correlations remained significant after controlling for alexithymia, $p > 0.031$ for all, $r_{\text{partial}} = [-0.095, 0.019]$.

Overall, the results from correlational analyses largely confirmed was hypothesis regarding the specific empathy profiles across psychopathy dimensions as conceptualized by the triarchic and classical 2-factor models. Similarly, interoception measures were also differentially associated with empathy domains as well as with alexithymia. Opposingly, interoceptive attention and accuracy do not seem to play a major role within psychopathy traits, particularly after controlling for alexithymia. Regardless, univariate results also indicated that multivariate models (controlling for sex, age, and alexithymia) should be implemented when evaluating the interplay between psychopathy, empathy, and interoception.

TABLE 3 Zero-order correlations.

	Age (years)	TriPM Boldness	TriPM Meanness	TriPM Disinhibition	TriPM Total	LSRP Primary	LSRP Secondary	LSRP Total	QCAE Cognitive	QCAE Affective	QCAE Total	BPQ Body Awareness	IAS	TAS
Age (years)	1	0.089 [−0.025, 0.200]	−0.037 [−0.150, 0.077]	0.010 [−0.103, 0.123]	0.038 [−0.076, 0.150]	−0.125 [−0.235, −0.012]	−0.053 [−0.165, 0.061]	−0.117 [−0.227, −0.003]	−0.005 [−0.118, 0.108]	−0.117 [−0.228, −0.004]	−0.063 [−0.175, 0.051]	−0.157 [−0.266, −0.045]	0.081 [−0.033, 0.192]	−0.097 [−0.208, 0.017]
TriPM Boldness	0.043	1	0.234 [0.124, 0.338]	−0.142 [−0.252, −0.029]	0.591 [0.511, 0.660]	0.204 [0.093, 0.310]	−0.250 [−0.353, −0.141]	0.012 [−0.101, 0.125]	0.190 [0.079, 0.297]	−0.269 [−0.371, −0.161]	0.003 [−0.111, 0.116]	−0.070 [−0.182, 0.044]	0.133 [0.020, 0.243]	−0.414 [−0.504, −0.316]
TriPM Meanness	0.404	<0.001	1	0.519 [0.431, 0.597]	0.827 [0.787, 0.859]	0.628 [0.554, 0.692]	0.374 [0.273, 0.468]	0.645 [0.573, 0.706]	−0.376 [−0.469, −0.274]	−0.419 [−0.508, −0.321]	−0.486 [−0.568, −0.395]	−0.107 [−0.217, 0.007]	−0.142 [−0.252, −0.029]	0.181 [0.069, 0.289]
TriPM Disinhibition	0.817	0.001	<0.001	1	0.632 [0.558, 0.695]	0.354 [0.251, 0.450]	0.605 [0.527, 0.672]	0.573 [0.491, 0.644]	−0.314 [−0.412, −0.208]	0.010 [−0.104, 0.123]	−0.224 [−0.329, −0.114]	−0.022 [−0.135, 0.091]	−0.149 [−0.258, −0.037]	0.328 [0.223, 0.426]
TriPM Total	0.394	<0.001	<0.001	<0.001	1	0.564 [0.482, 0.637]	0.319 [0.213, 0.417]	0.570 [0.488, 0.642]	−0.213 [−0.319, −0.103]	−0.333 [−0.430, −0.228]	−0.324 [−0.422, −0.219]	−0.097 [−0.208, 0.016]	−0.061 [−0.174, 0.052]	0.009 [−0.105, 0.122]
LSRP Primary	0.005	<0.001	<0.001	<0.001	<0.001	1	0.284 [0.176, 0.385]	0.860 [0.828, 0.887]	−0.234 [−0.338, −0.124]	−0.283 [−0.384, −0.175]	−0.314 [−0.413, −0.208]	−0.066 [−0.178, 0.048]	−0.066 [−0.178, 0.048]	0.140 [0.028, 0.250]
LSRP Secondary	0.229	<0.001	<0.001	<0.001	<0.001	<0.001	1	0.733 [0.675, 0.781]	−0.279 [−0.381, −0.171]	0.092 [−0.021, 0.204]	−0.157 [−0.266, −0.045]	0.036 [−0.078, 0.149]	−0.117 [−0.227, −0.004]	0.458 [0.363, 0.543]
LSRP Total	0.008	0.784	<0.001	<0.001	<0.001	<0.001	<0.001	1	−0.315 [−0.413, −0.209]	−0.152 [−0.261, −0.039]	−0.307 [−0.406, −0.200]	−0.028 [−0.141, 0.086]	−0.109 [−0.219, 0.005]	0.343 [0.239, 0.439]
QCAE Cognitive	0.906	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1	0.284 [0.177, 0.385]	0.874 [0.845, 0.899]	0.081 [−0.033, 0.192]	0.335 [0.230, 0.432]	−0.319 [−0.417, −0.213]
QCAE Affective	0.008	<0.001	<0.001	0.822	<0.001	<0.001	0.036	<0.001	<0.001	1	0.714 [0.653, 0.765]	0.103 [−0.010, 0.214]	−0.001 [−0.115, 0.112]	0.089 [−0.025, 0.200]
QCAE Total	0.153	0.950	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1	0.111 [−0.002, 0.222]	0.244 [0.134, 0.348]	−0.188 [−0.295, −0.076]
BPQ Body Awareness	<0.001	0.113	0.016	0.612	0.027	0.134	0.415	0.530	0.068	0.019	0.012	1	0.204 [0.093, 0.310]	−0.030 [−0.143, 0.084]
IAS	0.067	0.002	0.001	<0.001	0.164	0.135	0.008	0.013	<0.001	0.976	<0.001	<0.001	1	−0.291 [−0.391, −0.184]
TAS	0.028	<0.001	<0.001	<0.001	0.844	0.001	<0.001	<0.001	<0.001	0.043	<0.001	0.500	<0.001	1

Above the diagonal: correlation coefficients and corresponding 99% confidence intervals; bellow the diagonal: *p*-values.

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TABLE 4 Correlation comparison (Steiger's Z-test for dependent correlations).

	Z	*p*-value
TriPM Boldness and *QCAE Cognitive* vs. *TriPM Meanness* and *QCAE Cognitive*	10.974	<0.001
TriPM Boldness and *QCAE Cognitive* vs. *TriPM Disinhibition* and *QCAE Cognitive*	7.848	<0.001
TriPM Disinhibition and *QCAE Affective* vs. *TriPM Meanness* and *QCAE Affective*	10.546	<0.001
TriPM Disinhibition and *QCAE Affective* vs. *TriPM Boldness* and *QCAE Affective*	4.281	<0.001
LSRP Primary and *QCAE Cognitive* vs. *LSRP Secondary* and *QCAE Cognitive*	0.892	0.372
LSRP Primary and *QCAE Affective* vs. *LSRP Secondary* and *QCAE Affective*	−7.306	< 0.001
TriPM Bldness and *QCAE Cognitive* vs. *LSRP Primary* and *QCAE Cognitive*	7.827	<0.001
TriPM Boldness and *QCAE Cognitive* vs. *LSRP Secondary* and *QCAE Cognitive*	6.925	<0.001
TriPM Disinhibition and *QCAE Affective* vs. *LSRP Primary* and *QCAE Affective*	5.996	<0.001
TriPM Disinhibition and *QCAE AFFECTIVE* vs. *LSRP Secondary* and *QCAE Affective*	−2.093	0.036
TriPM Boldness and *IAS* vs. *TriPM Meanness* and *IAS*	5.089	<0.001
TriPM Boldness and *IAS* vs. *TriPM Disinhibition* and *IAS*	4.269	<0.001
TriPM Disinhibition and *BPQ* vs. *TriPM Meanness* and *BPQ*	1.969	0.049
TriPM Disinhibition and *BPQ* vs. *TriPM Boldness* and *BPQ*	0.720	0.471
LSRP Primary and *IAS* vs. *LSRP Secondary* and *IAS*	0.970	0.332
LSRP Primary and *BPQ* vs. *LSRP Secondary* and *BPQ*	−1.932	0.053
TriPM Boldness and *IAS* vs. *LSRP Primary* and *IAS*	3.594	<0.001
TriPM Boldness and *IAS* vs. *LSRP Secondary* and *IAS*	3.607	<0.001
TriPM Disinhibition and *BPQ* vs. *LSRP Primary* and *BPQ*	0.877	0.380
TriPM Disinhibition and *BPQ* vs. *LSRP Secondary* and *BPQ*	−1.478	0.140
BPQ and QCAE Affective vs. *BPQ* and *QCAE Cognitive*	0.418	0.676
BPQ and QCAE Affective vs. *IAS* and *QCAE Affective*	1.872	0.061
IAS and QCAE Cognitive vs. *IAS* and *QCAE Affective*	6.608	<0.001
IAS and QCAE Cognitive vs. *BPQ* and *QCAE Cognitive*	4.754	<0.001

3.2. Hierarchical linear regression models

3.2.1. Psychopathy dimensions and empathy domains

Table 6 includes detailed statistical findings regarding regression models (Models 1–4) examining whether psychopathy dimensions (triarchic phenotypes or classical factors—included in block 3) are differentially associated with either cognitive or affective empathy after controlling for sociodemographics (block 1) and alexithymia (block 2). For Model 1 (triarchic phenotypes and cognitive empathy), sociodemographics were not associated with QCAE Cognitive, $R^2 = 0.006$, $F_{(2,\ 512)} = 1.629$, $p = 0.197$, while adding alexithymia subsequently produced significant changes, $\Delta R^2 = 0.104$, $F_{(1,\ 511)} = 60.019$, $p < 0.001$, being negatively associated with cognitive empathy, $\beta = -0.325$, $p < 0.001$. Triarchic phenotypes also contributed significantly to predicting cognitive empathy, $\Delta R^2 = 0.134$, $F_{(3,\ 508)} = 30.075$, $p < 0.001$. Alexithymia was still a significant predictor after this final block, $\beta = -0.155$, $p < 0.001$, but boldness and meanness emerged as additional significant predictors, despite displaying opposite associations with cognitive empathy ($\beta = 0.215$, $p < 0.001$ and $\beta = -0.384$, $p < 0.001$, respectively). Replacing triarchic phenotypes for classical factors (Model 2) also significantly contributed to predicting cognitive empathy, $\Delta R^2 = 0.043$, $F_{(2,\ 509)} = 12.938$, $p < 0.001$, as both primary and secondary psychopathy were negatively associated with this empathy domain ($\beta = -0.160$, $p < 0.001$ and $\beta = -0.124$, $p = 0.009$, respectively), despite alexithymia remaining a significant predictor as well, $\beta = -0.246$, $p < 0.001$.

Model 3 (triarchic phenotypes and affective empathy) revealed a significant contribution of sociodemographics, $R^2 = 0.095$, $F_{(2,\ 512)} = 27.010$, $p < 0.001$, driven by enhanced affective empathy in female subjects, $\beta = -0.292$, $p < 0.001$, while alexithymia was not a significant predictor, $\Delta R^2 = 0.005$, $F_{(1,\ 511)} = 2.837$, $p = 0.093$. Triarchic phenotypes explained an additional 18.6% of the variance, $\Delta R^2 = 0.186$, $F_{(3,\ 508)} = 44.007$, $p < 0.001$, with meanness being negatively related to affective empathy, $\beta = -0.529$, $p < 0.001$, while disinhibition displayed a positive association, $\beta = 0.281$, $p < 0.001$. After the last block, sex was still associated with affective empathy, $\beta = -0.118$, $p = 0.007$, while age emerged as a negative predictor, $\beta = -0.107$, $p = 0.006$. Inputting LSRP scores on the last block (Model 4) also produced significant changes in the model, $\Delta R^2 = 0.073$, $F_{(2,\ 509)} = 22.407$, $p < 0.001$, driven by a similar pattern of results where primary and secondary psychopathy displayed opposite associations with affective empathy ($\beta = -0.289$, $p < 0.001$ and $\beta = 0.150$, $p = 0.001$, respectively). In this model, sex was still associated with this empathy domain, $\beta = -0.205$, $p < 0.001$, in contrast with age, $\beta = -0.100$, $p = 0.017$.

Altogether, results from the previously described models largely validate our predefined hypotheses regarding the interplay between psychopathy dimensions and empathy domains. Within the triarchic

TABLE 5 Partial correlations (controlling for alexithymia).

		TriPM Boldness	TriPM Meanness	TriPM Disinhibition	LSRP Primary	LSRP Secondary	QCAE Cognitive	QCAE Affective
QCAE Cognitive	r_p and 99% *CIs*	0.067 [−0.047, 0.179]	−0.341 [−0.438, −0.237]	−0.234 [−0.338, −0.123]	−0.202 [−0.308, −0.090]	−0.158 [−0.267, −0.046]	-	-
	p-value	0.128	<0.001	<0.001	<0.001	<0.001	-	-
QCAE Affective	r_p and 99% *CIs*	−0.256 [−0.359, −0.147]	−0.444 [−0.531, −0.348]	−0.020 [−0.134, 0.093]	−0.299 [−0.399, −0.193]	0.058 [−0.056, 0.171]	-	-
	p-value	<0.001	<0.001	0.643	<0.001	0.187	-	-
BPQ Body Awareness	r_p and 99% *CIs*	−0.090 [−202, 0.023]	−0.103 [−0.214, 0.011]	−0.013 [−0.127, 0.100]	−0.063 [−0.175, 0.051]	0.056 [−0.058, 0.168]	0.075 [−0.039, 0.187]	0.106 [−0.007, 0.217]
	p-value	0.040	0.020	0.762	0.157	0.206	0.089	0.016
IAS	r_p and 99% *CIs*	0.015 [−0.099, 0.128]	−0.095 [−0.206, 0.018]	−0.060 [−0.172, 0.054]	−0.026 [−0.139, 0.087]	0.019 [−0.094, 0.132]	0.267 [0.158. 0.369]	0.026 [−0.088, 0.139]
	p-value	0.741	0.031	0.177	0.550	0.662	<0.001	0.559

TABLE 6 Hierarchical linear regression models examining psychopathy dimensions (triarchic phenotypes and classical factors) as predictors of empathy domains (cognitive and affective).

Independent variables	QCAE Cognitive Empathy		QCAE Affective Empathy	
Models	*Model 1 TriPM*	*Model 2 LSRP*	*Model 3 TriPM*	*Model 4 LSRP*
Block 1: Demographics				
Sex	−0.081		−0.292**	
Age (years)	0.011		−0.059	
R^2	0.006		0.095	
F	1.629		27.010**	
Block 2: Alexithymia				
Sex	−0.090		−0.290**	
Age (years)	−0.019		−0.052	
TAS	−0.325**		0.071	
ΔR^2	0.104		0.005	
F	60.019**		2.837	
Block 3: Psychopathy				
Sex	0.003	−0.037	−0.118*	−0.205**
Age (years)	−0.054	−0.048	−0.107*	$-0.100^{\dagger}$
TAS	−0.155**	−0.246**	0.065	0.042
TriPM Boldness	0.215**	-	−0.028	-
TriPM Meanness	−0.384**	-	−0.529**	-
TriPM Disinhibition	−0.033	-	0.281**	-
LSRP Primary	-	−0.160**	-	−0.289**
LSRP Secondary	-	−0.124*	-	0.150*

n = 515; standardized beta weights are presented for each predictor; $*p < 0.01$; $**p < 0.001$; $^{\dagger}p < 0.02$. QCAE, Questionnaire of Cognitive and Affective Empathy; TAS, Toronto Alexithymia Scale; TriPM, Triarchic Psychopathy Measure; LSRP, Levenson Self-Report Psychopathy Scale.

model, meanness displayed a broad empathy impairment. Conversely, adaptive boldness traits were associated with enhanced cognitive empathy, while disinhibition was positively related to affective empathy. Contrary to our hypotheses, boldness was unassociated with the affective domain and cognitive empathy was not negatively linked to disinhibition. Within the classical factors, there was indeed a broad empathy impairment in primary psychopathy, while secondary psychopathy was only negatively associated with cognitive empathy, although there was an unexpected positive association of the latter psychopathy factor with affective empathy. Finally, it is important to note that alexithymia was negatively associated with cognitive empathy (as postulated), while sex-related effects were only significant in the affective domain.

3.2.2. Interoception measures and empathy domains

Additional models (Models 5 and 6) were implemented to evaluate the association of interoception measures (included in block 3) with cognitive and affective empathy—see Table 7 for full statistical findings. Importantly, the role of sociodemographics and alexithymia was also accounted for within these models, although the results from these

TABLE 7 Hierarchical linear regression models examining interoception measures (interoceptive attention and accuracy) as predictors of empathy domains (cognitive and affective).

Independent variables	QCAE Cognitive Empathy	QCAE Affective Empathy
Models	*Model 5*	*Model 6*
Block 1: Demographics		
Sex	−0.081	−0.292**
Age (years)	0.011	−0.059
R^2	0.006	0.095
F	1.629	27.010**
Block 2: Alexithymia		
Sex	−0.090	−0.290**
Age (years)	−0.019	−0.052
TAS	−0.325**	0.071
ΔR^2	0.104	0.005
F	60.019**	2.837
Block 3: Interoception		
Sex	$-0.099^{\dagger}$	−0.285**
Age (years)	−0.031	−0.046
TAS	−0.248**	0.083
BPQ Body Awareness	−0.001	0.052
IAS	0.271**	0.032
ΔR^2	0.067	0.004
F	20.681**	1.209

n = 515; standardized beta weights are presented for each predictor; **p* < 0.01; ***p* < 0.001; $^{\dagger}p < 0.02$. QCAE, Questionnaire of Cognitive and Affective Empathy; TAS, Toronto Alexithymia Scale; BPQ, Body Perception Questionnaire; IAS, Interoceptive Accuracy Scale.

control blocks will not be described here as they are similar to the findings previously reported for Models 1–4. Within Model 5, adding interoception measures produced significant changes, $\Delta R^2 = 0.067$, $F_{(2, 509)} = 20.681$, $p < 0.001$, as IAS scores were positively associated with cognitive empathy, $\beta = 0.271$, $p < 0.001$, even though alexithymia was still a negative predictor of this empathy domain, $\beta = -0.248$, $p < 0.001$. In Model 6, including interoception scores as predictors did not significantly change the model, $\Delta R^2 = 0.004$, $F(2, 509) = 1.209$, $p = 0.299$, although female subjects were still associated with larger affective empathy after this block, $\beta = -0.285$, $p < 0.001$. Results from these models partially support our hypotheses regarding the specific interaction between interoception and empathy domains, as the association concerning cognitive empathy and interoceptive accuracy was indeed established, despite the positive relation between affective empathy and interoceptive attention not being confirmed. As previously described, the interaction between interoception measures and empathy domains provides the landscape for the adequate interpretation of the putative role of interoception across psychopathy dimensions.

3.2.3. Psychopathy dimensions and interoception measures

Regression models (Models 7–10) testing how psychopathy (triarchic phenotypes or classical dimensions—included in block 3) is associated with interoceptive attention or accuracy while controlling for sociodemographics (block 1) and alexithymia (block 2) are presented in Table 8. In Model 7 (triarchic phenotypes and interoceptive attention), sociodemographic variables significantly contributed to BPQ Body Awareness, $R^2 = 0.037$, $F_{(2, 512)} = 9.755$, $p < 0.001$, as age was a significant negative predictor, $\beta = -0.135$, $p = 0.002$. Opposingly, alexithymia, $\Delta R^2 = 0.002$, $F_{(1, 511)} = 1.230$, $p = 0.268$, and triarchic phenotypes, $\Delta R^2 = 0.008$, $F_{(3, 508)} = 1.357$, $p = 0.255$, did not produce significant changes in the model. Similarly, using classical factors instead of triarchic phenotypes (Model 8) on the last block did not produce significant changes in predicting interoceptive attention, $\Delta R^2 = 0.008$, $F_{(2, 509)} = 2.055$, $p = 0.129$.

In Model 9 (triarchic phenotypes and interoceptive accuracy) sociodemographics were not associated with IAS scores, $R^2 = 0.008$, $F_{(2, 512)} = 2.145$, $p = 0.118$, but including alexithymia significantly modified the model, $\Delta R^2 = 0.080$, $F_{(1, 511)} = 45.065$, $p < 0.001$, due to a negative association with interoceptive accuracy, $\beta = -0.285$, $p < 0.001$. The last block with triarchic phenotypes did not produce significant changes in the model, $\Delta R^2 = 0.014$, $F_{(3, 508)} = 2.625$, $p = 0.050$, and replacing these with classical psychopathy factors (Model 10) did not induce any specific contribution to interoceptive accuracy as well, $\Delta R^2 = 0.002$, $F_{(2, 509)} = 0.486$, $p = 0.616$. Regardless, alexithymia remained a significant predictor of interoceptive accuracy after this last block in both models ($\beta = -0.245$, $p < 0.001$ and $\beta = -0.294$, $p < 0.001$, respectively).

Generally speaking, and widely contrary to our hypotheses, these models suggest that psychopathy dimensions are not associated with interoceptive attention and accuracy, regardless of whether the triarchic or classical 2-factor operationalization is used. Results regarding interoceptive attention are not as surprising within the context of the previously reported lack of association between affective empathy and this interoception-related construct. However, as interoceptive accuracy was related to cognitive empathy, it was feasible to expect that this construct would also play a role within the psychopathy personality structure. Finally, it is also important to highlight that alexithymia was only significantly associated with the interoceptive accuracy domain (as expected). The influence of sociodemographic variables on interoception measures was not congruent to our hypotheses, as there were no sex-related effects and age was only negatively associated with interoceptive attention.

3.3. Exploratory analyses

Based on the previously described findings and existing theoretical knowledge, exploratory path models were implemented to integrate the associations between psychopathy dimensions, empathy domains, interoception, and alexithymia. Theoretical frameworks, particularly introspection-centric simulation theory, have proposed that alexithymia can underlie reduced empathic processing (Goldman, 1992, 2006). The rationale is that an inability to adequately interpret our own affective states also interferes with our capacity to infer and/or share the emotional states of others (Bird and Viding, 2014). Valdespino et al. (2017) compiled behavioral and neural evidence exploring alexithymia as a transdiagnostic liability for empathy impairment across several psychopathological constructs, including psychopathic personality. There is evidence suggesting that empathy may mediate the link between alexithymia and psychopathy within the dark triad personality structure (Jonason and Krause, 2013),

TABLE 8 Hierarchical linear regression models examining psychopathy dimensions (triarchic phenotypes and classical factors) as predictors of interoception measures (interoceptive attention and accuracy).

