A cost-benefit framework for prosocial motivation—Advantages and challenges

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Prosocial motivation as cost-benefit decisions

In everyday life, people help others, from assisting colleagues with a task, to holding doors for strangers. These types of actions have been called prosocial behaviors—actions that benefit others (1). These behaviors are found not only in humans but also in a wide range of species where individual actions increase the fitness of a group, facilitating social cohesion (2–4). In humans these behaviors are very versatile and vary between contexts and individuals. Characteristics of the beneficiary (e.g., family vs. strangers), of the agent (e.g., personality traits), and the context (e.g., type of benefit), all influence how willing people are to help others (4–9). Understanding how these characteristics modulate willingness to help is important to uncover why there is variability in prosocial behavior.

Here, I propose that a group of prosocial behaviors could be conceptualized as goal-directed actions (10)—actions that benefit others at the agent's own cost. The agent needs to be incentivized by the social benefit to overcome the cost and perform the action. Thus, in this group of actions, the material and direct benefit of the action is not received by the agents themselves but by others. The probability of a prosocial action to occur will depend then, among other factors, on how costly and how beneficial the action is—e.g., high benefits for low costs would have a high probability for the prosocial action to occur and vice versa. Crucially, this cost-benefit process is highly subjective—e.g., some people could be highly sensitive to others' welfare, and be prosocial for little benefit regardless of the cost, while others could be very sensitive to the cost, refraining to act even if the cost is low, regardless of the social benefit.

This framework can be conceptually and methodologically powerful when addressing prosocial motivation. First, it can account for different types of behaviors that, in appearance, might not seem necessarily related. For instance, effortful prosocial actions, where effort costs need to be overcome to benefit others; and harm aversion, where costs are incurred to decrease others' suffering, have been linked empirically under a cost-benefit framework (11). Thus, costs (e.g., effort, time, money, distress) and benefits (e.g., money, avoiding harm, food, emotional support) can vary across contexts, but the decisional process might share similar principles. Secondly, using computational models, this framework allows us to understand the mechanisms underlying prosocial behaviors across different contexts, while capturing the idiosyncratic cost-benefit evaluations performed by individuals (10, 12, 13). Finally, costs and benefits can be manipulated and measured separately in experimental paradigms, accounting for individual variability in the sensitivies that people have to each element of the decision (10). Considering all of the above, in the following I will describe how a cost-benefit framework could be useful to address inter-individual and inter-contextual variability in prosocial behavior.

Inter-individual variability—Psychiatric and affective traits

Prosocial behavior is known for impacting social relationships, life satisfaction, economic success as well as mental and physical health (14–16), and its alteration, together with socio-affective disruption, have been linked to personality, depressive and anxiety disorders (6, 17–24). The propensity to act prosocially may therefore vary with psychiatric traits.

Crucially, new perspectives in psychiatry have proposed disorders as one extreme of a continuum where different traits are present to certain degrees (25, 26). Thus, healthy and neurodiverse populations vary only in the magnitude and combination of strength of subclinical traits. Many subclinical traits have been associated with prosocial disruption. For instance, psychopathy, alexithymia and apathy have all been linked to impaired prosocial behavior and social cognition (9, 18, 27–31). Other traits, disrupted across psychiatric disorders such as empathy and interoception (20, 32–35), have been linked to facilitating prosocial actions (36–39). Importantly, all these subclinical traits are not independent from each other (30, 40–42). Thus, how people evaluate the costs and benefits of being prosocial, or some broader impact on mood or willingness to act in general, is unclear.

