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ICF-CY as a Framework for Understanding Child Engagement in Preschool

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Engagement in preschool predicts children's development, learning, and wellbeing in later school years. The time children engage in activities and social interactions is conditional for preschool inclusion. Engagement is part of the construct participation, which is determined by attendance and involvement. Two suggested underlying dimensions of engagement had been identified as essential when assessing children's participation in preschool activities. As engagement is a key question in inclusion of all children, and preschool becomes a common context for them, it is increasingly important to understand the concept of engagement in those settings. In Sweden most children attend preschool but children in need of special support tend not to receive enough support for their everyday functioning. This study aimed to conceptualize child engagement in preschool with ICF-CY as a framework to clarify core and developmental engagement dimensions included in Child Engagement Questionnaire (CEQ). The content of CEQ was identified through linking processes based on ICF linking rules with some exceptions. Specific challenges and solutions were acknowledged. To identify engagement dimensions in the ICF-CY, CEQ items related to ICF-CY chapters were integrated in the two-dimensional model of engagement. Findings showed that engagement measured for preschool ages was mostly related to Learning and Applying knowledge belonging to Activities and Participation but the linkage detected missing areas. Broader perspectives of children's everyday functioning require extended assessment with consideration to mutual influences between activities, participation, body functions, and contextual factors. Related to core and developmental engagement, findings highlight the importance for preschool staff to pay attention to how children do things, not only what they do. Activities related to core engagement include basic skills; those related to developmental engagement set higher demands on the child. Linking challenges related to preschool context were not consistent with those reported for child health. Using the ICF-CY as a framework with a common language may lead to open discussions among persons around the child, clarify the different perspectives and knowledges of the persons, and facilitate decisions on how to implement support to a child in everyday life situations in preschool and at home.

Keywords: children, core engagement, developmental engagement, ICF-CY, learning, participation, preschool, special support

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INTRODUCTION

Early childhood researchers have proposed that children's engagement in preschool is a strong predictor for learning, development, and wellbeing in later school years (Hamre and Pianta, 2001; Belsky et al., 2007; Ladd and Dinella, 2009; Chien et al., 2010; Fuhs et al., 2013). Engagement is defined as the time children are actively involved with material, other persons, or in a situation (McWilliam and Bailey, 1992; De Kruif and McWilliam, 1999). Engagement seems to be an essential component of development and learning for children in need of special support in preschool[1] (Dunst et al., 2006; Pramling Samuelsson and Johansson, 2006). It can be regarded as a key component in identifying children in need of special support in preschool (Almqvist, 2006). In other words, children displaying low levels of engagement, such as inattention toward learning activities in preschool, are at risk for learning difficulties and impaired academic achievement over time (Metcalfe et al., 2013). Even if norm-referenced measures and formal diagnoses traditionally are used to identify children in need of special support (Simeonsson, 2006; Lillvist, 2010; Lillvist and Granlund, 2010; Drabble, 2013), an alternative way to identify those children is to look at their functioning (e.g., engagement) in everyday life. Difficulties in functioning in terms of engagement, at its own or together with a diagnosis, may be a sign of a need for special support. Engagement is also a fundamental aspect of inclusion and inclusive practices in preschool (European Agency for Special Needs Inclusive Education, 2017a,b) and can be used in intervention processes.

Engagement is seen as a part of the construct participation, with attendance as a prerequisite for involvement (WHO, 2001; Granlund, 2013; Imms et al., 2017). In addition, involvement can be operationalized as engagement. In the International Classification of Functioning, Disability, and Health (ICF) (WHO, 2001) participation is defined as involvement in life situations affecting health and wellbeing. The child and youth version of ICF (ICF-CY) (WHO, 2007) provides a comprehensive list of different aspects of child functioning together with environmental aspects, which co-exist and provide a holistic perspective of barriers and facilitators for child functioning, engagement included. Thus, the ICF-CY may be used to further understand the concept of engagement. By linking items in instruments measuring engagement to ICF-CY codes it will provide an understanding of whether or not an instrument is holistic and cover most aspects included in the framework. The ICF-CY can serve as a common framework that makes it easier for professionals in different disciplines to interact, and also for parents and professionals to discuss about the child, the social and physical environment in the preschool, and interventions (WHO, 2007; Adolfsson et al., 2010; Klang Ibragimova et al., 2011).

In Sweden, one of the natural contexts for child engagement is the preschool environment. The national curriculum for Swedish preschool (Swedish National Agency for Education, 2010) advocates an inclusive approach in which all children, with and without need of special support, are included together with peers in preschool groups. Although Swedish children in need of special support due to physical, psychological, health-related, socioeconomic, or other factors have the legal right to receive special support (SFS, 2010), several studies have shown that the majority of them do not receive additional support for their everyday functioning, such as engagement in preschool activities (Lillvist and Granlund, 2010; Lundqvist et al., 2016; Almqvist et al., 2018). To identify opportunities and barriers for child engagement in preschool activities, it is important that the team around the child, i.e., preschool teachers, childminders, other professionals, and parents, share a common language related to children's everyday functioning, where engagement is one aspect.