Independent variables	BPQ Body Awareness		IAS	
Models	*Model 7 TriPM*	*Model 8 LSRP*	*Model 9 TriPM*	*Model 10 LSRP*
Block 1: Demographics				
Sex	−0.112†		0.043	
Age (years)	−0.135*		0.072	
R^2	0.037		0.008	
F	9.755**		2.145	
Block 2: Alexithymia				
Sex	−0.113†		0.036	
Age (years)	−0.139*		0.046	
TAS	−0.048		−0.285**	
ΔR^2	0.002		0.080	
F	1.230		45.065**	
Block 3: Psychopathy				
Sex	−0.077	−0.092	0.081	0.048
Age (years)	−0.150**	−0.151**	0.033	0.039
TAS	−0.059	−0.077	−0.245**	−0.294**
TriPM Boldness	−0.023	-	0.029	-
TriPM Meanness	−0.098	-	−0.127	-
TriPM Disinhib.	0.060	-	−0.014	-
LSRP Primary	-	−0.073	-	−0.041
LSRP Secondary	-	0.084	-	0.031
ΔR^2	0.008	0.008	0.014	0.002
F	1.357	2.055	2.625	0.486

$n = 515$; standardized beta weights are presented for each predictor; $^{*}p < 0.01$; $^{**}p < 0.001$; $^{\dagger}p < 0.02$. Models 7 and 8 were implemented using wild bootstrapping due to heteroscedasticity. BPQ, Body Perception Questionnaire; IAS, Interoceptive Accuracy Scale; TAS, Toronto Alexithymia Scale; TriPM, Triarchic Psychopathy Measure; LSRP, Levenson Self-Report Psychopathy Scale.

despite the caveat of this study not providing a multidimensional conceptualization of psychopathy. Burghart and Mier (2022) argued for the need to explore the putative mediating role of empathy within the alexithymia and psychopathy association, which could provide an important contribution to dissociate psychopathy dimensions. Complementarily, recent evidence from path models and network analysis has also suggested that alexithymia may be an important mediating bridge between interoception and empathy (Mul et al., 2018; Yang et al., 2022). Hence, existing evidence from path models combined with theoretical reasoning allows us to postulate that an indirect pathway, driven by alexithymia and/or empathy, may mediate the link between interoception and psychopathy. However, the specific interaction between psychopathy dimensions, empathy domains, and interoception measures is still completely unexplored.

In our confirmatory analyses, alexithymia and cognitive empathy were both related to interoceptive accuracy, while also displaying differential associations across psychopathy dimensions. Importantly, these specific connections between alexithymia and cognitive empathy were congruent within each psychopathy dimension (e.g., meanness was associated with higher alexithymia traits as well as with impaired cognitive empathy). Thus, it is feasible to postulate that interoceptive accuracy may underly variability in alexithymia and cognitive empathy, ultimately explaining how these constructs are differentially related to psychopathy dimensions. Path models were thus conducted to explore whether alexithymia and/or cognitive empathy act as mediators between interoceptive accuracy and psychopathy traits, with the additional upside of simultaneously accounting for the covariance of interoception and empathy domains, besides the shared variability within psychopathy dimensions already considered in regression analyses. Full statistical details for these models are provided in Supplementary material 2.

The first models implemented (Model 1A for triarchic phenotypes; Model 1B for classical factors) analyzed whether the previously postulated path directionality (interoception → alexithymia → empathy → psychopathy) provided an adequate alternative for framing our hypothesized preregistered associations between these constructs. Model 1A (triarchic phenotypes) displayed poor fit according to several statistics, $\chi^2(6) = 89.085$, $p < 0.001$, RMSEA = 0.164, RMSEA 90% CI = [0.135, 0.195], TLI = 0.533, CFI = 0.900, AIC = 149.085, BIC = 276.410. Similarly, despite being slightly better, Model 2A (classical 2-factors) also presented an inadequate fit to the data, $\chi^2(4) = 26.542$, $p < 0.001$, RMSEA = 0.105, RMSEA 90% CI = [0.069, 0.144], TLI = 0.743, CFI = 0.951, AIC = 74.542, BIC = 176.402. Modification indices suggested adding a direct effect between alexithymia and boldness in Model 1A as well the covariance between the IAS and BPQ Body Awareness within both models. These modifications were thus included, originating the final retained models (Figure 1) for both triarchic phenotypes (Model 2A) and classical factors (Model 2B). Model 2A displayed good fit according to most measures, $\chi^2(4) = 5.079$, $p = 0.279$, RMSEA = 0.023, RMSEA 90% CI = [0.000, 0.074], TLI = 0.991, CFI = 0.999, AIC = 69.079, BIC = 204.892, indicating the improved fitness in contrast to Model 1A. An equivalent improvement was observed for Model 2B, which also presented good fit accordingly to most statistics, $\chi^2(3) = 4.670$, $p = 0.198$, RMSEA = 0.033, RMSEA 90% CI = [0.000, 0.087], TLI = 0.975, CFI = 0.996; AIC = 54.670; BIC = 160.774.

Within the final model retained for triarchic phenotypes (Figure 1A - Model 2A), each dimension was still differentially associated with cognitive and affective empathy, despite some changes after also considering the covariance between empathy domains. More specifically, affective empathy deficits emerged in boldness ($\beta = -0.283$, $p < 0.001$), while disinhibition was now negatively associated with cognitive empathy ($\beta = -0.258$, $p < 0.001$) and no longer positively related to affective empathy ($\beta = 0.061$, $p = 0.175$). Alexithymia displayed significant and positive direct associations with meanness ($\beta = 0.136$, $p = 0.003$) and disinhibition ($\beta = 0.243$, $p < 0.001$), with negative effects observed for boldness ($\beta = -0.343$, $p < 0.001$) and cognitive empathy ($\beta = -0.269$, $p < 0.001$). Interoceptive accuracy was oppositely associated with cognitive empathy and alexithymia ($\beta = 0.260$, $p < 0.001$ and $\beta = -0.297$, $p < 0.001$, respectively). Conversely, there were no direct effects of interoception on triarchic phenotypes ($p > 0.116$ for all). Importantly, all indirect effects linking interoceptive accuracy to triarchic phenotypes *via* alexithymia and/or cognitive empathy were significant (all $p < 0.002$). This included a serial mediation effect linking interoceptive accuracy to triarchic phenotypes *via* alexithymia and cognitive empathy.

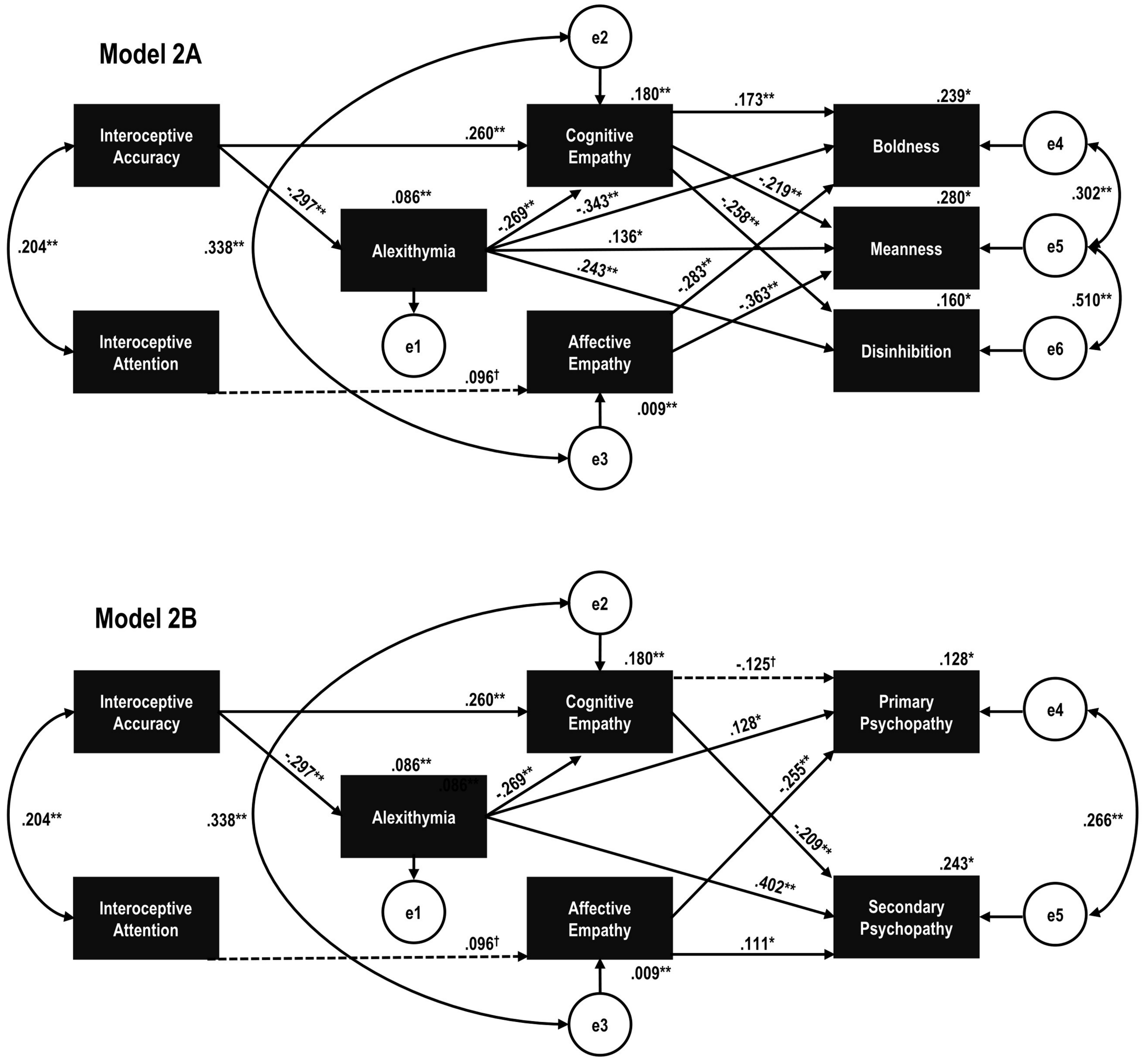

FIGURE 1
Final retained path models exploring alexithymia and/or cognitive empathy as mediators between interoception and psychopathy. (Model 2A) Triarchic phenotypes model. (Model 2B) Classical factors model. *p<0.001; **p<0.010; $^{\dagger}p$<0.020.

In the retained path model for classical psychopathy factors (Figure 1B - Model 2B), there were still two distinct empathy profiles for primary psychopathy (significant affective impairment, $\beta = -0.255$, $p < 0.001$, and marginally significant cognitive empathy deficits, $\beta = -0.125$, $p = 0.013$) and secondary psychopathy (negative association with cognitive empathy, $\beta = -0.209$, $p < 0.001$ and positive relation with the affective domain, $\beta = 0.111$, $p = 0.006$), although alexithymia was positively related to both factors ($\beta = 0.128$, $p = 0.005$ and $\beta = 0.402$, $p < 0.001$, respectively). However, as observed in the triarchic model, there was no direct association between interoception and either primary or secondary psychopathy traits ($p > 0.186$ for all). All indirect effects between interoceptive accuracy and classical psychopathy factors were also significant, as alexithymia and/or cognitive empathy were significant mediators ($p < 0.009$ for all).

Although somewhat unexpected, BPQ Body Awareness was marginally associated with affective empathy in both retained path models ($\beta = 0.096$, $p = 0.010$), and this empathy domain significantly mediated the link between interoceptive attention and all psychopathy scores ($p < 0.009$ for all), except for disinhibition ($p = 0.105$).

3.4. Control analyses

Excluding careless responders, outliers, and other confounders did not produce any major changes in the current findings (full outputs available at https://osf.io/zyf4e/). Univariate analyses were largely unaffected, although several small significant correlations were no longer significant (boldness with disinhibition, age with primary psychopathy and affective empathy, interoceptive accuracy with several psychopathy dimensions). Importantly, results pertaining to triarchic phenotypes remained unchanged in the regression and path models. Conversely, findings regarding classical psychopathy factors sustained some modifications. The negative association between both classical factors and cognitive empathy was no longer statistically significant (Model 2), although primary psychopathy was still negatively related to this empathy domain on the path model. Similarly, affective empathy was no longer significantly associated with secondary psychopathy (Model 4 and path model). Consequently, the indirect effects of interoceptive accuracy on primary psychopathy *via* cognitive empathy and/or alexithymia were not significant, as well as the mediation effect of affective empathy between interoceptive attention and primary psychopathy. It is also important to highlight that the marginal direct effects of interoceptive attention on affective empathy reached significance on all path models in the control analyses.

4. Discussion

Despite the historical and widely discussed link between psychopathy and empathy, evidence identifying distinct empathy profiles across psychopathy dimensions is still lacking. In particular, there are not many studies comparing what part empathy plays within competing conceptualizations of psychopathy, such as the classical 2-factors framework and the triarchic model. Moreover, and importantly, understanding the underlying mechanisms of empathy impairment (or absence of) within psychopathy traits can also provide important insights into the etiological pathways of this personality construct. Recent neurobehavioral models have argued for the importance of interoception in empathic processing, which can also open the door to exploring the role of inner body sensations within the realm of psychopathy. Hence, using theory-driven measurement frameworks for each construct, the current study aimed to examine the complex interplay between psychopathy dimensions, empathy domains, and interoception measures. Importantly, additional putative confounders that have been strongly associated with these constructs were also accounted for within the analytical approach, namely sociodemographics (sex and age) and alexithymia. The major findings of the current work will be discussed in subsequent sections.

4.1. Distinct empathy profiles across psychopathy dimensions

Our hypothesis-driven analyses suggest that the triarchic phenotypes and classical factors of psychopathy are differentially associated with cognitive and affective empathy, even when considering the covariance between psychopathy dimensions. Exploratory analyses with path models (additionally accounting for covariance within empathy domains) further refined these empathy profiles. Primary psychopathy was associated with a broader empathy impairment as expected (cognitive empathy nearing significance), while secondary psychopathy was linked to reduced cognitive empathy and, unexpectedly, to enhanced affective empathy. Within the triarchic model, meanness was associated with multidomain empathy deficits and disinhibition only displayed diminished cognitive empathy (as hypothesized), somewhat replicating empathy profiles from the two classical factors. In contrast, boldness displayed a unique pattern congruent with the expected results, with enhanced cognitive empathy despite reduced affective empathy scores.

Altogether, these results are highly aligned with previous meta-analytical evidence, further expanding existing knowledge by comparing empathy profiles across conceptual frameworks within the same community sample. First, affective psychopathy traits (contemplated within meanness and primary psychopathy) were associated with a broad empathy impairment, despite larger effects observed within the affective empathy domain. These results are widely consistent with previous meta-analyses, which highlighted callous-affective-meanness traits as the core dimension underlying empathy deficits in psychopathy (Northam and Dadds, 2020; Waller et al., 2020; Burghart and Mier, 2022; Campos et al., 2022). Disinhibition and secondary psychopathy, which encompass behavioral manifestations proximally linked to antisocial behavior, were negatively related to cognitive empathy. This was also largely expected based on meta-analytical evidence from subscales indexing these behavioral manifestations of psychopathy (Burghart and Mier, 2022; Campos et al., 2022) as well as from the link between cognitive empathy and antisocial outcomes (Miller and Eisenberg, 1988; Jolliffe and Farrington, 2004; van Langen et al., 2014). Surprisingly, secondary psychopathy was positively associated with affective empathy, even after accounting for the covariance between empathy domains in the path model. Despite this effect being small, it was still not congruent with previous meta-analytical evidence that reported a negligible albeit significant negative association between impulsive-antisocial traits and affective empathy (Campos et al., 2022). One putative explanation could be the specific affective empathy subscales proposed within the QCAE. For instance, Burghart and Mier (2022) reported that secondary psychopathy (as measured by the LSRP) is differentially associated with empathic concern (significant and moderate negative association) and personal distress (non-significant positive effective size). Similarly, our exploratory analyses with subscale scores (Supplemental material 1) also suggest that secondary psychopathy was only positively associated with the emotional contagion subscale. Regardless, it is important to highlight that LSRP Secondary displayed somewhat fragile internal consistency within our sample, thus limiting the interpretability of its association with affective empathy.

Finally, and most importantly, the current findings provide further evidence for boldness traits as an important additional dimension of the psychopathic personality structure, as recently reported in the recent meta-analysis (Campos et al., 2022). Despite sharing the affective empathy impairment observed within the meanness phenotype and primary psychopathy, boldness was positively associated with cognitive empathy. The boldness phenotype was developed to encompass low fear tendencies within the context of interpersonal behavior, such as persuasiveness and dominance (Patrick and Drislane, 2015). Even though primary psychopathy includes interpersonal traits, these focus on maladaptive characteristics stemming from the influential Hare's conceptualization (Levenson et al., 1995). Hence, the current results reinforce that boldness additionally maps adaptive interpersonal expressions of psychopathy that rely on intact (or even enhanced) cognitive empathy to achieve effective social functioning, despite an underlying inability to share the emotional states of others, that is, impaired affective empathy (Hoppenbrouwers et al., 2016; Gao et al., 2020; Campos et al., 2022; Glenn et al., 2022).

4.2. The interplay between interoception, alexithymia, and empathy

Another key contribution of the current work was the differential associations of interoception measures with cognitive and affective empathy. More specifically, according to our hypotheses, interoceptive accuracy was significantly related to cognitive empathy, despite being unassociated with the affective domain. Despite conflicting findings in the field, a recent systematic review suggests that interoceptive accuracy is related to perspective-taking in emotional scenarios (Baiano et al., 2021). However, most existing studies only targeted performance-based cardiac interoceptive accuracy and often used a widely criticized heartbeat counting task (e.g., Brener and Ring, 2016; Corneille et al., 2020; Ferentzi et al., 2022). The current findings expand on previous evidence by reporting a positive association of interoception accuracy and cognitive empathy using self-report beliefs-based measures and after controlling for putative confounders such as sex, age, and alexithymia.

Importantly, within our sample, alexithymia was also negatively associated with both interoceptive accuracy and cognitive empathy. As previously discussed, alexithymia has been discussed as a contributing factor for empathy impairment as well as a putative mediator between interoception and empathy (Goldman, 1992, 2006; Bird and Viding, 2014; Valdespino et al., 2017). Evidence from network analyses suggested that enhanced interoception (broadly conceptualized) is concomitantly associated with improved empathic abilities and reduced alexithymia (Yang et al., 2022). Mul et al. (2018) reported that alexithymia mediated the association of specific interoception-related subscales with total empathy scores. The existing evidence is, however, largely unspecific, as it does not examine how exact theory-informed interoception and/or empathy domains play a role within these models. Hence, our results further contribute to this discussion, suggesting that this mediation effect may only emerge within the scope of interoceptive accuracy and cognitive empathy. That is, accurately perceiving our inner body information contributes to the effective understanding of our affective experiences, which consequently allows us to build adequate inferences about the emotional states of others.

Finally, our results suggest that interoception attention is not related to affective empathy, contrary to our hypothesis. The presumed link between interoceptive attention and affective empathy was driven by an embodied perspective regarding the vicarious experience of sharing the feelings of others (e.g., Goldman and de Vignemont, 2009; de Waal and Preston, 2017; Riečanský and Lamm, 2019). Presumably, observing someone experiencing any given emotional state (e.g., pain or disgust) activates physiological responses within our body, which would be more easily perceived and/or heavily weighted by subjects with an enhanced allocation of attentional resources to interoceptive stimuli. However, one can argue whether these lower-level processes of interoceptive attention are adequately captured when using self-report questionnaires to assess beliefs about interoception attention. Alternatively, implicit measures recording neural activity when subjects are required to focus their attention on interoceptive vs. exteroceptive stimuli may provide an interesting alternative to further examine the interplay between interoceptive attention and empathy (Ernst et al., 2013; Farb et al., 2013; Kuehn et al., 2016; Petzschner et al., 2019).

4.3. Interoception within psychopathy: Indirect effects driven by alexithymia and/or empathy

The final major contribution of the current work was exploring the association of self-reported interoceptive attention and accuracy with psychopathy dimensions. Neither of the interoception measures was associated with any psychopathy subscale after controlling for alexithymia, contrary to our hypotheses. Although no evidence existed until now assessing the association between interoception and triarchic phenotypes, previous results using the classical model display conflicting findings. Secondary psychopathy has been negatively related to interoceptive accuracy, as measured by heartbeat detection performance (Nentjes et al., 2013) as well as with specific interoceptive subscales indexing a construct that is closer to self-reported interoceptive attention (Lyons and Hughes, 2015). Conversely, Zwets et al. (2014) found no significant association of psychopathy with anger-specific bodily sensations, while a recent report also suggested that both classical psychopathy factors are unrelated to self-report and performance-based tasks of interoception (Lamoureux and Glenn, 2021).

Despite the absence of direct associations between interoception and psychopathy, we correctly predicted positive relations between alexithymia and several psychopathy scores (meanness, disinhibition, primary and secondary psychopathy), although there was also a strong unexpected and negative association with boldness. These findings, together with the previously described association between cognitive empathy and alexithymia, led us to conduct exploratory path models to investigate whether the link between interoception and psychopathy could be mediated by alexithymia and/or cognitive empathy. Our rationale was that interoceptive accuracy may underly variability in alexithymia and cognitive empathy, ultimately explaining how these constructs are differentially associated with psychopathy dimensions. Although these analyses were exploratory, significant indirect effects were indeed found between interoceptive accuracy and all psychopathy dimensions *via* either alexithymia, cognitive empathy, or both.