A cost-benefit framework can illuminate how these different variables interact and influence people's prosocial decision-making process. In an online study (11), we measured willingness to help in two different contexts, one where the benefit was monetary and the cost was effort (prosocial effort), and another where the cost was financial, and the benefit was alleviating pain (harm aversion). Behavior in both tasks were correlated, supporting the idea of cost-benefit evaluations across contexts. Crucially, we also measured affective and psychiatric traits to identify which constellations of these traits most strongly predicted prosociality. We found that general subclinical traits associated with affective reactivity, such as high empathy but low alexythimia and emotional apathy, more strongly explained prosocial variability in these two contexts, rather than psychiatric traits such as depression and anxiety. These results suggest that people who are highly sensitive to their own and others' emotions are more likely to behave prosocially. Consistently, in a further lab-based experiment, we found that interoception was associated with prosocial behavior, but specifically related to sensitivity to others' benefits (43). Thus, people who were more aware of their bodily signals were more incentivized by the reward that others received, working more to obtain them. These results support the idea of high sensitivity to own and others' states as an important motor for cost-benefit prosociality. Future directions should disentangle further the relationship between psychiatric disorders and the specific elements in a prosocial decision using computational models, such as drift-diffusion models. These models have the potential to unveil which psychiatric or subclinical traits are linked to what specific aspect of the cost-benefit decisional process (44–46).

This cost-benefit, transdiagnostic approach can also contribute to modern psychiatry research. Advances in diagnosis and treatment of psychiatric symptoms have been improved from evidence-based research, such as the Research Domain Criteria (RDoC) initiative, which unifies biological and cognitive markers across specific domains in psychiatry (47). Likewise, computational psychiatry has revealed cognitive mechanisms underlying psychiatric traits, identifying protective factors and improving diagnostic tools (48, 49). A cost-benefit prosocial framework could help to understand social disruption in the psychiatric-healthy spectrum, illuminating the mechanisms of prosocial behavior and characterize individual variability. Progress in understanding the computational underpinnings of cost-benefit prosocial decisions has already been made, identifying differences between people on how specific elements of the decisional process influence prosocial behavior (8, 9, 45). These mechanisms have been linked to neural patterns of activity associated with individual variability in willingness to help others (10, 45, 50–52). Thus, neurocomputational models of cost-benefit prosocial decisions might be a powerful tool to capture transdiagnostic psychiatric profiles linked to social disruption, similar to previous computational psychiatry advances addressing other cognitive domains (53, 54).

Inter-contextual variability—Major global challenges

Prosocial behavior is essential for addressing major global challenges of the 21st century, such as infectious diseases and climate change (55–58). However, it has been shown that people are averse to engaging in pro-environmental behavior (59), and a considerable amount of people did not engage in behaviors that prevented the spread of COVID-19 (60).

These challenges can be seen under a cost-benefit prosocial framework. During the COVID-19 pandemic for instance, using masks or isolating from others not only affected the agents themselves but also the health of other people around them (58). Thus, these behaviors can be seen as harm aversion decisions, where the personal cost can benefit others by preventing their harm. Likewise, pro-environmental behavior can be considered as prosocial since it requires making decisions with outcomes for other people (56). Many pro-environmental behaviors, such as recycling or campaigning for more environmental actions, require putting in effort to benefit society. Thus, they involve a cost-benefit decision, where effort (or other) costs are incurred toward the welfare of people in general. Indeed, studies have shown that when the personal cost is lower and the environmental benefit is higher, pro-environmental behavior increases (61–64), and it is better predicted by pro-environmental attitudes (61). Therefore, understanding people's willingness to act in a way that helps toward global challenges can also be considered as linked to cost-benefit decision-making.

From a cost-benefit perspective, actions that alleviate these global challenges could bring material and direct benefits to the agents who perform them. However, this is not necessarily the case. For instance, people might not see risk for themselves during an outbreak of an infectious disease due to demographic and health characteristics (65, 66). Furthermore, generational gaps can exist in attitudes toward climate change, as the most severe consequences of global warming might not be seen for older adults (67, 68). Thus, the cost of prosocial actions within these global challenges must be

still incurred by the agent, but the benefits are received by others seen as more vulnerable to their consequences.