This study is focused on understanding child engagement in preschool with ICF-CY as a framework. It aims to conceptualize child engagement by using the classification to clarify engagement dimensions included in Child Engagement Questionnaire (CEQ) (McWilliam and Bailey, 1992; De Kruif and McWilliam, 1999) and recent data from the Swedish preschool context (Sjöman et al., 2016). The findings are mainly expected to raise awareness in preschool teachers and other professionals that are involved in providing support in preschool, of the concept of child engagement as a way to provide support for functioning in everyday life in preschool for children in need of special support.

BACKGROUND

Child Engagement in Preschool

The construct engagement can be referred to the extent to which a child participates in academic or non-academic tasks (Aydogan, 2012). Studies focusing on children's engagement in academic tasks usually consist of cognitive, emotional, and behavioral aspects and refer to the concept school engagement, mostly in literature of older children in primary school settings (Fredricks et al., 2004; Skinner et al., 2008; Ladd and Dinella, 2009). However, definition of engagement for children during preschool age are much less elaborated and differentiated than those for older children in primary school (Aydogan, 2012). Engagement in early childhood settings, such as preschool, mostly includes child involvement in play activities, with peers, materials, or teachers (McWilliam and Ware, 1994; Howes and Smith, 1995; Kontos and Keyes, 1999). Early childhood researchers usually describe the level of complexity in child engagement with the environment as an indicator of children's level of competence in cognitive and social domains (Pellegrini and Bjorklund, 1998).

The CEQ (McWilliam and Bailey, 1992; De Kruif and McWilliam, 1999) that will be used in the present study has previously been used to measure child engagement in preschool settings in several other studies in Europe and US (e.g., McWilliam et al., 2003; Almqvist, 2006; Luttropp and Granlund, 2010; Castro et al., 2015; Sjöman et al., 2016). The CEQ rates children's global engagement levels and aims to assess how children engage in behaviors (McWilliam, 1991; De Kruif and McWilliam, 1999). De Kruif and McWilliam (1999)

[1]In this article the concept children in need of special support is defined as "children who need additional support for development and learning in preschool."

argue, that the items could be assorted into four underlying factors: Competence, Persistence, Undifferentiated behavior, and Attention. Related to the CEQ, a recent longitudinal study in Swedish preschools suggested two dimensions of the concept engagement: core and developmental engagement (Sjöman et al., 2016). Core engagement consisted of less complex behavior, such as attention toward activities or other children's play (e.g., *Seems to be aware about what's going on around the child, watches or listens to adults,* #17), and showed weak association to chronological age. Developmental engagement, on the other hand, turned out to be strongly related to chronological age and referred to behavior with higher complexity, such as problem solving or pretending (e.g., *Tries to complete things even if it takes a long time to finish*, #18). Additionally, the results revealed that children in need of special support tended to spend less time in developmental engagement, i.e., with complex tasks. Instead, they showed core engagement frequently when they were met by responsive teachers and when they were included in positive peer interactions. Hyperactivity tended to have a negative influence on children's core engagement and developmental engagement, even though the association between hyperactivity and developmental engagement was a little bit weaker. Moreover, the results showed that quality of social interaction in preschool explained a large percentage of the total negative effect of hyperactivity on both types of engagement. Consequently, preschool children with hyperactivity showed a higher level of engagement when they were met by positive social interactions, which was especially strong for peer interactions. This implies the importance of teacher's perception of children's engagement behavior and knowledge about how to support child–child interaction in preschool in order to improve engagement in everyday functioning, especially among children in need of special support. Both dimensions, core and developmental engagement, should be considered in the assessment of a child's engagement in preschool activities.

Support to Children in Swedish Preschools

For young children in Sweden, preschool[2] is part of everyday life. Every child has a legal entitlement to preschool, i.e., public authorities guarantee a place for each child whose parents demand it. It is provided for all children from the age of one, and most children attend preschool from an early age until the age of five: 88 percent of 2 year old's and more than 93 percent of children between 3 and 5 years (Swedish National Agency for Education, 2015). The Swedish Education Act (SFS, 2010) states that Early Childhood Education and Care should promote all children's development and learning. Based on democratic values the curriculum states that pedagogical activities in preschools should be related to the needs of all children, and the goal for the preschool is to strive to ensure that each child develop their identity, self-autonomy, and curiosity as well as experience of enjoyment and participation.