As previously described, existing theoretical proposals and empirical work have argued that alexithymia may underlie the empathy impairment typically associated with psychopathy traits (Krause et al., 2013; Bird and Viding, 2014; Valdespino et al., 2017). The current work further adds an additional layer to this discussion, with interoceptive processing emerging as a putative low-level mechanism underlying alexithymia and/or cognitive empathy. Without neglecting the exploratory nature of these findings, it is important to reason that there is neurobiological evidence supporting at least some degree of shared variance between these constructs. When discussing alexithymia as a transdiagnostic source of empathy impairment across clinical disorders, Valdespino et al. (2017) argued for the centrality of the insula within the co-occurrence of alexithymia and empathy impairments, including those observed in psychopathic personality. Importantly, the insula is also a core hub for interoceptive processing (Craig, 2009; Adolfi et al., 2017; Berntson and Khalsa, 2021) as well as a brain structure that has been implicated within the neurobiological and etiological pathways of psychopathy (Blair, 2013; Poeppl et al., 2019; Penagos-Corzo et al., 2022). Hence, the partial convergence between interoception, alexithymia, empathy, and psychopathy from a neuroanatomical standpoint could suggest an intricate (likely with some degree of causality) interaction between these constructs.

4.4. Limitations and recommendations for future studies

Despite the important contribution of the current work, several limitations and recommendations for future work should be addressed. The first major issue is the need to interpret the mediating effects stemming from the exploratory path models with caution, as these models were not postulated *a priori*. The direction of the associations between interoception, alexithymia, empathy, and psychopathy was proposed based on theoretical groundings as well as evidence stemming from less complex path models, but there is no strong empirical work to support the causality of the proposed interactions. Thereby, longitudinal studies or experimental work evaluating neural markers of interoceptive, emotional, and empathic processing would be ideal to further explore putative causal relations, despite the challenging nature of these endeavors.

Another important caveat is that within this study we did not examine the more fine-grained 4-facets model stemming from the classical 2-factors models (Neumann et al., 2007; Hare et al., 2018). This model proposed 4 correlated first-order factors without losing model fit, namely the interpersonal and affective facets (stemming from primary psychopathy) as well as the impulsive and antisocial facets (underlying secondary psychopathy). Hence, future studies should employ alternative instruments such as the Self-Report Psychopathy Scale (Paulhus et al., 2016), which includes a specific facet for maladaptive interpersonal traits (e.g., scamming people, pushing people to breaking point) as well as a more explicit antisocial facet (e.g., serious crime, carry weapons) that can provide valuable information to further understand empathy within the context of psychopathic personality (Campos et al., 2022).

Regarding empathy measurement, recent psychometric studies have queried whether the QCAE is an acceptable tool to index cognitive and affective empathy. Reniers et al. (2011) originally argued for a second-order structure of the QCAE, with cognitive empathy encompassing perspective-taking and online simulation as first-order factors, while the affective domain incorporated emotion contagion, proximal responsivity, and peripheral responsivity. Factor structure analyses as well as cross-domain correlations between these subscales have led several authors to question the broader cognitive and affective empathy domains within this questionnaire while favoring the first-order 5-factor oblique solution (Michaels et al., 2014; Myszkowski et al., 2017; Queirós et al., 2018; Di Girolamo et al., 2019; Liang et al., 2019; Gomez et al., 2022). However, these specific subscales can be somewhat debated as well due to their questionable or blatantly unacceptable internal consistency, in contrast to the acceptable-good reliability of broader cognitive and affective empathy scores. Regardless, we do still consider that the QCAE was the more adequate self-report measure available to index cognitive and affective empathy according to contemporary conceptual and neurobiological models. Concomitantly, it is obviously feasible to postulate that psychopathy, interoception, and alexithymia may be differentially related to lower-level empathy processes as those indexed by QCAE subscales or other alternative measures. Despite evidence still being recent and/or inconsistent, ongoing work has explored how specific (despite interlinked) second-level features of cognitive (e.g., inferring non-emotional vs. emotional mental states) and affective empathy (e.g., affective sharing, empathic concern, personal distress) are dissociable from a behavioral and neurobiological standpoint (Kalbe et al., 2010; Sebastian et al., 2012; Grynberg and López-Pérez, 2018; Grynberg and Konrath, 2020; Stevens and Taber, 2021). Hence, future studies could develop theory-driven hypotheses to examine how specific cognitive and affective empathy subprocesses interact with psychopathy, interoception, and alexithymia. Moreover, as recent evidence has questioned the convergence between self-perceived empathy vs. objective empathic abilities (Murphy and Lilienfeld, 2019; Sunahara et al., 2022), upcoming studies should examine whether the current pattern of results is replicated when using performance-based tasks or neural correlates of cognitive and affective empathy.

Another important drawback when contemplating the current findings concerning the role of interoception in psychopathy, empathy, and alexithymia is the somewhat questionable construct validity of interoception-related self-report measures (Desmedt et al., 2022). Recent evidence specifically indicated a lack of consistency among subjects when interpreting BPQ Body Awareness, as only 36.4% of participants considered that the questionnaire assessed interoceptive attention, while 30.4% interpreted it as pertaining to interoceptive accuracy (Gabriele et al., 2022). This could actually explain the positive association found between BPQ Body Awareness and IAS in the current dataset (Campos et al., 2021). Hence, there is still a need for future studies using novel and more reliable measures of interoception to assess its role in psychopathy, including not only self-report questionnaires (e.g., Interoception Attention Task; Gabriele et al., 2022) but also experimental tasks and neuronal correlates targeting different interoceptive pathways (e.g., Park and Blanke, 2019; Legrand et al., 2022; Nikolova et al., 2022).

Finally, it is important to highlight that some associations between empathy and classical psychopathy factors were no longer significant in the control analyses. This may be mainly due to small effect sizes between LSRP and QCAE scores (in contrast to triarchic phenotypes), making these associations more susceptible to the reduced power (lower sample size) in the control analyses.

4.5. Conclusion and main implications

Summing up, the current study provided a hypothesis-driven endeavor to examine the complex interplay between psychopathy dimensions, empathy domains, and interoception, using established frameworks to conceptualize each construct and controlling for important confounders such as sex, age, and alexithymia. The first major result, largely consistent with our hypotheses, was that distinct empathy profiles were observed across psychopathy dimensions. This clearly highlights the need for researchers in the field to contemplate the multidimensional nature of both constructs, as merely stating that empathy impairment is a hallmark of psychopathic personality can be nowadays seen as a widely non-specific and incomplete statement. Within the scope of psychopathy-empathy interplay, our findings indicate that boldness is associated with enhanced cognitive empathy, despite the co-occurring negative association with the affective domain. These results further reinforce the importance of the boldness phenotype within the constellation of psychopathy traits, as these adaptive interpersonal manifestations may help us to understand the longstanding emotion paradox of psychopathy as well as the more recently proposed profile for successful psychopathy.

Secondly, the current study also provided valuable evidence regarding the interplay between interoception and empathy, as within our sample a specific positive association between self-reported interoceptive accuracy and cognitive empathy was observed. Moreover, these constructs were also significantly related to alexithymia, providing evidence supporting emerging theoretical models of the neurobiological underpinnings of empathy, which argue that interoceptive processing contributes not only to perceiving our own emotional states but also to the ability to infer the feelings of others. Considering the transdiagnostic nature of alexithymia, these findings may also contribute to future work exploring how interoception may play a role in other empathy-related psychopathological constructs (e.g., autism, schizophrenia).

Lastly, in contrast to our hypotheses, self-perceived interoceptive attention and accuracy were not associated with either psychopathy dimension (triarchic or classical) after controlling for alexithymia. We thus proposed and exploratorily examined a theoretical mediation model where interoceptive accuracy could be indirectly linked to psychopathy *via* alexithymia and/or cognitive empathy. These indirect pathways were indeed observed and can provide a valuable venue for upcoming work aiming to explore the etiological pathways of empathy profiles across psychopathy dimensions. Furthermore, these findings may open the door for encompassing interoception-related strategies within behavioral interventions for emotional processing and empathy deficits in populations with high psychopathy traits. This may be useful when considering the modest efficacy and challenging nature of psychotherapeutic programs targeting psychopathy manifestations. Regardless, as our mediation effects were not planned under confirmatory testing, future preregistered hypothesis-driven studies should be designed to formally test this model while also accounting for other methodological limitations of the current study.

Data availability statement

The datasets generated and analyzed for this study can be found in the Open Science Framework - https://osf.io/zyf4e/.

Ethics statement

This study (involving human participants) was reviewed and approved by the Ethics Committee of the School of Health, Polytechnic University of Porto (reference E0048/2000, approved on 19 February 2020) and by the Data Protection Officer from the University of Porto (reference 2019101115001996, approved on 31 January 2020). Participants provided their informed consent (electronic form) to participate in this study.

Author contributions

CC, NR, and FB were collaboratively responsible for study design and preregistration. The online survey was developed by CC with supervision from FB. Data collection and statistical analysis were conducted by CC. CC prepared the first draft of the manuscript which was then reviewed by NR and FB. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1082965/full#supplementary-material

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Improving disease management of patients with inflammatory bowel disease: the potential role of self-concordant health goals

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Inflammatory bowel diseases (IBD) are chronic gastrointestinal conditions that significantly impact patients' quality of life. Previous research indicates that patients with IBD have a higher prevalence of anxiety compared to the general population and other chronic diseases. This pilot study aimed to investigate the relationships between goal integration, positive and negative emotions, goal self-efficacy, and trait anxiety as the outcome variable, focusing on patients' self-management strategies. Drawing from the Self-Concordance Model (SCM) of Self-Determination Theory (SDT), the study explored how goal integration is associated with more fulfilling and enjoyable experiences and fewer negative emotions, ultimately improving psychological well-being. Health-related goals were evaluated using the Personal Project Analysis technique, while the State–Trait Anxiety Inventory was utilized to measure general anxiety levels. Among the 141 participants with inflammatory bowel disease, 96 reported having health-related goals. Of these, 66 were female (68.75%), and 30 were male participants (31.25%). Path analysis revealed a moderate negative association between self-concordance (SC) and negative emotions, which, in turn, predicted higher levels of trait anxiety. Furthermore, the alternative model tested indicated that trait anxiety predicted a lower level of self-concordance. Setting well-integrated health goals involves an internal capacity, enabling patients to experience less negative emotions during self-management activities. Anxiety can hinder individuals from accessing their inner needs, resulting in less self-concordant aspirations and more negative emotions. These findings may contribute to developing prevention and intervention programs to enhance IBD patients' adherence to lifestyle changes, ultimately improving their overall well-being.

KEYWORDS

health-related goals, self-concordance, health behavior, chronic disease, inflammatory bowel disease, trait anxiety

1. Introduction

The global prevalence of inflammatory bowel diseases (IBDs) is rising, with these chronic conditions affecting multiple organs and primarily targeting the intestinal tissues (Podolsky, 2002; Sartor, 2006; Park et al., 2019). IBD patients often experience abdominal pain, bloody diarrhea, fatigue, and frequent bowel movements, significantly impacting their daily lives (Dibley and Norton, 2013; Devlen et al., 2014). Therapy aims to alleviate symptoms, achieve remission, and improve the overall quality of life for patients (Habibi et al., 2017). Given the physical burden of the disease and the heightened psychological vulnerability, empowering patients with self-management strategies, including emotion regulation and disease management skills, is crucial. This paper presents the findings of a cross-sectional pilot study conducted among inflammatory bowel disease patients. Our main objective was to explore the role of striving for health goals in disease management by examining the associations between three key elements of the health goal-striving process (goal-related self-concordance, goal self-efficacy, and positive and negative emotions) and their relationship with general anxiety.

1.1. Psychological aspects of living with IBD

The symptoms of IBD and its associated medications profoundly disrupt patients' daily activities and psychological well-being, affecting various aspects of their lives, such as work, school, family, relationships, and overall psychological health (Dibley and Norton, 2013; Devlen et al., 2014). Numerous studies have demonstrated that the prevalence of anxiety and depressive disorders is higher among IBD patients compared to the general population and other chronic diseases (Robertson et al., 1989; Addolorato et al., 1997; Katon and Ciechanowski, 2002; Katon et al., 2007; Kovács and Kovács, 2007; Scott et al., 2007; Graff et al., 2009; Byrne et al., 2017; Bhamre et al., 2018). These symptoms tend to worsen during disease relapses, and long-term anxiety levels have been associated with poorer IBD-related outcomes (Nahon et al., 2012; Selinger and Bannaga, 2015; Narula et al., 2019). Moreover, managing IBD requires specific self-management skills, including adhering to complex medication regimens, regular medical check-ups, cancer screenings, addressing medication side effects and extraintestinal symptoms, and making lifestyle adjustments (e.g., stress management, healthy eating, smoking cessation; von Wietersheim et al., 1992; Kane et al., 2001; Dudley-Brown, 2002). Effective disease management is crucial to minimize complications and prevent psychological distress (Dudley-Brown, 2002). While previous research has primarily focused on disease education interventions rather than self-management components (Barlow et al., 2010; Kemp, 2012), it is crucial to further investigate factors that can enhance self-management and improve patient adherence, especially considering the significant nonadherence rates and maladaptive coping strategies among IBD patients (Wagoner and Kavookjian, 2017).

1.2. Lifestyle change and health-related personal goals

Supporting lifestyle changes is a vital aspect of disease management for individuals with IBD. Various activities related to disease management, role adjustment, and emotional well-being can be framed as personal goals (Austin and Vancouver, 1996; Peterman and Lecci, 2007; Martos, 2009a). For IBD patients, these goals may include alleviating physical symptoms, maintaining disease remission, managing lifestyle changes (medication adherence, dietary modifications, smoking cessation, and regular physical activity), and improving mental health. Health goals serve as a tool for IBD patients to adapt to the necessary lifestyle changes imposed by the disease (Strecher et al., 1995; Mann et al., 2013). Although many studies have highlighted the impact of adopting a healthy lifestyle on the quality of life of IBD patients (Lo et al., 2021; Lamers et al., 2022; Schlee et al., 2022), the experiences of setting personal health goals have not yet been explored among this population.

1.3. Goal self-concordance

According to the Self-Determination Theory (SDT) of health behaviors (Ryan and Deci, 2000), intrinsic motivation is crucial in long-term adherence. SDT proposes a continuum of motivation, where autonomously regulated health goals are pursued out of intrinsic motives and are aligned with the individual's integrated sense of self (Sheldon and Elliot, 1999; Judge et al., 2005). The Self-Concordance Model (SCM; Ryan et al., 1996) addresses the extent to which goals are integrated into the self, indicating a lower degree of control, higher autonomy, and consistency with one's core values, talents, and needs (Sheldon and Elliot, 1998, 1999; Judge et al., 2005). According to SCM, higher self-integration leads to greater effort and improved goal implementation outcomes (Sheldon and Elliot, 1999). Individuals become more deeply engaged in their health management with more integrated goals, leading to more effective goal achievement (Vansteenkiste et al., 2005). Developing self-concordance regarding health goals can support lifestyle changes for people with IBD (Reed-Knight et al., 2011).

1.4. Goal self-efficacy

Self-efficacy (SE) is key to health behavior change (McAuley, 1993; Lorig and Holman, 2003; Fernández et al., 2009). SE refers to an individual's belief in their ability to perform the behaviors required to manage a situation (Bandura, 1977, 2001). This motivational factor has been shown to influence goal progress and long-term commitment (Bandura, 1977; Sheldon and Elliot, 1998; Koestner et al., 2008). Previous research among IBD patients has demonstrated that SE is a relevant component of disease management and coping (Graff et al., 2016). Moreover, SE has been found to have a positive association with self-esteem and health-related quality of life and a negative association with depression and anxiety (Izaguirre et al., 2017). IBD patients with high self-efficacy are more likely to visit gastroenterologists regularly and be open to psychological support (Keefer et al., 2011). Both self-efficacy and self-concordance are important determinants of successful lifestyle change. The question remains about how these factors interact and which is a stronger predictor of successful goal pursuit.

1.5. Positive and negative emotions

Self-concordant striving not only affects optimism about goal attainment but also influences emotions during the process (Sheldon and Elliot, 1999; Sheldon et al., 2004, 2022; Sheldon and Lyubomirsky, 2006; Wang, 2009; Gaudreau, 2012). Goals that align with inner values, talents, and needs have the potential to fulfill basic psychological needs, thereby contributing to enhanced psychological well-being (Sheldon and Elliot, 1999; Sheldon, 2002). In comparison, individuals with non-concordant goals tend to experience lower levels of happiness, even if they manage to accomplish those goals (Sheldon and Elliot, 1999). Furthermore, self-concordant goals are perceived as more attainable, facilitating more effective goal pursuit (Werner et al., 2016). Moreover, happiness-related exercises are more effective when self-concordant (Dickerhoof, 2007). Self-concordant future events are associated with more positive and intense emotions (Ernst et al., 2018).

1.6. The present study

This study proposes and examines a model (refer to Figure 1 for an overview and the hypothesized relationships between the variables). The level of self-integration of health goals reflects an individual's internal capacity, as well-integrated health goals are closely aligned with their inner values, talents, and needs. Pursuing well-integrated goals allows individuals to engage in activities that genuinely reflect their motivations, resulting in more self-rewarding experiences filled with joy, pleasure, and a sense of flow while minimizing negative emotions such as frustration, sadness, or distress. Consequently, experiencing more positive and fewer negative emotions during the process of goal pursuit can act as a mediator in enhancing overall functioning. We assumed that self-concordance (SC) and goal self-efficacy (SE) would predict lower levels of anxiety by experiencing more positive and less negative emotions during goal implementation. We acknowledge the interdependence between self-concordance, goal self-efficacy, and positive and negative emotions. However, we do not propose a specific hypothesis regarding the direct impact of self-concordance or goal self-efficacy on trait anxiety. As this is a pilot study and causal relationships cannot be established, we propose an alternative model that may also be plausible. Drawing on previous research, we hypothesize that trait anxiety could be associated with more negative and less positive emotions, and also undermine both self-efficacy and self-concordance.

2. Methods

2.1. Participants

Participants were recruited from the Internal Medicine Department of the University of Szeged. Our target group was patients living with any type of inflammatory bowel disease. In sum, 141 IBD patients' data were involved in the analysis. Data collection was carried out by filling in a paper-pencil questionnaire during patients' regular check-ups in the hospital, due at a 6–8 weeks pace. Before receiving the questionnaire, the participants were informed about the participation conditions and requested to provide informed written consent.

2.2. Measures

2.2.1. Personal project analysis

Patients were asked to list their health-related goals, select one of them and assess it according to the criteria provided. Sample personal health goals included domains such as sport (Example: *"I definitely need to start doing some form of exercise regularly."*), weight management (Example: *"I want to lose weight."*), eating habits (Example: *"Greater adherence to the diet"*), reduce smoking (Example: *"I want to quit smoking."*), mental health (Example: *"Find a better work-life balance."*), and sleeping (Example: *"Get 8 h of sleep every night."*). The health goals were rated according to the following criteria (Little, 1993; Martos, 2009b).

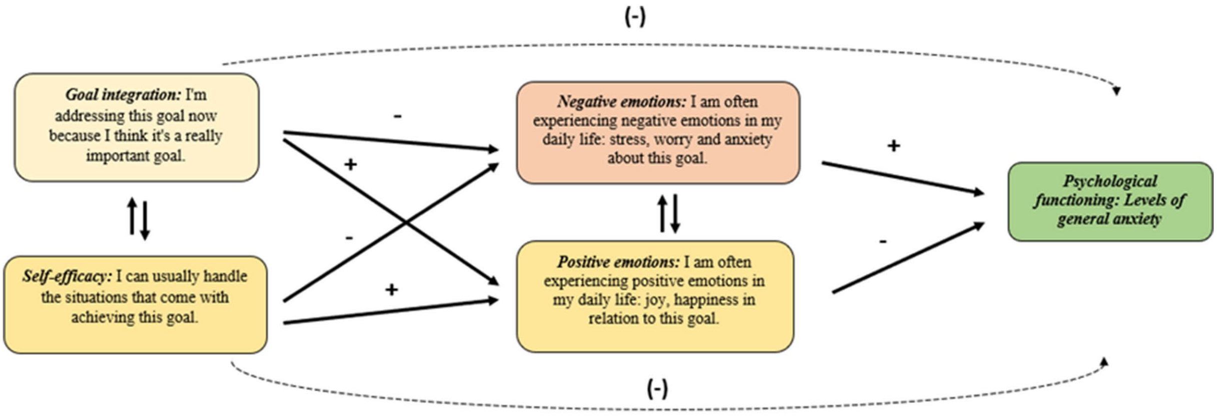

FIGURE 1
Goal integration's role in emotional experiences of lifestyle change and better psychological functioning. "+" stands for a positive, and "–" for a reversed association.

2.2.1.1. Goal self-concordance

Goal self-concordance refers to the extent to which the person has internalized the goal. It was calculated from the subtraction of two items of controlled motivation (External regulation: *"One of the reasons I am pursuing this goal is because somebody else wants me to."*) and (Introjected regulation: *"One of the reasons I am pursuing this goal is* because *I would feel ashamed, guilty, or anxious if I did not."*) and two items of autonomous motivation (Identified regulation: *"One of the reasons I am pursuing this goal is because I really believe that it is an important goal to have."*) and (Intrinsic regulation: *"One of the reasons I am pursuing this goal is because of the fun and enjoyment which the goal will provide."*; Sheldon and Elliot, 1999). The self-concordance score was rated on a seven-point Likert scale (ranging from "Not at all true for me" to "Very true for me"). Due to the composite nature of the index, the standard reliability estimate of alpha is not applicable (Sheldon and Elliot, 1999).

2.2.1.2. Goal self-efficacy

Goal self-efficacy refers to the person's belief in his/her ability to achieve the goal. This four-item questionnaire provides a seven-point Likert scale for each response. Example item: *"I can handle the situations that come with achieving this goal."* The self-efficacy score was rated on a seven-point Likert scale (ranging from "Not at all true for me" to "Very true for me"). Internal consistency of the four items was excellent: Cronbach's α =0.805 (Rózsa et al., 2003).

2.2.1.3. Positive and negative emotions

Six items referred to the emotional experiences during the goal implementation process. Three items were used for measuring negative (Example item: *"How often do you experience negative emotions on a daily basis: stress, worry, and anxiety about this goal?"*) and three items for positive emotions (Example item: *"How often do you experience positive emotions on a daily basis: joy and happiness about this goal?"*). Both subscales used a seven-point Likert scale (ranging from "Not at all true for me" to "Very true for me"). Internal consistency of the items for positive emotions was Cronbach's α =0.806, and for the negative emotions, Cronbach's α =0.890 (Martos et al., 2013).