Even the benefit in such global challenges present specific characteristics—e.g., they are uncertain in their target (who will be benefitted specifically?), time (when will they be benefitted?), and impact. Thus, this reframing may be useful, as costs and benefits can be dissociated and manipulated in such a way that different scenarios can be emulated, and the mechanisms and the variables that affect prosocial decisions in specific contexts can be compared. Furthermore, by reframing these challenges as cost-benefit decision-making problems, it may be possible to precisely measure whether people are actually willing to act prosocially to meet these global challenges, rather than increasing their desire to help without actually changing behavior. Indeed, recently we found that people are highly hypocritical in a cost-benefit, harm aversion context, judging others' misconduct harshly even when they themselves have committed the same transgressions (69). This hypocritical behavior was associated with behavioral and neural markers of guilt, suggesting that people might desire a prosocial goal, but feel frustrated when their will fails. Given that in these global challenges a high degree of hypocritical blame occurs (e.g., blaming others for transgressing COVID-19 regulations while throwing crowded parties themselves), this cost-benefit approach could unveil the mechanisms underlying these behaviors, potentially facilitating prosociality.

A different methodological approach also would be beneficial to study behavior in these global challenges. For instance, most studies on climate change have relied on self-reports with no real consequences for the environment (63, 70), and on small samples of western, largely student, populations who might not represent behaviors across the globe (71). With online settings, these barriers can be more easily broken, and a more global sample reached. This approach has already been used during the COVID-19 pandemic in a prosocial context. In data collected online from countries across five continents, a study found that distancing behavior during COVID-19 pandemic was correlated with hypothetical charity donations (72). This supports the notion that different cost-benefit prosocial decisions can share variance. Interestingly, this study also examined links with another global challenge, i.e., aging, which might be linked to differences in cost-benefit evaluations (73). A cost-benefit framework could allow us to comprehend contextual variability, identifying those factors that can modulate prosociality within global challenges. Global, online approaches are crucial for this, and can be expanded to other global challenges such as climate change (e.g., https://manylabsclimate.wordpress.com/).

Limitations and challenges for prosociality research

Here, I have presented a cost-benefit framework for prosocial motivation where an agent must incur a cost to benefit someone else. This framework could be useful to disentangle the mechanisms underpinning variability in prosocial decisions across individuals and contexts. Identifying variables that could foment prosociality in the population might act as a protective factor not only for mental and physical health, but also to address global challenges of our time.

Despite the advantages that this framework might have, an obvious limitation is that it does not necessarily account for all types of prosocial behaviors. For instance, there is a group of prosocial behaviors that can bring some material benefits for the agent themselves, such as cooperation and reciprocity (4). Likewise, factors other than cost-benefit evaluations can modulate prosociality, such as social norms and moral values (74, 75). Furthermore, costs and benefits can change their value depending on the opportunity-costs of the environment, something that some studies have started to look at in prosocial contexts (76). In addition, in some contexts, costs could be rewarding in their own right (77), even if the benefit is for someone else (78). However, more than a direct criticism, these challenges add complexity to this framework, inviting to expand it to other levels within a cost-benefit decisional process.

I have argued that a cost-benefit framework for prosocial behavior could be useful to reduce global threats. Nevertheless, how to translate discoveries in behavioral sciences to the public domain has proved challenging (79). There are some signs however that this could change in the following years. In the middle of COVID-19 pandemic, a seminal article summarized relevant findings in our field, suggesting policies that could help to face the emergency (80). Even though some criticized this piece (81), a recent preprint concluded that around 85% of the suggestions were supported by evidence produced during the pandemic (82). Innovatively, they also assessed the quality of empirical evidence considering impact in policy making. Given previous work on decision-making research informing policy making (83), a prosocial cost-benefit framework could be one of the topics that could benefit society if applied in the real world. This not only will help to combat global challenges, but will also prove whether the knowledge we have accumulated in our discipline makes sense in the wild (84). Diversifying our samples and creating knowledge from countries in the Big South might be crucial to achieve these goals (85, 86). Understanding prosocial behavior could potentially have a positive impact on the lives of many people across the world, and this cost-benefit framework might be an important contributor to this end.

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.

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