2.2.2. State–trait anxiety inventory

The Trait Anxiety Subscale was used to measure the general levels of anxiety. The trait anxiety score was calculated from 20 items, rated on a four-point Likert scale (ranging from "Almost Never" to "Almost Always"). Example items: *"I worry too much over something that really does not matter"* and *"I am content; I am a steady person."* The scale had an internal consistency of 0.925 in our sample (Sipos, 1978; Spielberger, 1983).

2.3. Procedure

Our research was the pilot phase of a broader longitudinal study. The presented data were collected from April to May 2022 as a pilot study to test the self-concordance-based model's reliability. Future phases of the research project, started in November 2022, will extend to three waves of longitudinal data collection. The paper-pencil questionnaire package, consisting of several other scales not discussed here, took approximately 30–40 min to complete. Only the Personal project analysis questionnaire is attached in Supplementary Material. The ethics approval was provided by the Regional Research Ethics Committee (RKEB) of the University of Szeged, Albert Szent-Györgyi Health Centre, under Nr. 14/2022-SZTE RKEB. The study was conducted following the Declaration of Helsinki.

2.4. Statistical analyses

JASP 0.14.6.0 was used for the statistical analyses of the data. Patients' scores for the inventories were summarized using descriptive statistics, and Pearson's correlation coefficients were used to quantify associations between variables (0.10 is small, 0.30 is moderate, and 0.50 is large; Cohen, 1988). Path analysis was used to examine the relationships between variables. To further examine the relationship between variables, standardized regression coefficients (β) were used to quantify the strength of association (0.10 is small, 0.30 is moderate, and 0.50 is large).

3. Results

3.1. Descriptive statistics of the sample

According to the type of IBD, 79 patients (56.02%) had Crohn's disease (CD), 56 patients (39.71%) had a diagnosis of ulcerative colitis (UC), five patients (3.54%) reported having an unspecified type (UT) of IBD, and one patient (0.7%) did not know the type of the disease. Concerning the status of IBD, 95 patients' disease was in remission (46.0%), and 44 patients' disease was in the relapse phase (31.2%) at the time of the data collection, with two missing data (1.41%). The mean age of IBD subsamples for CD was 38.4 years ($SD = 11.9$), for UC, 39.70 years ($SD = 13.3$), and for UT, 54.0 years ($SD = 18.7$). Of CD patients, there were 46 female (58.22%), 31 male (39.24%) participants, and two persons with missing data (2.53%). UC patients involved 39 female (69.64%) and 14 male participants (25.0%), with three missing data (5.35%). From UT of IBD patients, there were three female and two male participants. Of the total sample, 101 patients (71.63%) reported having a health-related goal, and 40 patients (28.37%) reported not having a health-related goal. Of those with a health-related goal, 66 were female (68.75%) and 30 were male participants (31.25%), with five missing data. The IBD subsamples' demographic information and other characteristics are summarized in Table 1.

3.2. Correlations between goal characteristics and trait anxiety

We run a series of bivariate Pearson correlations for the study variables. According to the results, positive emotions, higher self-efficacy, and goal-self-concordance have a significant, weak to medium-strong negative association with the levels of trait anxiety (p was everywhere <0.001, $n = 91–105$): $r_{PE} = -0.37$, $r_{SC} = -0.46$, $r_{SE} = -0.36$. Negative emotions had a significant, moderate positive association with trait anxiety ($r_{NE} = 0.43$, $p < 0.001$). There was a significant positive association between SC and SE ($r = 0.33$, $p < 0.001$), and a significant negative association between PE and NE ($r = -0.38$,

TABLE 1 Demographic information and IBD characteristics.

Variable name	Type of IBD		
	UC	CD	UT
N	56	79	5
Age (*M, SD*)	38.65 (12.17)	39.00 (7.07)	37.35 (11.27)
Gender			
Male	8	19	2
Female	28	34	2
Missing	6		
Level of education			
Primary school	4	11	2
High school	18	16	1
College and higher	14	21	1
Missing	4		
State of disease			
Remission	19	38	1
Relapse	17	17	3
Missing	3		
Psychological functioning (M, SD)			
Trait Anxiety	44.64 (9.78)	40.98 (11.88)	49.25 (10.69)
State Anxiety	40. (9.61)	38.91 (11.80)	47.25 (14.25)
Health-related goal			
One or more	101 (%)		
None	40 (%)		

$p < 0.001$). Descriptive statistics and correlations are presented in Table 2.

3.3. Path analysis

3.3.1. Model I

For path analysis, data were examined from individuals who reported having a health goal and completed all questions. Since our self-concordance-based model is saturated, the fit indices indicate a perfect fit to the data: X^2 (0) = 0.00, $p = 1.00$, CFI = 1.00, TLI = 1.00, RMSE = 0.00, SRMR <0.001. Self-efficacy has a significant positive effect on positive emotions ($\beta = 0.45$ $p < 0.001$), and a significant negative effect on negative emotions ($\beta = -0.19$, $p = 0.05$). Self-concordance has a positive effect on positive emotions ($\beta = 0.19$, $p = 0.06$), and a significant negative effect on negative emotions ($\beta = -0.27$, $p = 0.01$). Positive emotions have no significant effect on trait anxiety ($\beta = -0.13$, $p = 0.23$), but negative emotions have a significant negative effect on trait anxiety ($\beta = 0.21$, $p = 0.03$). Self-concordance has a significant negative effect on trait anxiety ($\beta = -0.28$, $p = 0.004$). Self-efficacy has no significant effect on trait anxiety ($\beta = -0.15$, $p = 0.16$). Self-efficacy has a significant moderate positive association with self-concordance ($\beta = 0.34$, $p = 0.002$). Positive and negative emotions have a significant small negative association ($\beta = -0.32$, $p = 0.002$). Figure 2 shows defined paths.

3.3.2. Model II

In the absence of longitudinal data, we tested an alternative model for the pilot study to explore the effect of trait anxiety on self-efficacy and self-concordance. Since the alternative model is also saturated, the fit indices indicate a perfect fit to the data: X^2 (0) = 0.00, $p = 1.00$, CFI = 1.00, TLI = 1.00, RMSE = 0.00, SRMR <0.001. Self-efficacy has a significant positive effect on positive emotions ($\beta = 0.42^*$, $p < 0.001$), no significant effect on negative emotions ($\beta = -0.15$, $p = 0.16$), and no significant effect on self-concordance ($\beta = 0.19$, $p = 0.08$). Trait anxiety has a significant positive effect on negative emotions ($\beta = 0.35$, $p < 0.001$), a significant negative effect on positive emotions ($\beta = -0.25$, $p = 0.01$), a significant negative effect on self-concordance ($\beta = -0.29$, $p = 0.005$) and a significant negative effect on self-efficacy ($\beta = -0.38$, $p < 0.001$). Neither positive emotions ($\beta = 0.11$, $p = 0.36$) nor negative emotions significantly predict self-concordance ($\beta = -0.12$, $p = 0.24$). Positive and negative emotions have a significant small negative association ($\beta = -0.31$, $p = 0.005$). Figure 3 shows defined paths.

4. Discussion

Inflammatory bowel diseases (IBDs) are chronic conditions increasingly affecting a larger population worldwide (Goodhand et al., 2012). Patients with IBD have a higher prevalence of anxiety disorders compared to other chronic disorders, but the underlying factors require further investigation (Kovács and Kovács, 2007; Mikocka-Walus et al., 2016; Navabi et al., 2018). Effective self-management and adaptation to disease-specific lifestyle changes are crucial for maintaining and improving the health of IBD patients. This study examined a model based on goal self-concordance theory (Sheldon and Elliot, 1999) and found that more integrated goals are associated with increased positive affect and reduced negative affect, which, in turn, may contribute to better psychological functioning. By assessing patients' autonomous motivation toward personal health goals, we provide evidence of how individuals with IBD can enhance their ability to manage their disease effectively.

The current results partially support our assumption that self-concordance represents an internal capacity leading to better self-management of IBD patients. Self-concordance significantly predicted lower levels of negative emotions and higher levels of positive emotions. Consistent with previous research, internally regulated goals are more likely to lead to activities that satisfy basic psychological needs and promote overall well-being (Ryan and Deci, 2000, 2017; Sheldon et al., 2004). The unidirectional relationship between positive and negative emotions and self-concordance reinforces the role of goal integration in enhancing positive emotions, as supported by the multivariate analysis.

A high level of goal self-concordance predicts reduced negative emotions, which, in turn, is associated with lower levels of trait anxiety. However, positive emotions do not significantly predict trait anxiety. This suggests a dynamic interaction between self-concordance and psychological functioning. Since goals are expressed through individual language, they reflect an individual's ability to make accurate or inaccurate self-descriptions and reflect their state of self (Kuhl and Kazen, 1994; Sheldon and Elliot, 1999). Negative affect can impede conscious access to individuals' extended personality system, resulting in inaccurate self-descriptions (Kuhl, 2000) and less

TABLE 2 Correlations among goal self-concordance, goal self-efficacy, positive and negative emotions, and trait anxiety.

Variable	Mean	*SD*	1.	2.	3.	4.	5.
1. Positive emotions	4.27	1.32	–				
2. Negative emotions	3.27	1.77	−0.38**	–			
3. Self-concordance	2.81	2.22	0.31**	−0.34***	–		
4. Self-efficacy	4.89	1.21	0.48***	−0.26**	0.33***	–	
5. STAI-T	41.9	11.3	−0.37***	0.43***	−0.46***	−0.36***	–

($n = 91–105$); **$p < 0.01$, ***$p < 0.001$.

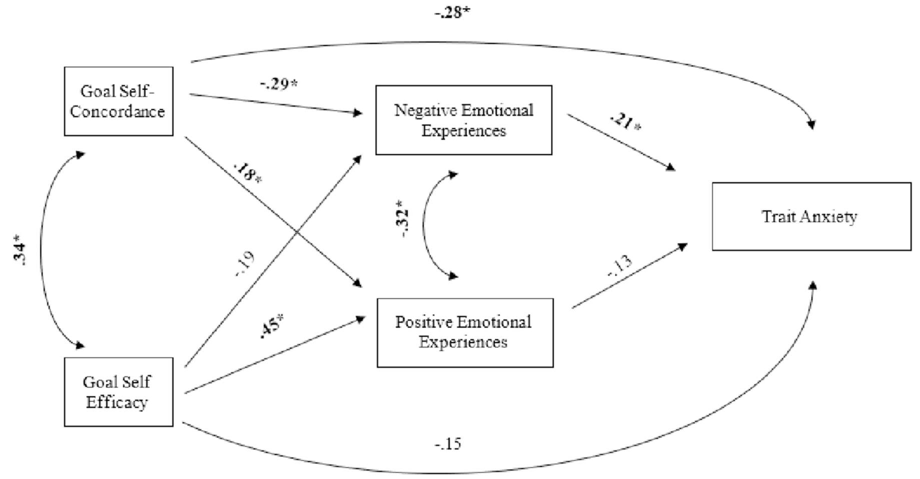

FIGURE 2
Path Diagram I. The diagram shows the standardized path coefficients. The sample size for the path model was n=101. p for SE and NE was 0.06. *p<0.05.

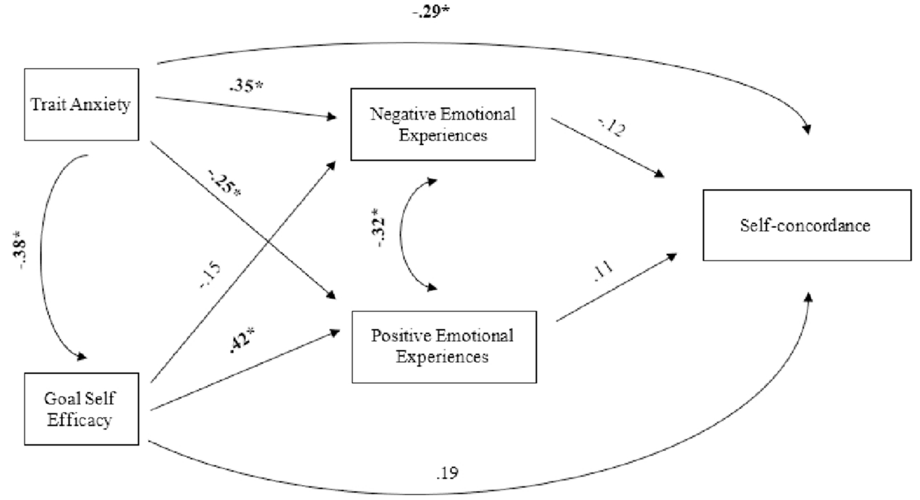

FIGURE 3
Path Diagram II. The diagram shows the standardized path coefficients. The sample size for the path model was n=88.

self-concordant aspirations. According to our results, anxiety can hinder the ability to connect with their inner needs and formulate goals in a self-concordant manner. The results of this pilot study can guide future research on the role of anxiety in successful goal integration and the mechanisms by which self-concordance may improve self-management in patients with IBD.

We also hypothesized that self-efficacy would be associated with positive and negative emotions, and our results partly supported this hypothesis. In both models, self-efficacy was significantly related to positive emotions but did not show a significant association with negative emotions. Additionally, self-concordance significantly predicted trait anxiety, while trait anxiety also predicted self-efficacy. These distinct emotional patterns in self-concordant and self-effective goal striving support previous research indicating that although self-efficacy and self-concordance are linked, they represent different aspects of goal striving (Fuchs et al., 2016; Downes et al., 2017).

4.1. Limitations

Our study has several limitations that should be considered when interpreting the results. Firstly, the cross-sectional design of the data assessment prevents us from establishing causal relationships between variables. Future studies employing longitudinal designs would provide a clearer understanding of the causal effects. Secondly, the pilot study had a relatively small sample size, which may limit the generalizability of the findings. However, the effect sizes observed in our study can serve as a basis for determining sample sizes in larger studies involving IBD patients. Additionally, the small sample size could impact the precision of the estimated model parameters. Future studies with larger sample sizes would enhance the statistical power of the analyses (Wolf et al., 2013). Lastly, we could not assess goal attainment due to the cross-sectional design. Long-term assessments would be valuable in examining the importance of self-concordance for goal achievement.

4.2. Conclusion

The findings of our pilot study highlight the significance of health goal integration in more effective self-management and the psychological functioning of individuals with IBD. Health goals can be valuable tools for monitoring patients' self-management processes, including successful lifestyle change and adherence. However, further research is needed to explore the complex role of goal integration in long-term well-being and the interplay between self-concordance, self-efficacy, and emotional experiences during disease management. By enhancing patients' goal-related self-efficacy and self-concordance, clinicians can facilitate successful lifestyle changes and promote adherence in individuals living with IBD.

4.3. Plans and perspectives for future research

Based on the study, setting self-concordant goals is an internal capacity that can help patients with inflammatory bowel disease to maintain lifestyle changes and be more effective in disease management. This finding will serve as a basis for further research. Our research team is currently conducting a longitudinal study that will follow up with 300 IBD patients at 3 and 6 months to validate the proposed model and investigate causal relationships.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Regional Research Ethics Committee (RKEB) of the University of Szeged, Albert Szent-Györgyi Health Centre. The patients/participants provided their written informed consent to participate in this study.

Author contributions

TMa, BH, AD, and SN led the data collection. BH and TMa done the study conceptualization, data cleaning, data analysis, and writing. AD, VS, BR, KO, MC, and TMo was done the review of the paper and interpretation of the results. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1115160/full#supplementary-material

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Patients' representation of oncological disease: psychological aspects in the cancer journey

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KEYWORDS

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Introduction

Cancer patients' emotional distress, anxiety, and depression may affect different life areas (Rowland et al., 2009; Park et al., 2017; such as work, family, and relationship contexts) and may also lead to lower adherence to the intervention and detrimental effects on treatment efficacy (Arrieta et al., 2013; Savioni et al., 2022). In addition, people who received this diagnosis may change their motivation for everyday activities and their identity (Faccio et al., 2020; Durosini et al., 2021a). Some patients report having difficulty returning to their lives after cancer, experiencing the diagnosis as a trauma (e.g., Carreira et al., 2018). These consequences can occur regardless of the patients' stage of cancer and can also emerge during the communication of the diagnosis.

The confrontation with a life-threatening diagnosis requires physical and psychological adaptation to a new situation (Sebri et al., 2021; Durosini et al., 2022). In this sense, it becomes more and more important to understand not only the actual diagnosis from a medical point of view but also from the patients' personal and subjective representation of the disease. However, such subjective representation of the disease may lead patients to perceive themselves as "high-level" or "low-level" patients, with negative consequences for their healthcare journey.

In this opinion, we report highlights of patients' representation of cancer, with a specific focus on three psychological factors that could impact this representation. The available published evidence allows us to structure our opinion on the role of these aspects and the importance of the psychological perception of patients during the cancer journey. Finally, we conclude each section by providing details on the benefits of the psychologist's role in the oncological context to allow better consideration of all the discussed aspects.

Patients' representation of cancer

When it comes to patients' perception, tumors can highly vary in terms of size, stage of advancement, and severity of the diagnosis. The literature shows that a patient's perception of his or her disease is relatively independent of the objective and "scientific" characteristics of the disease. Historical work in this area has been done by Leventhal et al. (1980, 1984) and Bishop (1991), leading to a conception of illness representation (or "schema") associated with the idea of "prototype" from the cognitive psychology of categorization (Rosch, 1999). According to this theory, people form idealized models of symptoms and other attributes associated with different diseases. These models are compared with experienced symptoms and diagnosis information, leading to personal representations that influence coping, entry into, and use of medical treatment, as well as adherence and evaluation of treatment effects.

Broadly speaking, patients' representation should be considered as a mixture of the clinical/pathological information the patient is actually able to grasp, his or her own interoceptive experience of symptoms and discomfort, and the impact of health management on the overall quality of life (Weinman et al., 1996; Williams et al., 2023). People may have different mental images of their cancer and can use different colors, shapes, sizes, consistency, and texture to reflect what they thought their cancer looked and/or felt like (Harrow et al., 2008). Furthermore, chronic disease cannot be disentangled from the emotional burden that notably affects one's cognitive representations. For example, having a tumor deeply changes one's relationship with his or her own body (Sebri et al., 2021), when previously unnoticed, physical sensations are suddenly perceived as potentially threatening and felt in correspondence with strong negative arousal. In accordance with classical research on emotions (Frijda, 2009), it is not possible to predict one's emotional response based on objective characteristics of a stimulus: some patients may be psychologically disrupted or traumatized by some life events (e.g., Durosini et al., 2021d), while conversely, others may show extraordinary resilience when facing tragic news. Thus, published evidence highlighted that patients could have an individual perception of their cancer, judging the importance of their health, caring behaviors, and health-related concern in a specific way. According to Williams (1997), people's beliefs about their illness, self, and others could lead to possible dysfunctional illness behaviors. Illness representation includes, for example, the consequences and the causes of cancer and the controllability of the oncological journey (Williams, 1997). These aspects could be related to patients' personal experiences of illness, which generate inaccurate beliefs about the disease and could lead to inappropriate behaviors. Additionally, dysfunctional illness behaviors could be influenced by the beliefs that people have about themselves or others, in terms of personal vulnerability, negative evaluation of their self-competence, or lower beliefs in their ability (Williams, 1997). For example, the belief to be "defective" may lead patients who receive a life-threatening diagnosis to avoid complying with healthcare treatment, passively accepting their illness (Moorey and Geer, 1989). The interaction of all these aspects and other non-illness-related beliefs contributes to creating people's unique representation of their illness. On these bases, patients can perceive their cancer as more or less severe and their need for treatment as more or less urgent. As highlighted in a recent review, people who receive a low-risk oncological diagnosis may perceive their diagnosis and their overall health as less severe than people with advanced cancer (Dickey and Grayson, 2019). This could lead patients to perceive that their diagnosis has less weight and less value than that of other patients, promoting the view that they are less worthy of recognition. This can be linked not only to the type and severity of the cancer diagnosis but also to the type of cancer treatment prescribed and the related side effects. As Williams (1997) highlighted, the beliefs about the illness could incorporate the consequences/seriousness of the disease. In this line, patients who receive treatments that are associated with fewer adverse side effects may perceive themselves as less entitled to seek help when needed or receive attention and care, even if they need physical and psychological support. These patients' representation of themselves as less valuable than other patients may affect health management and the overall quality of life. It is possible that patients' subjective representations of the disease will be influenced by complex factors and will promote unexpected attitudes or behaviors that deserve to be taken into account to orient them in their decision-making and healthcare journey.

In addition to these aspects, published literature allows us to describe additional psychological factors that could impact the construction of personal representation on the cancer journey. In this opinion, we detailed three factors that may influence the process differently and allow for possible dysfunctional illness behaviors.

Social representation of disease and treatment

Patients are influenced in their personal representations of their conditions by the social context and the opinion of others. For example, text mining research focused on the communication around chemotherapy on Twitter shows that the social discourse is mainly structured around the utility and the side effects of this treatment, with tweets coming from patients more emotionally than those from health organizations (Zhang et al., 2018). In virtue of its reputation in terms of public discourse and also media representations (e.g., in movies), which often emphasizes the disruptiveness of its side effects, chemotherapy may be perceived as the "main" treatment for cancer or the treatment that is employed for the more severe cases. Patients or survivors who did not undergo chemotherapy may feel intimidated and insecure when confronted with other patients who did. They may feel like their cancer was "certainly" less severe, and therefore, their current demand for care and their need for expression and active listening (within the social context) are less important to meet than others. These beliefs may lead patients to fail to recognize the relevance of their physical and emotional burden related to the illness, and, consequently, to passively accept their diagnosis (Moorey and Geer, 1989). This could have a relevant impact on their general wellbeing.

In this line, psychologists have a crucial role to explore patients' concerns and beliefs about their diagnosis and the impact of social representation of disease and treatment on their psychological representation. Exploring and managing all these aspects are relevant to taking care of negative emotions and distorted representations of clinical conditions that could lead to negative outcomes and dysfunctional behaviors.

Social support and social recognition

Perceived social support during cancer may be an important precursor of personal growth and psychological wellbeing. Social support promotes patients' engagement in activities and individual motivation as it creates social bonds that encourage personal reflection on their needs and objectives (Novick et al., 2011; Cho et al., 2020; Durosini et al., 2021c). However, recent international studies identified important aspects related to the impact of cancer on informal caregivers and family members (Lambert et al., 2019; Sun et al., 2019), who can be involved in a more or less intense way in the cancer journey of their loved ones. In some cases, the social group may be a source of strain and distress instead of help to cancer patients. Reactions of family and friends to a diagnosis of cancer are influenced by several factors (Flanagan and Holmes, 2000). Excessive dread and fear may cause friends and family to display avoidance and withdrawal behaviors or over-solicitous and overprotective behaviors toward the loved ones (Norbeck et al., 1991). Therefore, caregivers' behaviors toward the patient could change deeply after the diagnosis of cancer. For example, the caregiver suddenly becomes over-caring and over-supportive in daily life. A patient who is used to being autonomous and independent inside the relationship may paradoxically feel overwhelmed and unworthy of the received attention. Additionally, the presence of the loved ones and the attention received can constantly remind the patient of the bad diagnosis: "I would just prefer to not think about my cancer while others' attention reminds me of it". On the contrary, it could happen that caregivers show an attitude of underestimation of the illness or estrangement from their loved ones, avoiding paying attention to the diagnosis and treatment. This could often represent safe mind "escapism" to preserve themselves from unacceptable negative emotions but can be perceived negatively by patients. This could appear as a greater devaluation of their suffering and illness, and some patients could perceive themselves as "low-level patient".

The psychologist could help caregivers to focus on their emotions, heuristics, and bias and obtain greater control of their inner world. Psychologists must ascertain the caregiver's preferred level of engagement in the decision-making process and the consultation and be aware of possible barriers/facilitators to family participation. The psychologist could help explore the solution for inclusion according to personal desire and help caregivers provide adequate support according to their loved one's preferences (Laidsaar-Powell et al., 2018).

Poor communication

A central aspect of the process of care is the communication between healthcare professionals and patients. The discussion about the diagnosis and the health treatments could represent a stressful aspect for patients and a potential source of emotional/affective discomfort, if not adequately managed. The absence of an effective and supportive place where patients can comprehend the clinical information could lead to a lower understanding of the rationale of their illness and a lower ability to create realistic expectations about risks related to their diagnosis. Generally, a diagnosis of cancer is associated with the expectancies of some potentially unfavorable events, such as pain, death, and loss of function (Parker et al., 2001). Psychological distress, depression, and anxiety could also lead to additional difficulties in managing several challenges related to their health journey and the treatment decision-making processes. The inadequate management of emotions might lead patients to be worried, confused, and anxious, and, consequently, make decisions based only on their negative feelings, avoiding a rational evaluation of their situation. The presence of emotional processing guided by expert psychologists is essential to have well-informed patients who can be actively involved in the decisions concerning their cancer journey (Oliveri et al., 2020). This aspect is also important because a survey found that the majority of physicians do not have a consistent strategy or plan when they convey bad news to their patients (Baile et al., 2000).

Emphasizing a collaborative discussion and involving patients in the decision-making process could lead to an accurate evaluation of health conditions and the subsequent plan of care. This is true for all the types and stages of cancer. In addition, non-advanced cancer patients (e.g., stages I and II) can be exposed to the risk of poor communication. Doctors may focus only on "favorable" clinical aspects of these types of cancer compared with other types of serious cancers (i.e., less invasive therapies than advanced cancers), avoiding the importance of all the psychological aspects connected with this diagnosis. In a context of a non-collaborative relationship between doctors and patients, this information could promote an incongruence between their "clinical information" and "psychological perception of their illness", leading them to a sense of "inferiority". This could make patients feel not authorized in their demand for care and in their need for expression and active listening. Patients may also perceive themselves as "less needy and worthy of care" than other patients with a more serious diagnosis. The active role of a psychologist in a multidisciplinary team could help a collaborative discussion that considers patients' inner words (and the role of emotions in the decision-making process and their illness perception) and supports physicians during communications (Oliveri et al., 2020). Using emotional intelligence (Durosini and Pravettoni, 2021; Durosini et al., 2021b) to stay in contact with patients could guarantee better patient education and an empathic context.

Conclusion

This article highlighted the relevance of patients' representations of cancer and the impact of social context and healthcare aspects on their perceptions of care. Published evidence highlighted that patients can represent their cancer as more or less severe and their need for treatment as more or less urgent. Patients may perceive that their diagnosis has less weight and less value than that of other patients, promoting the view that they are less worthy of recognition or value as a human being. We described three complex factors that influence the subjective representation of the illness: (i) the social representation of disease and treatment, (ii) the social support and social recognition, and (iii) the poor communication.

It is important to guide patients to recognize their health conditions and reorient their representations of illness into their own life story. Exploring their personal beliefs and needs in relation to their cancer journey allows them to have personal control over their illness, helping them to transfer their skills to several areas of life (Sebri et al., 2020). In this context, the active role of psychologists is relevant for taking care of patients' emotions, supporting physicians during communication, and guaranteeing patient and caregiver education and information (Oliveri et al., 2020). Additionally, patients can benefit from peer support (Durosini et al., 2021c). It is based on a non-hierarchical relationship, and the interaction between individuals with similar characteristics is generally beneficial. The relationship between patients with a similar history of cancer can help to establish a sense of normalcy in patients' life and acquire new competencies.

Author contributions

ID conceptualized the ideas presented in the article and wrote the first draft of the manuscript. GP edited the manuscript and contributed with important intellectual content. All authors contributed to the refinement of the manuscript and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Acceptance and adherence to non-invasive positive pressure ventilation in people with chronic obstructive pulmonary disease: a grounded theory study

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Introduction: Non-Invasive Positive Pressure Ventilation (NPPV) is an established treatment for people with Chronic Obstructive Pulmonary Disease (COPD), but it is often improperly used or rejected. The patterns of acceptance and adherence to NPPV, conceiving constraints, and strengths related to its adaptation have not been explored from a qualitative perspective yet.

Objectives: This study aims to qualitatively explore patterns of adaptation to NPPV in people affected by COPD and to identify the core characteristics and the specific adaptive challenges during the adaptation process.

Methods: Forty-two people with moderate or severe COPD were recruited and 336 unstructured interviews were conducted. A Constructivist Grounded Theory was used to gather and analyze data: the transcriptions were mutually gathered in open, selective, and theoretical phases, with open, selective, and theoretical coding, respectively.

Results: The analysis resulted in a non-linear and dynamic process, characterized by three phases: deciding, trying NPPV, and using NPPV. The patterns revealed that positive and negative NPPV experiences, together with beliefs, emotions, stressful mental states, and behaviors result in different acceptance and adherence rates.

Discussions: These findings may be helpful to implement new care strategies to promote acceptance and adherence to NPPV.

KEYWORDS

chronic obstructive pulmonary disease (COPD), non-invasive positive pressure ventilation (NPPV), acceptance, adherence, constructivist grounded theory

1. Background

Chronic obstructive pulmonary disease (COPD) is the third leading cause of death worldwide, causing 3.23 million deaths in 2019 (World Health Organization, 2014; Venkatesan, 2022). COPD is a common, preventable, treatable, and progressive chronic lung disease characterized by airflow limitation that is not fully reversible. Progressive dyspnea, chronic cough, and/or sputum production are considered the main symptoms, and a history of exposure to risk factors (i.e., smoke, air pollution, exposure to particles) is also a major consideration (Vogelmeier et al., 2017). Disease progression often leads to severe hypoxemia (Lacasse et al., 2022), resulting in daytime fatigue (Ebadi et al., 2021), sleepiness (Li et al., 2021), reduced exercise tolerance, impaired cognitive functions (Simargi et al., 2022; Zhao and Zhou, 2022), anxiety (Martínez-Gestoso et al., 2022), and depression (Peiffer et al., 2021; Martínez-Gestoso et al., 2022). Long-term Oxygen Therapy (LTOT) has been found to improve the quality of life (Pavlov et al., 2018). Another respiratory treatment is Non-Invasive Positive Pressure Ventilation (NPPV), which refers to the administration of synchronized ventilatory support without using an invasive artificial airway (endotracheal tube or tracheostomy tube). NPPV is considered standard therapy for patients with Acute Respiratory Failure (ARF) or Chronic Respiratory Failure (CRF) due to COPD. Improvements in both survival and intubation rates are well-rooted (Windisch et al., 2002; Roberts et al., 2008; Comellini et al., 2019), reducing mortality and lowering hospital care costs (Abubacker et al., 2021; Burns et al., 2022). NPPV helps to relieve symptoms such as daytime fatigue, and dyspnea, normalizing CO_2 and O_2 levels in the body; it can be effective in reducing time in hospital and preventing exacerbations (Comellini et al., 2019; Wilson et al., 2020). In interventions such as NPPV, balancing the comfort of the patient and the parameters setting of ventilatory support is a recognized part of patient-centered care and it is more and more desirable to increase both compliance and adherence (Barry and Edgman-Levitan, 2012). NPPV's rejection or improper use represents big challenges and has been associated with baseline dyspnea, acute acidosis, and intolerance to the treatment, in particular to the mask (Hess, 2011), air leaks (Tan et al., 2022), and the size of the dead space (Elliott, 2004).

Previous studies have used quantitative research designs and have paid attention to the influence of NPPV from a medical perspective, resulting in less literature about the lived experiences and the process of adaptation to NPPV's usage (Ngandu et al., 2016; Dennis et al., 2022; McCormick et al., 2022). These few studies noted that COPD people expressed initial feelings of being trapped (Iosifyan et al., 2019) and fears that they will become completely dependent on others (Torheim and Gjengedal, 2010; Beckert et al., 2020) or on medical devices (Lindahl et al., 2005), and experienced anxiety or discomfort (Christensen et al., 2018). However, only one study tried to develop a behavioral model of their experience with NPPV, showing that, after both a restrained and a transition phase, the patient tends to develop tolerance or total rejection towards NPPV (Sørensen et al., 2014). Furthermore, to our knowledge, no study has explored the perspective of COPD patients on adaptation to NPPV not only considering the first hours of adaptation but rather the first weeks, with a constructivist approach based on grounded theory.

1.1. Objectives

The main aim of this study was to develop a theoretical account of the pattern of acceptance and adherence to NPPV in COPD people, conceptualizing barriers and facilitators that may explain variations during the adaptation process. In particular, the aim was to identify the characteristics and management levers of NPPV in people affected by COPD and suggestions to guide its adaptation and adherence. The research questions orienting this study were "What is the main concern during the adaptation to NPPV for COPD patients?" and "How did the COPD patients cope with NPPV?"

2. Methods

2.1. Ethical approval and informed consent

This study was approved by the Ethics Committee of the IRCCS Fondazione Don Carlo Gnocchi (reference: 15 February 2015), in Milan (Italy), in the mainframe of a large RCT on acceptance and adherence to NIV in people with COPD (ref. ClinicalTrials.gov ID: NCT02499653).

All the participants signed a Consent Form after being informed verbally and in writing about the study, their right to withdraw at any time, anonymity, and confidentiality. We confirm that all personal identifiers have been removed or disguised so the individuals described are not identifiable and cannot be identified through the details of the story.

2.2. Design

We used a qualitative approach, according to the Constructivist Grounded Theory (CGT), which favors the generation of a conceptual understanding from a bottom-up standpoint of textual data (Glaser, 2002; Charmaz, 2006, 2014; Glaser and Strauss, 2017). CGT allows emphasizing both conceptualization and the interactive process in an area that is not extensively evaluated. Moreover, the constructivist aspect of the method allowed for the elaboration of the theoretical coding session by session, resulting in a dynamic deliberation of the researchers (Charmaz, 2006, 2014). The research strategy followed the grounded theory method as presented by Glaser and Strauss (2017), developed by Glaser (1978), and influenced by Strauss and Corbin (1998) as described in Hylander (2003). This study followed the COREQ (COnsolidated criteria for REporting Qualitative research) (Tong et al., 2007).

2.3. Participant selection

2.3.1. Sampling and method of approach

Eligible participants were approached face-to-face at the Cardio-Respiratory Rehabilitation Unit of IRCCS Fondazione Don Carlo Gnocchi, Milan (Italy), after the respiratory visit with the Pulmonologist. They were recruited according to purposive sampling, respecting the inclusion and exclusion criteria described in paragraph 2.3.2, and proceeded until theoretical saturation was reached (i.e., the emergent theory was fully represented by the data collected). In this regard, of the relatively homogenous population and the lack of a previous theoretical model about the adaptation to NPPV, analysis was conducted after every 15 interviews, and data saturation was determined when no new codes, themes, or patterns emerged (Fusch and Ness, 2015).

2.3.2. Inclusion and exclusion criteria

Participants were included if they had a confirmed diagnosis of COPD according to Global Initiative for Chronic Obstructive Lung

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Abbreviations: LTOT, long-term oxygen therapy; NPPV, non-invasive positive pressure ventilation; ARF, acute respiratory failure; CRF, chronic respiratory failure; COPD, chronic obstructive pulmonary disease; GOLD, global initiative for chronic obstructive lung disease; RCT, randomized controlled trial; FEV_1, forced expiratory volume in 1 second; MMSE, mini-mental state examination; CGT, constructivist grounded theory; COREQ, consolidated criteria for reporting qualitative research.

Disease (GOLD) criteria (Venkatesan, 2022), from moderate [Stage 2–50% ≤ Forced Expiratory Volume in 1 Second (FEV_1) < 80% predicted] to severe (Stage 3– 30% ≤ FEV_1 < 50% predicted) along with using NPPV.

Patients admitted with acute decompensated hypercapnic exacerbations of COPD requiring acute NPPV were screened for eligibility at least 2 weeks after the resolution of decompensated acidosis (arterial pH >7.30). Patients were required to have persistent hypercapnia ($PaCO_2 > 53$ mm Hg) and hypoxemia ($PaO_2 < 60$ mm Hg; or cor pulmonale; >30% of sleep time with oxygen saturation < 90% as measured by pulse oximetry); and arterial pH > 7.30 while breathing room air.

Exclusion criteria were symptoms indicating a severe cognitive and/or behavioral dysfunction [Mini-Mental State Examination (MMSE) corrected<21] (Folstein, 1983).

2.4. Data collection

2.4.1. Instruments

Unstructured interviews were undertaken because we had established through a literature review that little was known about the nature of the characteristics and management levers of NPPV (Ngandu et al., 2016) and, in particular, the underline process of adaptation to NPPV in COPD (Sørensen et al., 2014). Moreover, our topic was broad, and we did not set out to focus on any factor of the adaptation process. A story-telling approach was used to encourage the participants to narrate their relationship with the first approach to NPPV. Hence, most clinical sessions began with the story of what was new for the participants: therefore, they mostly talked about their first approach to NPPV. Every time participants struggled with phrasing an episode, prompts were applied. An inductive interviewing approach encouraged subjects to express themselves freely, thereby allowing themes to emerge.

2.4.2. Duration

Concurrent data collection and analysis, constant comparative analysis, and theoretical sampling were carried out between June 2015 and December 2018. The duration of each face-to-face conversation was about 30–45 min, and they were conducted during the adaptation process to NPPV weekly for a total of 4–8 sessions, according to the patient's needs, and during a psychological support intervention for an average time of about 1–2 months and a half per participant. The clinical sessions were audiotaped and transcribed verbatim immediately after their conclusion. Moreover, some field notes and analytic memos were annotated both during and after the interview to aid further interpretation as well as for self-reflection purposes. Data collection analysis has been implemented in parallel to refine concepts and theory.

2.4.3. Setting of data collection

Clinical sessions were conducted face-to-face by the first author (EV), a trained Psychologist, either in the participants' homes or in a clinic room at the Cardio-Respiratory Rehabilitation Unit. There were no previous relationships between the study participants and the researcher before the start of the study, as new admissions at the mentioned department. No one else was present behind the participants and the researcher, to allow a comfortable environment and treat them as the main informants and competent commentators on their adaptation process to NPPV's usage.

2.5. Data analysis

Constructivist Grounded Theory Approach was used for data analysis (Charmaz, 2006, 2014; Glaser and Strauss, 2017). This approach is based on the concept of emergent themes, which are not used only to explore an issue but also to construct a cohesive idea or theory about an investigated phenomenon. Following the criteria for methodological rigor in qualitative research (Creswell, 2014), the transcribed data were jointly collected in open, selective, and theoretical phases (Glaser and Strauss, 2017) until conceptual density was achieved. They were categorized using the constant comparison model. Firstly, each sentence was analyzed line by line to elicit the categories and define their meaning (open coding). Secondly, the relationship between categories was considered to allow the formulation of conceptual main classification (selective coding). Finally, the integration between conceptual categories was favored to create a wide theoretical model about the process of adaptation to NPPV (theoretical coding). The analysis was carried out using the NVivo software (QSR International®, version 11).

2.5.1. Validity of the analysis

Data were validated by coming back to and scrutinizing all of them for meaning that had interfered. The grounded theory does not allow any sort of hypothesis. However, there is an assumption that might have influenced data collection, analysis, and interpretation. Indeed, a positive partnership with the patient could improve the adaptation to NPPV. To mitigate the impact of this assumption during the stages of the study, reflexive discussions among authors were conducted. Furthermore, coding and emergent findings were discussed regularly, to orient both subsequent sampling and analysis. Triangulation was sought with another psychologist (FP) and a clinician (PB) to enrich and fine-tune the analysis that converged on the final interpretation. All discrepancies have been discussed and a final consensus was reached.

3. Results

3.1. Characteristics of the study participants

According to CGT methodology, sampling evolved from a purposive to a theoretical strategy (Charmaz, 2006, 2014). The sampling strategy assured the gathering of relevant and diverse data inherent to the research question. Successively, to test stories about the process of successful adaptation or rejection to NPPV, we opted for theoretical sampling. The initial objective was to collect up to 30 sessions, but it was broadened to address the arising themes in the data. Therefore, a total of 336 sessions were included in the process of the analysis and reported the adaptation to NPPV of 42 participants (males = 19; females = 23; mean age = 77.02, SD = 7.53). Each session lasted a mean of 40 min (SD = 2.5) and 28.57% ($n = 12$) needed fewer than 8 sessions (a mean of 5 sessions over a total average period of 2 months).

None of the participants recruited withdrew from the study or was asked to interrupt the interviews.

The sociodemographic features of the sample are illustrated in Table 1.

3.2. The arisen process underlying acceptance and adherence to NPPV in COPD

The process behind acceptance and adherence to NPPV in COPD people emerged as a theoretical model through which the participants tried to balance their clinical needs with the difficulties in approaching NPPV. The process is configured as dynamic, non-linear, and marked by positive and negative experiences, facilitators, and barriers as well as psychological features that can influence the process itself and the coping strategies that the participants implement to deal with the process itself. Indeed, COPD participants can develop adherence to the treatment when they adopt constructive strategies; while, if they do not make the effort to deal with the adaptation to NPPV or they manage them destructively, they can develop poor compliance, rejection, or improper usage, respectively (Figure 1).

Table 2 shows the 50 most used words during the adaptation process to NPPV in COPD.

3.3. Patterns of adaptation and adherence to NPPV

The first step that characterized all the patients interviewed is represented by deciding on accepting the idea to try or reject NPPV when the physician proposes it [i.e., *"a huge new breathing machine that looks like a harness"* (A0103)]. An essential component of this first phase is a good alliance between the pulmonologist and the patient. Moreover, feelings of meaningfulness [i.e., *"I never had it and I do not understand why I should wear it"* (B0205)], perceived orders [i.e., *"I feel compelled, obliged. They are all with rifles pointed"* (B0202)], or hope of success of NPPV [i.e., *"It cannot do miracles, but I hope it helps me getting better"* (B0203)] were significantly related to the decision of accepting or rejecting NPPV at first sight.

Some COPD patients perceived NPPV as a command and did not completely understand the relevance and the objective of the device or, on the contrary, they did not recognize it as significant for themselves and their wellbeing. Therefore, most people totally and immediately rejected NPPV, yielding to the fear of losing autonomy as well as the preservation of self-determination, especially if they had few symptoms or lacked knowledge about their respiratory condition. On the other hand, some COPD patients considered NPPV as probably meaningful to improve the therapeutic and routine care processes, both witting of their respiratory conditions and fearing their deterioration. Other participants underlined their conception of the decision to undertake NPPV as resting solely with the doctor. In these cases, they immediately took a position against NPPV or decided to passively follow the physician's indications. Before perpetrating NPPV's usage, some COPD participants suspended it after trying it a few times and/or persevering on the basis of its everyday effects on their respiratory conditions. Indeed, some people

TABLE 1 Socio-demographic characteristics of the overall sample.

Socio-demographic characteristics	
Variable	Sample (*n* = 42)
Gender, M/F (% male)	19/23 (45.2)
Age, mean (SD)	77.02 (7.53)
Marital status, *n* (%)	
Single	2 (4.8)
Married	29 (69)
Widower	7 (16.7)
Separated	3 (7.1)
Divorced	0
Without any family or social support	1 (2.4)
Cohabitants, *n* (%)	
Spouse	23 (54.8)
Mather	1 (2.4)
Father	0
Sons	4 (9.5)
Other relatives	2 (4.8)
Carer	1 (2.4)
Friends	0
Senior centre	0
Alone	6 (14.3)
Spouse and carer	1 (2.4)
Spouse and sons	3 (9.6)
Educational Level, *n* (%)	
None	4 (9.5)
Primary school	14 (33.3)
Secondary school	7 (16.7)
High School	12 (28.6)
Bachelor's degree	1 (2.4)
Master's degree	4 (9.5)
Working area, *n* (%)	
Craft industry	1 (2.4)
Business sector	3 (7.1)
Housewives	6 (14.3)
Industrial chemistry	3 (7.1)
Desk Jobs	15 (35.7)
Workers	6 (14.3)
Food service industry	1 (2.4)
Healthcare	2 (4.8)
Construction industry	1 (2.4)
Transport	1 (2.4)
More areas	3 (7.1)
Mean length of illness, *n* (%)	
About 5 years	15 (35.7)
6–14 years	18 (42.9)

(Continued)

TABLE 1 (Continued)

Socio-demographic characteristics	
Variable	**Sample (n = 42)**
More than 15 years	9 (21.4)
Exacerbations during the last year, *n* (%)	
None	20 (47.6)
1–3	17 (40.5)
More than 3	5 (11.9)
Hospitalisations last year, *n* (%)	
Less than 1	20 (47.6)
2	13 (31)
More than 2	9 (21.4)
Assistance during the last year, *n* (%)	
Yes	9 (21.4)
None	33 (78.6)
Type of assistance (if received), *n* (%)	
Senior Centre	0
Day care	1 (2.4)
Nurse	4 (9.5)
Physiotherapy	2 (4.8)
Other (i.e., clean)	2 (4.8)
Smoking Habits, *n* (%)	
Yes, active	4 (9.5)
No, never	7 (16.7)
Ex	30 (71.4)
Pack/year, *n* (%)	
Less than 10	4 (9.5)
10–20	14 (33.3)
More than 20	16 (38.1)
Alcohol habits, *n* (%)	
Never	21 (50)
Rarely	10 (23.8)
Sometimes	9 (21.4)
Quite often	0
Almost always	1 (2.4)
Always	0
Physical activity, *n* (%)	
Never	17 (40.5)
Rarely	8 (19)
Sometimes	8 (19)
Quite often	8 (19)
Almost always	0
Always	0
Medications, *n* (%)	
LABA	25 (59.5)
LAMA	25 (59.5)
CSI	28 (66.7)
Anxiolytics	14 (33.3)
Antidepressants	13 (31)
Number of medication, mean (SD)	9.2 (3.25)
Number of comorbidities, mean (SD)	2.88 (1.31)
BMI, mean (SD)	29.27 (7.64)

SD, standard deviation; Tot., total score; n, number of subjects; M, male; F, female; LABA, long-acting b2-agonists; LAMA, long-acting muscarinic antagonist; ICS, inhaled corticosteroids; BMI, Body Mass Index.

accepted it simply because of the medical prescription or persisted in using NPPV despite feeling it was a burden.

Most of the involved patients experienced both positive (79 references) and negative feelings (140 references) related to NPPV's use. Examples of *internal positive experiences* were embodied by the benefits perceived during both daily life and night rest, while the *external positive experiences* could be represented by the perceived support from loved ones or the healthcare professionals.

On the other hand, *internal negative experiences* were depicted by the scarcity of a substantial effect on the respiratory symptoms or negative feelings such as fear of losing independence or of having to use NPPV forever. *External negative experiences*, for instance, were portrayed by a lack of professional support or listening and clarifications by healthcare professionals.

Both positive and negative experiences are provided to raise or strengthen the beliefs that often play a relevant role in the decision-making process to begin NPPV [i.e., *"I cannot decide, the decision is in the doctor's hands"* (Z02527)]. The experiences also contributed to evoking emotions [i.e., *"That machine ruins my life, and having to use it worries me. It makes me feel anxious, that they have already diagnosed me in the past."* (BO202)] and allowed us to develop pressure-filled mental states [i.e., *"My granddaughter does not want to see me with that mask. She is 32 years old and lives together with her boyfriend and she often visits me. I do not take it kindly."* (AO104)].

Both internal and external, positive, and negative experiences as well as beliefs and emotions and stressful mind states actively and dynamically interact with each other, that in turn interface with acceptance and adherence and the coping strategies developed by the patients to face experiences and emotions. On the other hand, some COPD participants did not develop constructive coping strategies, resulting in compliance with NPPV. In this context, the constructive coping strategies favored the flourishing of adherence, while the destructive coping strategies opened the doors to improper use or a total rejection of the NPPV (Figure 1).

3.4. Coping strategies

The analysis of coping strategies resulted in the creation of two categories: *consolidated strategies* (n = 16, 38.9%) and *new strategies* (n = 21, 50%). Both of them allow us to distinguish between "constructive" and "destructive" coping strategies, which represent a form of adaptive or maladaptive coping, respectively (Lazarus and Folkman, 1984). Five participants (11.9%) recurred to both

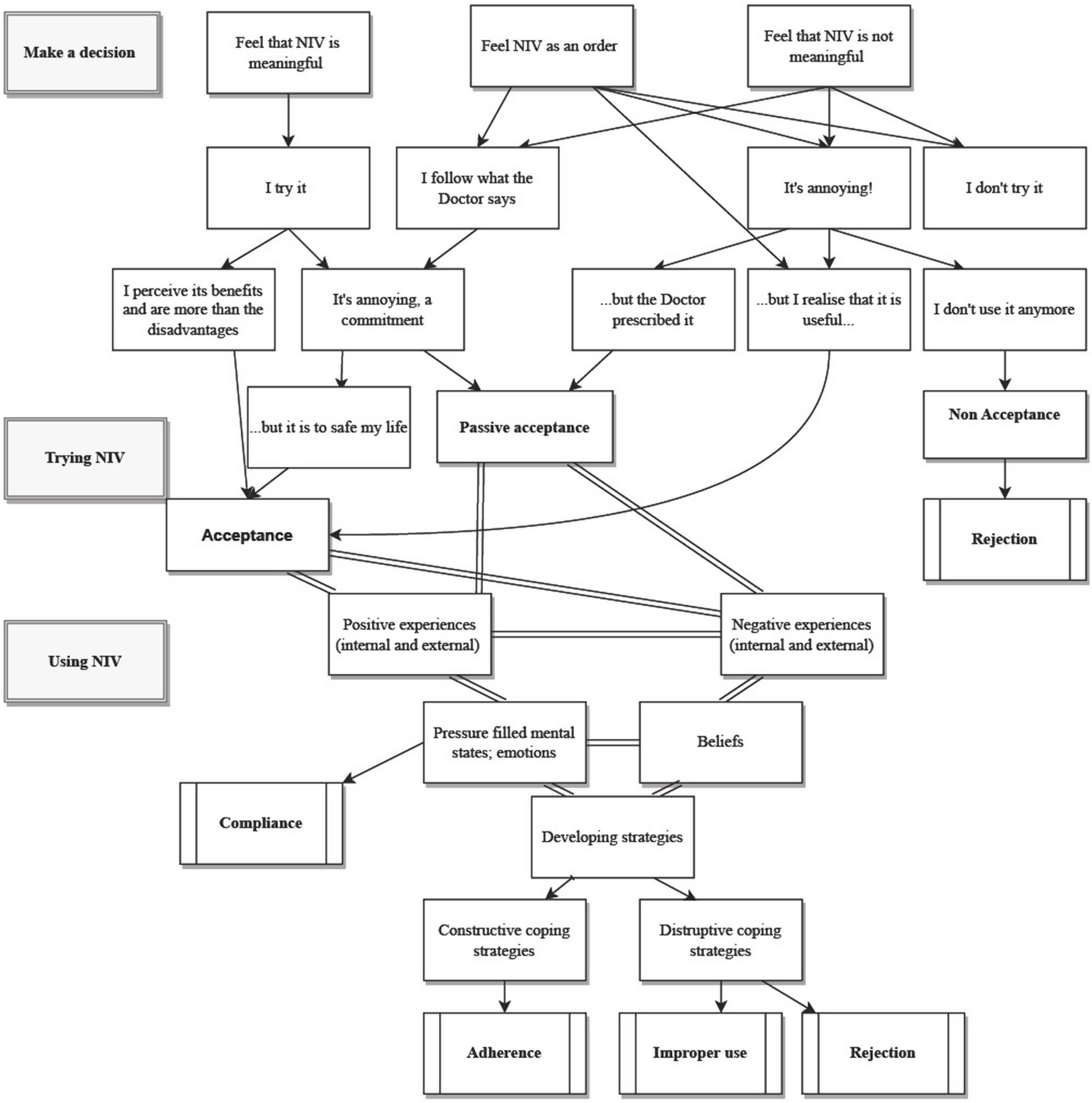

FIGURE 1
Patterns of acceptance and adherence to NPPV emerged from the analysis.

consolidated and new strategies. The most frequently used constructive coping strategies were represented by: adaptation, which consists of gradually increasing the amount of NPPV practiced according to the prescribed indication of the pulmonologist ($n = 5$; 11.90%); intellectualization, paying more attention to the facts than to the emotions ($n = 2$; 4.76%); irony or sense of humor ($n = 3$; 7.14%); performing NPPV as a ritual ($n = 6$; 14.28%); fantasy, which allowed access to a world of possibilities ($n = 1$; 2.38%); and distraction, opting for hobbies ($n = 9$; 21.42%).

On the other hand, the most common destructive coping strategies were depicted by: avoidance, which consisted of not asking for more information about the clinical conditions, fearing a deterioration, not asking for help, fearing becoming a burden or losing autonomy ($n = 2$; 4.76%; denial $n = 4$; 9.52%); rationalization, that is, looking for reasons to stop using NPPV ($n = 5$; 11.90%); and procrastination, which comprised of postponing bedtime to reduce the hours of NPPV practice ($n = 4$; 9.52%) (Table 3).

It is also important to note that some of these coping strategies were combined and were about a change of perspective about COPD or NPPV (constructive), as well as a return to the past, which hinders both awareness and changing perspective (destructive).

Adherence to NPPV may vary among individuals and may be influenced by various factors. From our study, it appears that the presence of a caregiver can certainly play a role in supporting and encouraging treatment adherence. However, it is important to note that adherence does not depend solely on the presence of a caregiver. Some factors that may affect adherence to NPPV in a person with COPD and that emerged from the study are shown in Table 4.

TABLE 2 Overall word frequency of the 50 most words used during the process of adaptation to NPPV.

Word	Length	Count	Weighted percentage
Ventilation	12	182	0.22%
Interview	9	138	0.16%
Respect	8	125	0.15%
Deepen	13	104	0.12%
Illness	8	104	0.12%
Mask	8	102	0.12%
Overall	11	102	0.12%
Exercise	9	101	0.12%
Difficulty	10	90	0.11%
Route	8	90	0.11%
Refers	9	87	0.10%
Meeting	8	79	0.09%
Device	11	73	0.09%
Problems	8	72	0.09%
Respiratory	12	71	0.08%
Something	8	69	0.08%
Reflect	10	69	0.08%
Could	8	68	0.08%
Let us do	8	65	0.08%
Machine	8	65	0.08%
Nuisance	8	63	0.07%
Possible	9	63	0.07%
The oxygen	10	61	0.07%
Elaborate on	12	59	0.07%
Relaxation	12	59	0.07%
Tells	8	56	0.07%
Salute	9	55	0.06%
Pathology	9	53	0.06%
To take	8	53	0.06%
May be possible	9	52	0.06%
Adds	8	51	0.06%
Hospital	8	51	0.06%
We reflect	11	51	0.06%
Worried	11	49	0.06%
Invasive	8	48	0.06%
To walk	9	46	0.05%
Possibility	11	45	0.05%
Recovery	8	45	0.05%
Medicines	8	44	0.05%
Showing	11	43	0.05%
Explore	10	42	0.05%
Family	8	42	0.05%
To breath	9	42	0.05%
Strategies	9	42	0.05%
Physiotherapy	12	41	0.05%
Management	8	39	0.05%
Try	9	38	0.04%
Mindfulness	11	36	0.04%
Hard	9	35	0.04%
Concern	14	35	0.04%

4. Discussion and conclusion

4.1. Discussion

The findings based on COPD participants' adaptation to NPPV pointed to both strengths and difficulties of the process, which has been characterized to be non-linear and dynamic. Participants reported the NPPV intervention as both a burden and a relief, an aspect that emerged along all the three principal identified phases: making a decision, trying NPPV, and using NPPV. According to previous studies, the adaption to NPPV could be defined as a lengthy and progressive process, a gradual familiarization, by which COPD patients try to modify their routine healthcare to introduce a new device (Lindahl et al., 2005; Ngandu et al., 2016). In this respect, it is important to note that this study paid attention to the adaptation to NPPV in CRF, because as previous studies noted, several patients in ARF described that experience as confused, not remembering all from the acute stage (Torheim and Gjengedal, 2010). On the other hand, Sørensen's theoretical model, which paid attention to the patients admitted to the hospital because of ARF, observed similar behavioral patterns: indeed, in both studies, an early failure in approaching NPPV was associated with a lack of tolerance and/or discontinuing NPPV until a complete dismission. Moreover, the authors identified the meaningfulness associated with the participants' experiences as a relevant strength, which could be led back to the constructive coping strategies that emerged from our model (Sørensen et al., 2014). Our study draws attention also to a peculiar vulnerability to failure (Duan et al., 2019) at both the beginning of the NPPV treatment and after a period of successful adaptation (Carratu et al., 2005; Sørensen et al., 2014). The participants' process of adaptation allowed us to note some individual variations between those who immediately accepted NPPV and those who became just compliant with it, those who accepted it after a long time but developed adherence, and those who completely refused it. These variations were related to both the inner and external, positive, and negative experiences related to the device as well as to the beliefs, emotions, and mental states felt. Unsolved breathlessness and the implemented coping strategies, contrary to the case of ARF (Sørensen et al., 2014), seemed to play an important role in improving or decreasing the acceptance and then adherence to NPPV.

The study also underlined the relevance of the positive support received from both the family members and the healthcare professionals during the adaptation to the device, confirming that the participants believed themselves inbetween dependence and autonomy at various levels because of NPPV. Indeed, their need for support emphasized the relevance of relationships as means for developing constructive coping strategies (Torheim and Gjengedal,

TABLE 3 Examples of constructive and deconstructive coping strategies and the respective number of participants who referred to each strategy.

	Constructive	Examples	Deconstructive	Examples
Coping strategies				
	Adaptation (*n* = 5; 11.90%)	*<<I could try to use the ventilation a few hours at a time, increasing them more and more...> >* (H0808)	Avoidance (*n* = 2; 4.76%)	*<<At home, nobody helps me, I do not want to be helped. I'm against it, I've always done it for everyone> >* (AO103)
	Intellectualization (*n* = 3; 7.14%)	*<<Today, for example, with the bike I did better and calmed down. I put in the ventilation and kept it all over the night>>*(E0508)	Denial (*n* = 4; 9.52%)	*<<I do not think it depends on the treatments I'm doing, but that's why it is, I'm old now> >* (AO102)
	Performing rituals (*n* = 6; 14.28%)	*<<It's like taking pills, you'll use to do it>>* (AO102)	Rationalisation (*n* = 5; 11.90%)	*<<For now, I do not feel a real benefit, "*(BO203)*"; Let us say I think I might be without it. I've been up to date ... If I need to do it>>* (AO102)
	Fantasy (*n* = 1; 2.38%)	*<<I think there is something magical. Maybe it's Dr. XX! The soup ... who knows!> >* (Y02425)	Procrastination (*n* = 4; 9.52%)	*<<I'll go to bed as late as possible, to reduce the ventilation hours ... it gives me too much trouble!> >* (BO204)
	Irony (*n* = 3; 7.14%)	*<<It will continue, but you must ironize> >* (Z02527)		
	Distraction (*n* = 9; 21.42%)	*<<I enjoy crosswords, solitude, deep breathing exercises, and prayer. At 74 I cannot change my life> >* (X2323)		

TABLE 4 Factors that may affect adherence to NPPV in COPD as emerged by the analysis.

Factor	Description	Citation
Education and understanding (*n* = 36; 85.71%; 40 references, 12.97% coverage)	A good understanding of the advantages and appropriate application of NPPV is essential. The patient must comprehend how the medication works and why it is crucial for controlling the symptoms of COPD. Health care professionals are required to give precise instructions and address any worries or inquiries.	*<< They put a machine on me at night. But it's too much to keep it all night. I've never had it and I do not understand why I should put it on and then I get short of air with the mask, it suffocates me and they do not understand it…> >* (B0205)
Comfort and fit (*n* = 5; 11.90%; 5 references, 1.1% coverage)	Comfort and fit of the NPPV equipment, such as the mask or nasal prongs, can have a big impact on adherence. Equipment fitting, adjusting, and review on a regular basis can reduce discomfort and increase compliance.	*<< At first the mask bothered me. Especially the olives. Now, with the new one, it's better. The last one is more comfortable > >* (C0507)
Side effects (*n* = 30; 71.42%; 56 references,13.47% coverage)	Some people may have NPPV-related side effects or discomfort, including as dry nasal passages, itchy skin, or claustrophobia. To increase adherence, health care practitioners must swiftly address these issues.	*<< My skin is delicate and that mask is a problem, I would like one that does not scar my face. All the skin on my face is damaged> >* (B0202)
Self-motivation (*n* = 10; 23.8%; 11 references, 5.16% coverage)	Adherence to NPPV frequently necessitates self-motivation and self-mastery. Even when there is no caregiver present, it is crucial that people commit to utilize therapy as directed and acknowledge its advantages.	*<<Yesterday with Dr XX we looked at the ventilator...if I have to bring it, I'll bring it. It's up to the doctor to give the device...experiences are many, of all colors> >* (G0710)
Support network or caregiver presence (*n* = 21, 50%; 34 references,24.9% coverage)	Although the absence of a devoted caregiver may make therapy compliance more challenging, individuals may turn to other sources of support, such as family, friends, or support groups. However, they are often afraid of being a burden to the latter. People can maintain their motivation and accountability with social support.	*<<My son is young, 21 years old, and he is out of the house all day because he works…> >* (Z2527)

2010; Kvangarsnes et al., 2013; Torheim and Kvangarsnes, 2014). It must be underlined that adherence is a complicated subject and that every person's situation is unique. It is fundamental to remind patients to consult a medical expert who can offer customized advice and assistance if there are some troubles adhering to NPPV or any other medical treatment. On the other hand, it is essential to take the ethical ramifications of top-down decision-making without the patient's point of view into account. The introduction of NPPV can have psychosocial and emotional implications for patients, as it may disrupt their daily routines, limit mobility, or cause discomfort. Considering these aspects, together with the person's values, building trust in the treatment process, and the centrality of patient wellbeing from the very beginning of the decision to embark on the NPPV adjustment pathway, can serve as carriers to encourage one's active involvement in the treatment process (Rapelli et al., 2023). Healthcare personnel should participate in shared decision-making procedures that put the patient's autonomy, informed consent, trust, and personal values and objectives first. Healthcare practitioners can improve patient participation and encourage more moral and patient-centered care by considering the patient's perspective. The results of our study are in line with those found in the literature, which encourages the consideration of these aspects in the engagement process, even in populations with chronic respiratory diseases in adaptation to external devices (Rapelli et al., 2022).

Our findings fit the data from empirical situations, abstaining from adopting predetermined theories. Recruitment was limited to people with moderate or severe COPD in need of NPPV: therefore, we cannot assume that our findings reflect all the possible details for the entire range of patterns of adaptation to NPPV. This study was conducted in a single rehabilitation ward, so the adaptation to NPPV and the management of COPD patients might reflect the local culture. In this case, we defined the sampling as purposive because we started by selecting only those patients who had a confirmed diagnosis of COPD according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria, from moderate [Stage 2-50% ≤ Forced Expiratory Volume in 1 Second (FEV_1) < 80% predicted] to severe (Stage 3-30% ≤ FEV_1 < 50% predicted) along with the use of NPPV and without cognitive impairment. Since this was a specific sample, purposive sampling allowed us to include individuals with unique insights or experiences that may contribute to a comprehensive understanding of the phenomenon under investigation. Subsequently, sampling was conducted based on the themes that progressively emerged. In the future, it might be useful to consider different rehabilitation centers or even different countries, as health professionals and/or different approaches to NPPV might differ. Subsequent quantitative studies may help in understanding which of the factors identified as influencing, from the patient's point of view, the process of adaptation to NPPV may influence to a greater or lesser extent (e.g., whether being without support, as in the case of one of our participants, significantly affects adherence to NPPV). Similarly, it would be very interesting to know whether having difficulty in changing certain lifestyle habits (e.g., smoking cessation) correlates significantly with difficulty in terms of adaptation to NPPV, an aspect that in our study was found to be related to motivation based on what participants reported, but which could not be verified. Nevertheless, the data included a considerable variation in COPD patients' experiences, length of the adaptation process to NPPV, comorbidities, age, and gender. Counseling interviews allowed us to gain insight into the participants' adaptation to NPPV, paying attention to their beliefs, thoughts, and behaviors, and following the adaptations to NPPV step by step. This approach allowed us to comprehend a limited research area, even if the sample of people with COPD involved in our study is relatively small and they were all psychologically supported during the NPPV's adaptation.

4.2. Conclusion

For COPD individuals, using NPPV represents both a necessity and a stressful experience at the same time. The patterns of adaptation arising from our study underlined the importance of an interrelationship between beliefs, state of mind, emotions, behaviors, and coping strategies, as a fundamental matching to improve or decrease acceptance and then, adherence to the device. These findings offer clinicians and policymakers a series of patients' perspectives, paying attention to the psychological factors underlined by the adaptation to NPPV, discussing both constraints and strengths, that could be useful to manage a new model of care related to the introduction of a medical device in the patient's routine.

4.3. Practice implications

Further studies that test this theoretical model in other countries as well as involving people with very severe COPD are needed. Moreover, our study highlighted the importance of the caregiver's role during the adaptation process to NPPV, suggesting how considering the relationship between caregiver and patient could be relevant. Supportive material might help visualize complex information. Finally, translating the model into clinical practice, considering also other vulnerable patients who need NPPV, can help to gain insight into the better way of delivering its usage and management.

Data availability statement

The data that support the findings of this study are available from the corresponding author, [EV], upon reasonable request.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee of the IRCCS Fondazione Don Carlo Gnocchi (reference: 15th February 2015), in Milan (Italy), in the mainframe of a large RCT on acceptance and adherence to NIV in people with COPD (ref. ClinicalTrials.gov ID: NCT02499653). The patients/participants provided their written informed consent to participate in this study.

Author contributions

EV contributed to the design and implementation of the research, the analysis of the results, and the writing of the manuscript. PB and FP authors provided critical feedback and validated the analysis. FP supervised the entire work. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Beyond recovery: toward rights-based mental health care — A cluster randomized wait-list controlled trial of a recovery and rights training for mental health professionals with or without first person accounts

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Introduction: Mental health models grounded in Recovery and Rights are driving the advancement of transformative care systems through multifaceted actions, which encompass Continuing Professional Development. The objective of this work is to evaluate a training activity developed through a participatory process that included people with lived experience of psychosocial distress, their relatives, and mental health professionals.

Methods: The training focused on alternatives to diagnosis, recovery principles, rights-based care, and peer support. The evaluation followed a cluster randomized wait-list controlled design. Four hundred eighty-eight health professionals from eight care centers were randomized to three experimental conditions: a wait list control, which underwent a one-month interval between the baseline assessment and the training activity, and two experimental groups, with or without first-person accounts, which accessed the training immediately after completing the baseline assessment. The dependent variables measured at all follow-ups were beliefs and attitudes toward mental health service users' rights. One hundred ninety-two professionals completed at least one follow-up and were included in the analyses.

Results: We observed different evolutions of experimental and control groups with statistically significant differences for tolerance to coercion and total beliefs and attitudes scores. No differences were observed between the groups with or who attended training activities with or without first person accounts. Upon receiving the training activity, the control group had an evolution equivalent to the experimental groups.

Discussion: The results of this evaluation project provide compelling evidence for the need to expand recovery and rights training activities to reach a larger audience of mental health professionals These training activities hold the potential to positively influence the beliefs and attitudes of mental health professionals, ultimately contributing toward a better future for individuals with lived experience of psychosocial distress.

KEYWORDS

attitudes, beliefs, citizenship, education for mental health professionals, effectiveness, efficacy, recovery, rights-based care

1. Introduction

Unlike previous mental health reform movements such as anti-psychiatry, more confrontational with the status quo, the Recovery movement has taken a pragmatic approach toward disseminating its ideas among mental health professionals. Thus, while the efforts to integrate peer support workers into the care system have received more attention, the training of mental health professionals in Recovery principles has been another essential component of the movement. In the last 20 years, both the works that collect training contents of the recovery paradigm (Mabe et al., 2016), as well as narrative (Campbell and Gallagher, 2007; Jackson-Blott et al., 2019; Sreeram et al., 2021), rapid realist (Gee et al., 2017), and systematic reviews and meta-analyses (Eiroa-Orosa and García-Mieres, 2019) on the effect of these training activities have multiplied.

From a pedagogical perspective, these training activities encompass a range of learning objectives, including the acquisition of knowledge about the recovery model and its core concepts, as well as practical applications, critical analysis, and supervision. Similar to the Recovery model itself, the involvement of individuals with lived experience of psychosocial distress is a distinctive feature of these training activities, which has shown to offer additional benefits (Jackson-Blott et al., 2019). This participation allows staff to connect with the needs that are often overlooked by the Biomedical care model and discover alternative approaches proposed by the Recovery model. One of the primary goals of these training activities is to replace paternalistic practices focused solely on symptom relief with collaborative practices that prioritize the preferences and goals of service users, enabling them to reconstruct their life projects (Mabe et al., 2016). Additionally, going beyond the Recovery model, the enactment of the Convention on the Rights of Persons with Disabilities (CRPD; United Nations, 2006), has resulted in a proliferation of initiatives aimed at implementing rights-based mental health projects (Porsdam Mann et al., 2016). These include elements such as coercion reduction programs (Goulet et al., 2017; Gooding et al., 2020), the use of Advance Directives or Advance Decision Planning (Davidson et al., 2015) or legal alternatives to guardianships.

The extension of the Recovery model, especially in Anglo-Saxon countries and Western Europe, has consolidated and expanded the role of people with lived experience in training and awareness activities. Initially, these individuals were primarily former service users from the facilities where the activities were conducted. Their main function was to provide personal accounts of the experience of the care received. However, the expansion of mental health survivors' and consumers' movements, and the incorporation of peer support workers, facilitated their inclusion as trainers with pedagogical planning responsibilities and even leadership positions in projects aimed at implementing large-scale training activities. The scope of these activities has been very broad. The number of professionals who have participated in the countries that pioneered the Recovery model can be counted in the hundreds of thousands, including mandatory training campaigns in various territories (e.g., Way et al., 2002; Gilburt et al., 2013; Wilrycx et al., 2015). The complexity of the activities has been increasing, going from training and awareness sessions lasting a few hours, to complex processes of large-scale organizational transformation lasting several months, such as the recent REFOCUS (Slade et al., 2015) and GetREAL (Killaspy et al., 2015) projects.

Regarding the impact of these activities, the results of several reviews (Gee et al., 2017; Jackson-Blott et al., 2019), and the meta-analysis carried out by our research group (Eiroa-Orosa and García-Mieres, 2019), illustrates that recovery training for mental health professionals has a clear influence on beliefs and attitudes, while the effect on practices is less clear and very heterogeneous. It should be borne in mind that most of the studies that have measured behavioral variables have done so in the context of large-scale projects such as those already mentioned (Killaspy et al., 2015; Slade et al., 2015). This raises the question of whether it is possible to go beyond changing beliefs and attitudes, and achieve a transformation of practices, even with sufficient investment of resources. Qualitative accounts of participants in Recovery training activities (Leamy et al., 2014; Lean et al., 2015; Bhanbhro et al., 2016) offer us information to reflect on the former question. Some studies discuss the tensions between "top-down" management-led changes and "bottom-up" or team-initiated changes. In the large-scale projects mentioned, although the intention was to initiate organizational changes from the bottom up, it became apparent that the professionals involved had serious doubts about the existence of an institutional commitment to bring about tangible changes. This connects with other concepts that had already been addressed in smaller projects, but with great involvement of the participants, such as hope and autonomy. Some of the large-scale projects attempt to systematize and implement changes that first occurred spontaneously in highly committed transformative environments. Similar to the accomplishments of other social movements, when systematizing processes from the grassroots level, accounting for the unique characteristics of each context, certain contradictions emerge. One such challenge is the difficulty of replicating the innate motivation that arises organically. This seems to occur in a context in which institutions send mixed messages. On the one hand, they allocate funds to transformation projects, but on the other, they do not provide real support for the changes to take place and be maintained.

The objective of this work is to analyse the efficacy and effectiveness of a Recovery and rights-based care training activity for mental health professionals. Considering the above mentioned aspects, this activity is part of a broader initiative to transform the Catalan mental health care system (Eiroa-Orosa and Rowe, 2017). Despite substantial resource allocation in this territory toward the transformation of its mental health care system into one grounded in Recovery principles, a significant portion of the existing practices persist in relying on paternalistic approaches, hindering the active involvement of service users and their families. Our project, aimed at fostering this transformation, encompasses various stages ranging from designing evaluation instruments to implementing training and awareness initiatives targeting service users, their families, professionals, and the general population, as well as contributing to the design of public policies.

2. Materials and methods

2.1. Design and procedure

The efficacy and effectiveness of the recovery and rights training activity was evaluated through a prospective cluster randomized wait-list controlled trial. Each cluster was a mental health center. The training activity was offered through email or at events to the managers of prospective mental health centers. Once a request to carry out a training activity materialized, the name of the center was entered into a randomization table. Each center was randomly assigned to one of three conditions: a wait list control group who waited 1 month between the baseline evaluation and the training activity and one of two experimental groups, with or without first-person accounts, which accessed the training immediately after completing the baseline evaluation.

Once the center was randomized, professionals received a registration questionnaire, which included the baseline assessment comprising socio-demographic, ideology, and values variables, as well as a questionnaire on beliefs and attitudes towards service users' rights (see below). To analyse the efficacy of the training activity, the control group completed an extra evaluation just before the start of the training activity, 1 month after the baseline evaluation. All three groups received a follow-up questionnaire a week after the completion of the training activity (including satisfaction as well as the beliefs and attitudes questionnaire) and another one a month later (including the beliefs and attitudes questionnaire). Figure 1 shows a flow diagram of the evaluation procedure.

2.2. Participants

Considering the effect sizes of an anti-stigma intervention evaluated using a similar methodology and the same evaluation measure (Eiroa-Orosa et al., 2021a), the number of participants was estimated according to the following calculation of statistical power. Accepting an alpha risk of 0.05 and a beta risk of 0.2 in a two-sided test, assuming a correlation between the first and second measure of $r = 0.7$, 59 subjects were considered necessary in each group to recognize as statistically significant difference greater than or equal to 0.4 standard deviations.

The organizers disseminated announcements of the training activity to a wide array of healthcare providers, ensuring broad outreach. Furthermore, they took the initiative to personally present the activity during meetings of the Catalan government's mental health advisory council, effectively engaging key stakeholders. Following acceptance of the course offer, which often involved at least one phone call or face-to-face meeting, the training activity was integrated into the Continuing Professional Development program of each center, and participants received personalized invitations that included the title of the activity ("Beyond Recovery: Toward Rights-Based Mental Health Care"), a concise overview of the learning objectives, and a direct link to the baseline questionnaire.

Following these sample size calculations, the training activity was implemented in eight mental health and primary care centers with which the desired number of participants was reached. The recipients were professionals working in such settings: administrative officers, general practitioners, nurses, psychiatrists, psychologists, social workers, etc. All centers, except for two situated in Madrid, were located within the autonomous community of Catalonia. Three centers were located within university hospitals, four within community and rehabilitation services, and one within primary care. Two centers (a university hospital and a psychosocial rehabilitation center) hosted two editions of the course.

2.3. Training contents

The training activity is composed of four blocks that are taught in two 4-h sessions. The contents of the activity have been elaborated through a review and meta-analysis of the literature (Eiroa-Orosa and García-Mieres, 2019), and the analysis of 20 focus groups (seven with people with lived experience, one with relatives, and 12 with professionals). For details on the entire process consult Eiroa-Orosa and Rowe (2017). With the aim of scaling this type of activities, we have published an open access handbook with versions for both trainers and trainees (Eiroa-Orosa et al., 2021b).

2.3.1. First block: alternatives to diagnosis: from nosologies to shared experience

2.3.1.1. Learning objectives

- Recognize preconceived ideas regarding diagnoses and nosological systems.
- Promote critical thinking toward nosological systems, and awareness of the responsibility involved in diagnosis.
- Reflect on stigma and self-stigma in mental health, emphasizing the stigmatizing attitudes of professionals, as well as the overshadowing effect of the diagnosis.
- Know the existing alternatives to nosological classifications.

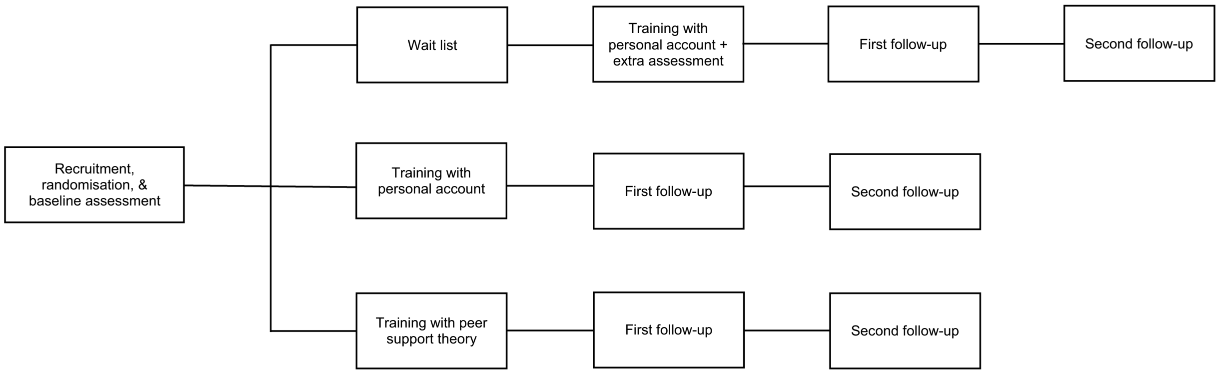

FIGURE 1
Flow diagram of the evaluation design.

2.3.1.2. Contents excerpt

For centuries and up to the present day, mental health care has revolved around psychiatric diagnoses, leading to significant efforts being dedicated to the creation and refinement of nosologies such as the Diagnostic and Statistical Manual of Mental Disorders and the International Classification of Diseases. Despite the original intent to establish objectivity, research consistently reveals that the diagnostic process is far from being neutral, where solely observable symptoms are considered. Rather, there are various interfering variables that can impact the process. Among these variables we find political and religious ideologies (e.g., Gartner et al., 1990), culture and ethnicity (e.g., Bhui and Bhugra, 2002; Delphin-Rittmon et al., 2015), race, social class, or gender (e.g., Garb, 1997, 2021). On the other hand, the low reliability of certain diagnoses (Rosenhan, 1973; Regier et al., 2013) have aroused criticism of current nosological systems.

Some of the criticisms of nosological systems are structured around the prevailing biomedical conception in psychiatry. Reich (1942) was a pioneer in attaching importance to the social transmission of psychological distress, rejecting biological factors and considering socioeconomic factors as fundamental in the genesis of psychic suffering. Foucault was also critical of the Biomedical model of mental distress. According to his views, diagnosing involves establishing an arbitrary boundary between normality and pathology, which implies qualifying as pathological what is out of the ordinary (Foucault, 1954). Foucault argued that mental illness is not a timeless and universal concept, but rather a socially constructed category that has changed over time (Foucault, 1972). He claimed that the modern biomedical approach to mental illness is a form of social control that pathologizes and stigmatizes individuals who do not conform to societal norms.

The antipsychiatry movement, which involved professionals, academics and the emerging consumers and survivors movements, all critical of the provision of mental health services (Rissmiller and Rissmiller, 2006), gathered a wide range of opinions and criticisms regarding conventional psychiatric practice. Some of these criticisms are the political use of psychiatry as an instrument of social control, the medicalization of social problems, the discrimination of people diagnosed, the unresolved conflicts of interests between the psychiatric profession and the pharmaceutical industry, and involuntary and coercive treatments. All these criticisms and many others culminated in the opposition by a sector of mental health professionals to nosological systems (Beutler and Malik, 2002) especially to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders due to the poor diagnostic reliability shown in various mental disorders (Regier et al., 2013).

It is also important to highlight that receiving a mental health diagnosis has been corroborated as a predisposing factor to suffer stigma from both the social environment of the person (Schomerus et al., 2012), and by mental health professionals (Hansson et al., 2011). From a socio-cognitive perspective (Corrigan, 2006), stigma is made up of three structures: stereotypes (cognitive), prejudices (emotional), and discrimination (behavioral). Stereotypes toward people with mental health diagnoses are usually classified into three categories: dangerousness, incompetence, and permanence (Sheehan et al., 2017). This results in fear and exclusion (Corrigan et al., 2001), influencing interpersonal relationships, job opportunities, and access to housing (Stuart, 2006). Sometimes, due to the influence of the social environment, stigmatized persons themselves accept and reproduce these prejudices and discrimination toward themselves and their collective, which has been called self-stigma (Corrigan and Watson, 2002). Self-stigma can result in low self-esteem and self-efficacy (Corrigan et al., 2006), fear of stigma for encountering stigma when seeking assistance from mental health services (Rüsch et al., 2005; Thornicroft et al., 2007), reduced adherence to empirically validated treatments (Sirey et al., 2001), difficulties in recovery-oriented achievements and lower quality of life (Rüsch et al., 2010).

Alternatives to nosological systems have a long tradition (e.g., Beutler and Malik, 2002), although most proposals have not gone beyond satisfying certain therapeutic schools (Langenbucher, 2004). Due to the potentially significant impacts of diagnoses and the limited reliability of current nosological systems, it is necessary reconsider the importance of the narratives of individuals with lived experience. Actively listening to these narratives in an authentic manner, free from the biases associated with pursuing a diagnosis, can prove invaluable in uncovering resilience factors that may aid mental health service users in overcoming their challenges. Therefore, some authors (e.g., Cromby et al., 2013) have proposed systems for understanding mental suffering based on accounts of people's experiences, as opposed to clinical nosologies. More recently, the Power Threat Meaning Framework (Johnstone and Boyle, 2018) has meant a solid formulation proposal based on the analysis of the contexts where distress and associated power imbalances occur.

2.3.2. Second block: formulation and goal setting: from symptom reduction to recovery

2.3.2.1. Learning objectives

- Understand the importance of formulating and establishing goals based on personal recovery and not exclusively on symptomatic relief.
- Understand the concept of Recovery, the history of the Recovery movement, its principles, and criticisms.
- Analyse how to work from the Recovery model and what can be done as professionals to promote it.
- Know the existing interventions based on the exercise of citizenship.

2.3.2.2. Contents excerpt

The Recovery movement was the result of synergies between organized groups of survivors and consumers, their relatives, and mental health professionals. At the beginning of the 90s Recovery in mental health was defined as a deeply personal, unique process of changing one's attitudes, values, feelings, goals, skills and/or roles and a way of living a satisfying, hopeful, and contributing life even with limitations caused by a mental illness (Anthony, 1993). The Recovery movement has promoted reforms of mental health care systems at various levels, especially focusing on the participation of service users and their relatives in relevant decisions (Davidson, 2016).

Some of the strategies used by mental health professionals when working from the Recovery model are: (a) the separation of the person from the diagnosis, (b) the exploration of the person's needs, acknowledging their point of view (c) the exploration and attention to their style of autonomy, (d) the negotiation of personalized recovery plans, (e) the exploration of the power dynamics that occur between professional and service users, (f) the reduction of coercion, and (g) teamwork between services users and professionals (Davidson et al., 2016).

Although the Recovery model has made significant contributions, its implementation in some areas has drawn criticism and sparked specific protest movements such as the "Recovery in the bin movement". These criticisms are centered on the conceptualization of a "successful recovery" that places a burden of responsibility on those who do not achieve it, the use of recovery indicators that ignore the diverse and unique nature of the concept, the individualistic application of positive psychology concepts, and the use of coercive measures such as involuntary outpatient treatment, which are disguised as "steps to recovery."

2.3.3. Third block: rights-based mental health care: collaborative practices, preferences, and advance directives

2.3.3.1. Learning objectives

- Reflect on the importance of exercising rights and its relationship with the process of recovery and full citizenship.
- Know the background in the most important European and international law in the field of mental health.
- Know the United Nations convention on the rights of persons with disabilities and and its implications for people with a psychiatric diagnosis.
- Analyse the different articles of the convention, related to confidentiality, support for decision making, informed and accessible consent, health decision planning, search for alternatives to involuntary admission and the right to choose treatment.

2.3.3.2. Contents excerpt

The Recovery approach is an important step in the process of improving care for mental health service users. However, it is vitally important to go one-step beyond recovery and work on the restoration of full citizenship. To achieve this, it is crucial to shift the current mental health care approach from the Biomedical model's viewpoint, which views service users as objects of care policy, to the social model's perspective, which sees the person as a subject of rights.

The Convention on the Rights of Persons with Disabilities included persons with lived experience of psychosocial distress in its elaboration. It recognizes rights such as equal and non-discriminatory treatment, receiving understandable information, expressing themselves freely, deciding on lives and treatment, maintaining confidentiality and privacy, receiving protection from torture and other cruel treatment, living independently, being included in the community and working (United Nations, 2006).

Despite the improvements that have occurred since the beginning of the deinstitutionalization process, currently practices considered torture and/or degrading treatment by the United Nations continue to be carried out in the field of mental health care (Gaebel et al., 2017). Examples of human rights violations include involuntary admission, forced medication, overmedication, invasion of privacy, coerced electroconvulsive therapy, mechanical restraint, confinement, and arbitrary incapacitation.

Mental health professionals have access to various tools that serve as alternatives to practices infringing upon service users' fundamental rights. These tools include informed consent (Manning and Gaul, 1997; Roberts, 2002), advance directives and decision planning (Srebnik and La Fond, 1999; Braun et al., 2023), and peer support among individuals who have personally experienced mental health challenges (Davidson et al., 2012; Smit et al., 2022).

2.3.4. Fourth block: promoting peer support: integrating the figure into the system

2.3.4.1. Learning objectives

- Understand the evolution of mutual support, from its beginnings as a spontaneous phenomenon to the present day, when it is promoted as an intentional practice.
- Know the efficacy and effectiveness of mutual support, reflecting on what are the benefits of this practice.
- Analyse the ways in which the implementation of peer support into the system can be promoted.

2.3.4.2. Contents excerpt

Mutual support exists spontaneously or regulated by different traditions, customs, and rituals in which the community comes together to offer support to those members who are going through difficult times. It can be said that practically any act of solidarity revolves around the idea of reciprocity, deeply rooted in all social groups. Regarding the formalization of support spaces, we could highlight one of the best-known models, the Alcoholics Anonymous mutual aid groups. Although it originated spontaneously around 1935, it was consolidated and expanded until became a standard treatment for addictions. In the field of mental health, one of the first groups that began to establish mutual aid groups was We Are Not Alone, a mental health mutual aid group established in North America in the mid-20th century.

When speaking about mutual support we can talk about three main modalities: mutual aid groups, expert patients, and professionalized peer support. The fundamental characteristic of mutual aid groups is that people can talk about their problems, achievements, and concerns as equals. They should not be confused with group therapies, since they do not include therapists, as it is not considered necessary to fulfill their objective. They are based on reciprocity and horizontality. In some groups, professionals from the mental health care network are accepted as participants, provided that they do not participate in the group as professionals, but as another member. It is also necessary to differentiate mutual support from formal expert patient programs. These consist of psychoeducational interventions taught by a person with experience of a chronic illness.

Peer support as an intentional practice (Mead et al., 2013) consists of people with lived experience who have been trained and make support their profession. It has its origins in the deinstitutionalization process and community care. With the shift toward the Recovery model, peer support has been acknowledged as a professional role within the mental healthcare field (Eiroa-Orosa and Sánchez-Moscona, 2023). While rooted in self-managed contexts, the formalization of training programs and their integration into multidisciplinary teams have enabled the recruitment and incorporation of this role into mental healthcare systems. It is essential to emphasize that the cornerstone of professionalized peer support lies in the personal experiences of the supporter and their peers. In other words, this type of support does not necessarily overlap with existing professions. The primary role of peer support is to actively listen, offer companionship, and share in the experiences of service users, providing validation and support.

Once incorporated, the tasks performed by peers can be categorized as direct or indirect support (Jacobson et al., 2012). The activities considered direct tasks are the defense of rights (providing information and support), connecting them to resources (connecting them with the desired services), sharing common experiences, building community (connecting the person with programs that link them to the community), building relationships (based on trust), facilitating group activities, developing skills and objectives, socialization, and the development of self-esteem. Indirect tasks include administration, communication, supervision, performing training, and obtaining and verifying information. In addition, the work of peer support workers also includes actions aimed at building relationships with other health professionals and legitimizing their role (Gagne et al., 2018). In this way, the tools essential for peers to fulfil their roles extend beyond their personal experiences of mental distress. They encompass life experiences of recovery and resilience, a respectful approach, genuine presence, modeling, collaboration, and active engagement (Jacobson et al., 2012).

2.3.5. Instruments

Participants filled out the following questionnaires.

2.3.5.1. Socio-demographic questionnaire

The first part of the questionnaire collected sociodemographic data including age, gender, qualifications, profession, years of experience, personal contact with mental disorders, and ideology (definitely left to definitely right, 5-point Likert scale).

2.3.5.2. Values items adapted from the world values survey

The study incorporated two items from the World Values Survey (Inglehart, 2008) to determine where the participants were located on two continuums. The items used in the study were: "Government should ensure that everyone is provided for" (statist vs. individualist social values) and "A child needs a home with both a father and a mother in order to grow up happily" (conservative vs. progressive family values). The items had a 6-point Likert scale, ranging from "I completely disagree" to "I completely agree."

2.3.5.3. Beliefs and attitudes toward mental health service users' rights scale

The BAMHS (Eiroa-Orosa and Limiñana-Bravo, 2019) was designed to measure mental health professionals' beliefs and attitudes toward mental health service users' rights. The instrument is a 25-item scale with a 4-point Likert type scale for each item. The structure of the instrument consists of four dimensions. The first subscale, Justification beliefs, pertains to mental health professionals' beliefs that maintain the current status quo. It includes items affirming that mental disorders are diseases like any other, that aggressiveness is caused by mental disorders, that it is not possible to recover without the intervention of a professional, or that some patients will never recover. The Coercion dimension examines attitudes toward involuntary admission and the use of mechanical restraints, as well as the respect for service users' autonomy. The Paternalism subscale reflects a set of beliefs that assume people diagnosed with mental disorders lack the capacity to manage their lives, including making decisions about having children, their treatment, or prioritizing treatment effectiveness over dignity. Finally, the Discrimination subscale embodies widespread prejudices toward mental health service users such as the ability to vote, the overuse of emergency settings, feeling comfortable becoming friends with, or feeling comfortable if a person with a mental disorder were a teacher in a school. Higher scores mean higher violation of rights. In our study reliabilities were high for the whole scale ($\alpha = 0.830$ at baseline among participants) and moderate for the subscales (system criticism/justifying beliefs $\alpha = 0.658$, freedom/coercion $\alpha = 0.510$, empowerment/paternalism $\alpha = 0.652$, and tolerance/discrimination $\alpha = 0.615$).

2.3.5.4. Satisfaction with the training activity

Together with the BAMHs, the participants filled out a satisfaction questionnaire at the first follow-up. The questionnaire consisted of items related to various aspects of the activity, including the organization, teaching methodology and style, teacher knowledge and suitability, interest of the topics, practical applications, time allocation, and materials used. The instrument showed excellent reliability ($\alpha = 0.913$).

2.4. Statistical analyses

Instrument reliability was measured using Cronbach's alpha. Attrition and differences between groups at baseline and different follow up points (including sociodemographic data and scale scores) was assessed using χ^2 tests for categorical data and *t*-tests and analyses of variance (ANOVAs) for continuous data. Attrition was analyzed comparing baseline characteristics and scores between participants who completed the first and second follow-ups and those who did not. Ideology and values were correlated with BAMHS scores at baseline using Pearson's r correlation coefficient. Longitudinal analyses were carried out using repeated measures general lineal models. First, to analyse efficacy, we carried out longitudinal models considering baseline scores, the extra assessment for the wait list group and the first follow-up for the experimental groups. Second, to analyse compared effectiveness, we carried out longitudinal models considering baseline scores, and both follow ups (i.e., ignoring the extra assessment of the wait list group). To account for potential confounding variables, we included ideology and values as covariates in our analyses. Additionally, we incorporated satisfaction with the training activity as a covariate specifically for the effectiveness analysis, as it was assessed at a later stage. Given that missing values were observed in the second follow-up assessment, and no statistically significant differences were found between the participants who completed the follow-up assessments and those who did not, we decided to utilize the expectation-maximization (EM) method to impute missing values and carry out intent-to-treat (ITT) analyses.

3. Results

Four hundred eighty-eight health professionals from 10 healthcare centers were randomized to one of the three experimental conditions. One hundred ninety-two professionals completed at least one follow-up and were included in the analyses. Figure 2 shows a flow diagram of the recruitment and follow-up process.

Table 1 shows the baseline characteristics and scores of the three groups. No statistically significant differences were found for any variable. Similarly, no statistically significant differences were found between participants who completed the first and second follow-ups and those who did not.

Table 2 shows correlations of BAMHs scores with ideology, values and satisfaction with the training activity. All BAMHs scores were statistically significantly and moderately correlated with ideology (respect of rights with left wing). Statist vs. individualist social values only correlated negatively with Discrimination. Finally, conservative vs. progressive family values were statistically correlated with BAMHs total score and all subscales except Coercion (respect of rights with non-conservative family values).

Table 3 shows the evolution of scores across all follow-up assessments. Notably, a statistically significant difference was observed only in the coercion domain when comparing the additional assessment of the waitlist group with the first follow-up assessment of the experimental groups. *Post hoc* analysis showed that the difference existed between the control group and the treatment groups, and not between the two treatment groups. When considering the interaction of experimental group membership with evolution between these two time points, statistically significant interactions and mild effect sizes were found for coercion and the total BAMHS scores. *Post hoc* analyses suggest that the experimental groups had higher reductions in scores compared to the control group. This was confirmed by carrying out covariance analyses (ANCOVAs) in which ideology and values were added as possible confounding variables. None showed statistically significant interactions with the evolution of scores, yet the interaction with group membership remained unchanged.

When conducting effectiveness analyses through repeated measures ANOVAs considering all follow-up assessments and disregarding the additional assessment of the waitlist group, we found no statistically significant interaction between time and group. These findings indicate that the evolution of the scores was similar among all groups once they had received the training without differences between training modalities or with those who had to wait another month and complete an additional assessment. It is worth noting that all time effects were observed to be statistically significant and had large effect sizes, indicating that participants' beliefs and attitudes toward the respect of rights were indeed strengthened. These findings were corroborated by performing EM to account for missing data.

When we carried out analyses of covariance to find possible confounders and predictors of the impact of the training activity, satisfaction scores showed a statistically significant positive covariation with the reduction of Coercion [$F(2, 102) = 3.155$, $p = 0.047$, $\eta^2 = 0.063$] and conservative family values covaried negatively with the reduction of Paternalism [$F(2, 102) = 3.862$, $p = 0.024$, $\eta^2 = 0.076$] and the total BAMHs score [$F(2, 102) = 3.440$, $p = 0.036$, $\eta^2 = 0.068$]. When we carried ITT analyses with data imputed through EM we found the reduction of the Beliefs subscale to be predicted by left-wing Ideology

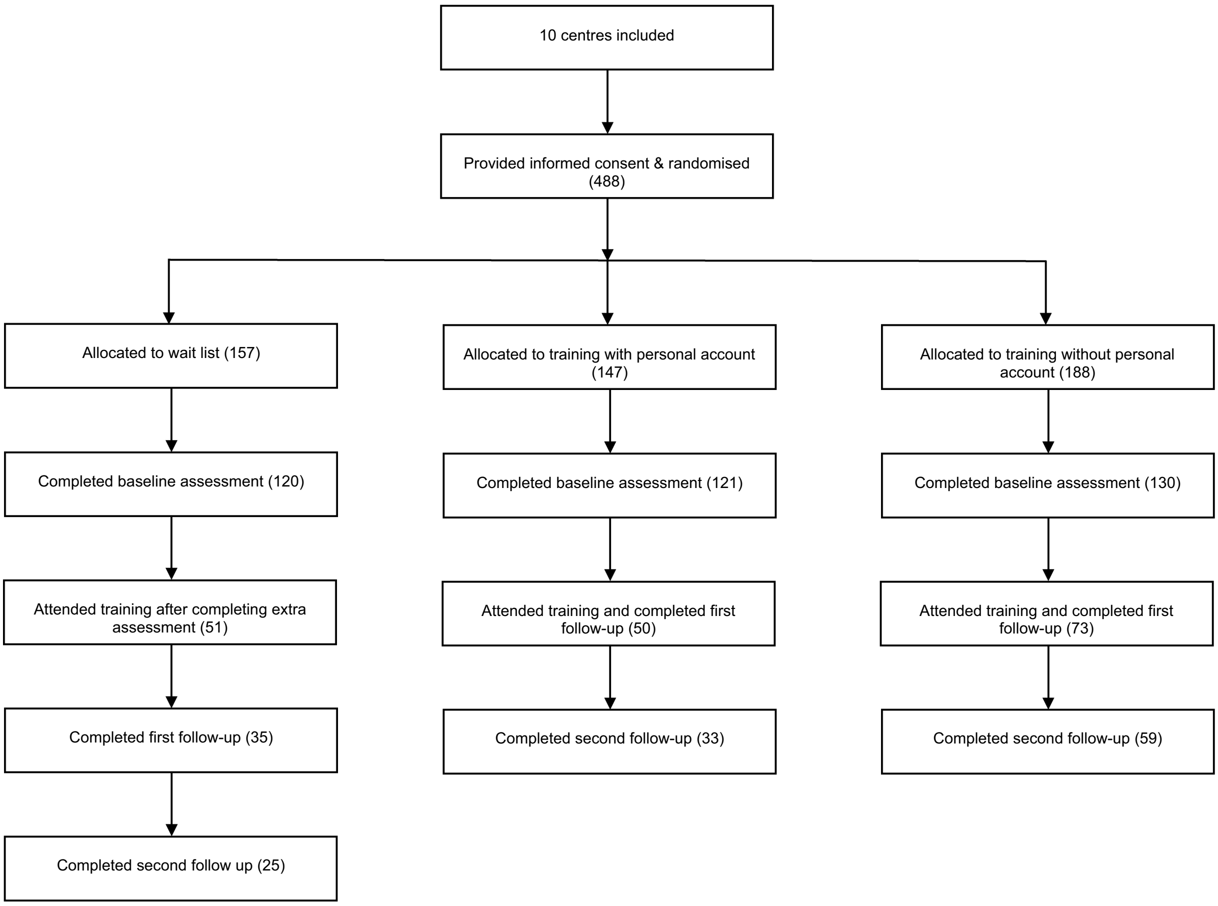

FIGURE 2
Flow the recruitment and follow-up process.

TABLE 1 Sociodemographic and baseline scores of participants included in the analyses[a] by group.

	Wait list (n = 64)		Training with account (n = 51)		Training without account (n = 77)				
	n	%	n	%	n	%	$\chi 2$	p	
Female gender	45	70.3	43	84.3	53	72.6	3.333	0.189	
Psychiatrists and psychologists[b]	27	42.2	15	29.4	25	32.9	2.299	0.317	
	M	SD	M	SD	M	SD	F	p	η^2
Age	39.17	10.92	40.37	8.51	38.51	8.98	0.566	0.569	0.006
Ideology (left 1–5 right)	2.14	0.85	1.96	0.87	1.88	0.74	1.699	0.186	0.018
Inglehart's items									
Statist social values	5.08	1.40	5.25	0.87	5.25	1.01	0.488	0.615	0.005
Conservative family values	2.41	1.28	2.47	1.47	2.39	1.06	0.062	0.940	0.001
BAMHS									
Beliefs	2.21	0.46	2.24	0.47	2.32	0.38	1.211	0.300	0.013
Coercion	2.36	0.46	2.17	0.43	2.27	0.39	2.748	0.067	0.029
Paternalism	2.09	0.43	2.17	0.52	2.25	0.37	2.234	0.110	0.024
Discrimination	1.83	0.46	1.77	0.62	1.78	0.43	0.251	0.778	0.003
Total	2.14	0.37	2.13	0.40	2.20	0.28	0.872	0.420	0.009

[a] To be included in the analyses, participants should have attended the training activities and completed the first follow-up.

[b] We dichotomised professional data to facilitate understanding, the two categories are psychiatrists and psychologists vs. nurses, social and support professionals.

TABLE 2 Pearson correlations of BAMHS scores with ideology and values variables.

	Ideology (left – right)	Statist social values	Conservative family values	Satisfaction with the activity
BAMHS items				
Beliefs	0.225**	−0.047	0.185*	−0,097
Coercion	0.355***	−0.132	0.105	−0.215**
Paternalism	0.224**	−0.055	0.318***	−0.153
Discrimination	0.266***	−0.191*	0.263***	−0.240**
Total	0.332***	−0.118	0.290***	−0.212**

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

[$F(2, 174) = 3.146$, $p = 0.046$, $\eta^2 = 0.037$], statist social values [$F(2, 174) = 4.443$, $p = 0.013$, $\eta^2 = 0.051$] and conservative values negatively [$F(2, 174) = 7.969$, $p < 0.001$, $\eta^2 = 0.088$]. The evolution of coercive and discriminant attitudes was predicted by higher satisfaction with the training activity [Coercion: ($F(2, 174) = 4.481$, $p = 0.013$, $\eta^2 = 0.051$), Discrimination: ($F(2, 174) = 3.935$, $p = 0.021$, $\eta^2 = 0.045$)]. The BAMHs total score evolution was predicted by conservative values [$F(2, 174) = 5.104$, $p = 0.007$, $\eta^2 = 0.058$] and Satisfaction [$F(2, 174) = 3.786$, $p = 0.025$, $\eta^2 = 0.044$].

4. Discussion

Consistent with prior literature, our study demonstrates that a Recovery and Rights-based training had an impact on the beliefs and attitudes of mental health professionals who participated. This is supported by the divergent trajectory observed in the control group compared to the two intervention groups, as well as the similar trajectory of all groups following effective participation in the training. The findings indicate that the intervention was both efficacious and effective, with effect sizes comparable to those observed in other regions where similar interventions have been implemented (Eiroa-Orosa and García-Mieres, 2019).

The intervention demonstrated efficacy and effectiveness primarily in reducing beliefs and attitudes related to the tolerance of the use of coercion in mental health. These results are consistent with international literature on the effectiveness of this type of interventions (Goulet et al., 2017; Gooding et al., 2020) and are particularly noteworthy given the high level of awareness of the problem in the study's context. Indeed, in Catalonia and Madrid, where the intervention was implemented, campaigns advocating for the reduction of coercion have been ongoing since 2016 (e.g., #0 Contenciones, n.d.).

Certain covariates were found to be predictors of increased impact of the training activity, particularly high satisfaction with training as a motivator and family conservative values as a deterrent. Satisfaction with the training was found to be associated with a reduction in discriminatory and coercive attitudes. Satisfaction is strongly related to engagement, and both have been found to be predictors of the impact of training activities. High levels of engagement and satisfaction can lead to better retention of training contents and increased application of the learned skills, ultimately resulting in a more positive impact of the training (Salas et al., 2012). In contrast, conservative family values appear to be a proxy for

TABLE 3 Follow up BAMHS per protocol scores by experimental group, differences between wait list control group extra assessment and experimental groups at first follow up, and time effect and time × group interaction at two (wait list extra vs. experimental first follow up) and three time points (baseline, first and second follow-ups).

	Wait list						Training with account				Training without account				Wait list extra assessment or experimental groups at FU1			Baseline, wait list extra assessment or experimental groups at FU1			Baseline, FU1 and FU2					
	Extra		FU1		FU 2		FU1		FU 2		FU1		FU 2		Group differences			Interaction time* group			Time effect			Interaction time* group		
	M	SD	*M*	SD	*M*	SD	*M*	SD	*M*	SD	*M*	SD	*M*	SD	*F*	*p*	η^2	*F*	*p*	η^2	*F*	*p*	η^2	*F*	*p*	η^2
Beliefs	2.19	0.52	2.13	0.51	2.25	0.57	2.06	0.46	2.11	0.46	2.18	0.41	2.14	0.39	1.457	0.236	0.017	2.568	0.080	0.030	8.178	<0.001	0.142	1.207	0.309	0.024
Coercion	2.27	0.45	2.18	0.56	2.18	0.52	1.98	0.49	1.89	0.44	1.96	0.44	1.89	0.48	7.704	<0.001	0.083	4.242	0.016	0.048	23.566	<0.001	0.323	0.819	0.514	0.016
Paternalism	2.08	0.40	2.08	0.50	2.10	0.62	2.11	0.43	2.05	0.53	2.16	0.41	2.08	0.43	0.567	0.569	0.007	1.207	0.302	0.014	7.308	<0.001	0.129	0.668	0.615	0.013
Discrimination	1.76	0.48	1.86	0.48	1.68	0.51	1.63	0.46	1.63	0.57	1.68	0.42	1.64	0.43	1.151	0.319	0.013	0.940	0.393	0.011	7.197	0.001	0.127	0.843	0.499	0.017
Total	2.10	0.38	2.08	0.42	2.09	0.44	1.99	0.36	1.97	0.40	2.05	0.33	1.99	0.35	1.253	0.288	0.014	4.753	0.010	0.054	21.665	<0.001	0.304	0.259	0.904	0.005

FU, Follow up.

resistance to change. Consistent with the literature (DeLuca and Yanos, 2016), this variable showed statistically significant albeit moderate baseline correlations with justifying Beliefs, Paternalism, and Discrimination. The findings from the longitudinal covariance analyses suggest that individuals who harbor these beliefs exhibit a higher propensity for skepticism regarding the integration of broader horizontal practices within mental health care systems. However, the evidence suggesting that conservative mental health professionals may be more resistant to change, particularly when it comes to the Recovery model, is still scarce and it is most likely not a one-dimensional phenomenon. Indeed, the current literature illustrates that organizational factors constitute substantial barriers that go beyond the individual characteristics of the participants (Gee et al., 2017; Eiroa-Orosa and García-Mieres, 2019; Jackson-Blott et al., 2019; Sreeram et al., 2021). However, since in our study we did not have access to organizational information and transformative institutional support processes were not established systematically, we perceived that gathering these variables could furnish novel insights to the evidence. Further investigation is imperative to identify potential obstacles that mental health professionals might encounter in embracing Recovery-oriented approaches.

4.1. Limitations

The main limitations of this study are that the same team of trainers conducted all training activities, and the follow-up period was relatively brief. These limitations were a consequence of the lack of resources during the project implementation. To ensure successful implementation of this type of training activities on a large scale, it is essential to conduct scalability tests using sufficient resources. Hence, it is imperative to conduct further studies with adequate resources to support widespread implementation and long-term monitoring of the impact of these training activities.

In addition, the diverse range of professions, care facilities, and territories where the training actions were conducted may imply that this study was carried out in a context characterized by considerable variability. This variability encompasses both the adaptable nature of the training contents and the evaluation process. While we have incorporated certain variables to account for potential distinctions, such as considering differences between professionals based on diagnostic knowledge, in line with Corrigan's TLC3 (Targeted, Local, Credible, Continuous Contact; Corrigan, 2011) criteria, it would be worthwhile to conduct and evaluate activities specifically tailored for targeted professional groups. Such an approach would allow for specific support and guidance during transformative processes.

Other limitations of this study are related to possible self-selection bias, and the failure to account for missing data from participants who only completed the baseline assessment. However, it should be noted that these limitations are inherent to the study's context. The training was not mandatory, and participants could sign up for free and attend the activity based on their motivation and availability. Furthermore, attrition was relatively high, although comparable to similar studies (Eiroa-Orosa and García-Mieres, 2019). If we had treated as missing the data from people who enrolled but did not ultimately participate, it would have resulted in a multitude of possible scenarios that would have been difficult to manage. Therefore, we chose to calculate efficacy and effectiveness based on the scores of participants who effectively received the training. This approach provides a more realistic evaluation of the intervention's impact under real-world conditions.

5. Conclusion

Training and awareness of professionals are fundamental elements for the implementation of Recovery and Rights-based mental health care models. Participation of people with lived experience, their relatives, as well as the involvement of all professionals, both dedicated to care and management, is essential for transformations to crystallize into care systems focused on achieving full citizenship despite experiencing psychosocial distress.

Data availability statement

The trial was registered at the Open Science Framework website under the document object identifier https://dx.doi.org/10.17605/OSF.IO/9U4PK. The datasets analyzed for this study can be found there and as supplemental material.

Ethics statement

All subjects gave a written informed consent in accordance with the Declaration of Helsinki. The trial was approved by the University of Barcelona Bioethics Committee (IRB00003099).

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1152581/full#supplementary-material.

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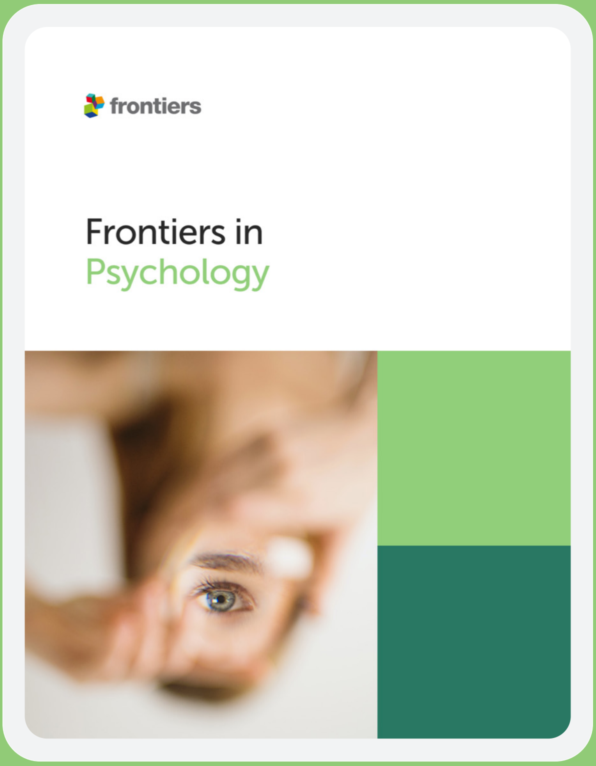

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