Preschool teachers and childminders have the responsibility to pay special attention to children who are in need of additional support. Children's right to support is further reinforced in the revised version of the national preschool curriculum (Swedish National Agency for Education, 2010). However, as mentioned earlier, actually not all of them do receive enough support to promote engagement in preschool (Lillvist and Granlund, 2010; Lundqvist et al., 2016; Almqvist et al., 2018). In addition, the Swedish Schools Inspectorate (Skolinspektionen, 2017) reported that about 2/3 of inspected preschools had shortcomings in their work related to special support. Those shortcomings were mostly related to differences in quality and equality, difficulties in planning and implementation of interventions, and structural aspects such as responsibilities, collaboration, and leadership. One reason may be that collaboration between different professional groups involved in providing daily support does not function optimally, i.e., the preschool staff, the preschool support team, professionals from child habilitation teams (physical therapists, occupational therapists, speech therapist, psychologist, etc.), and child healthcare teams. Their different educational and professional backgrounds and focus tend to interfere when planning and implementing support. Moreover, studies (Lillvist and Granlund, 2010; Almqvist et al., 2018) have found that children in need of special support without a formal identification of the needs (i.e., a medical diagnosis) were provided with support only by initiatives from the preschool staff. Children that were formally identified, on the other hand, were provided with support from professionals in the preschool support team, child healthcare, or habilitation team. The support for non-formally identified children mainly seemed to be focused on reducing behavioral problems, for example hyperactivity, rather than contributing to the child's engagement in preschool. The studies indicate that preschool staff working do not provide enough support to contribute to the child's engagement in everyday life in preschool. In addition, the study by Almqvist et al. (2018) showed that preschool staff did not regard engagement as an important aspect of the child's everyday functioning. With respect to the goals in the national curriculum of the preschool, child engagement as an aspect of inclusion is important to investigate.

The ICF-CY as a Framework to Conceptualize Child Engagement

The ICF and ICF-CY build on a biopsychosocial framework and was developed to "provide a unified and standard language and framework for the description of health and health related states" (WHO, 2001, 2007, p. 3). The framework integrates a medical and social model and as such provides a conceptual framework and terminology for recording functioning in everyday life.

The ICF-CY model illustrates how a child's functioning, health, and wellbeing are defined in a broad manner including body functions and structures, activities, and participation under influence of the context defined by environmental and personal factors (**Figure 1**). Functioning is related to aspects besides the physical, bringing in the child's involvement in a life situation and thereby engagement. The ICF-CY can be seen as an interactive system providing building blocks to study different aspects of child functioning in various everyday contexts and

[2]Swedish preschools are open for children aged 1-5 years. For children in need of special support, the time can be extended.

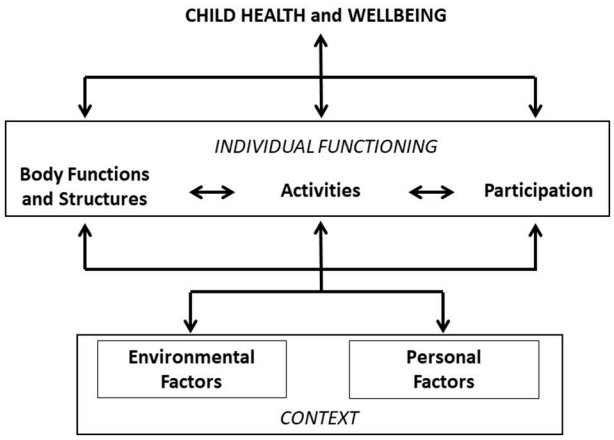

FIGURE 1 | The interactive ICF-CY model, adapted from WHO (2007) for use with children (Björck-Åkesson, 2018). The figure is reproduced with the permission of the copyright holder.

the complex relationships between functioning and contextual factors (WHO, 2007). In addition to a model, the ICF-CY includes a classification with a hierarchical structure organized at four levels of detail. Unlike the model, the classification compiles activities and participation. This component includes nine chapters that "covers the full range of life areas (from basic learning or watching to composite areas such as interpersonal interactions or employment)" (WHO, 2007, p. 14). The coding system of the classification provides an opportunity to identify content and/or compare data in for example text or measures by linking information or items to components, chapters, and categories in the comprehensive classification (Simeonsson et al., 2003; WHO, 2007; Cerniauskaite et al., 2011; Lee, 2011).

The identification and adaptation of content in ICF for the ICF-CY were guided by central elements such as growth and development (WHO, 2007). Even if the ICF-CY does not conceptually rely on a specified theoretical base, a systems theoretical perspective, for example represented by Bronfenbrenner and Ceci's (1994) ecological model, inspired and guided the development of the classification (WHO, 2007; Simeonsson et al., 2010). The ICF-CY was informed by contemporary science of early childhood development (Shonkoff and Phillips, 2000). Issues that informed the addition or expansion of content included cognition, language, and play. It also included content that reflects activities and the everyday environments of children. Particular attention was attended to the child in the family and other proximal environments, like the preschool.

The ICF-CY can be used in collaboration within and between professional groups to jointly assess influential factors of child functioning and learning (Simeonsson et al., 2010). Björck-Åkesson et al. (2010) have shown that professionals in child habilitation find the content in ICF-CY useful and that it is a logically coherent model. The professionals tend to find it useful for documenting children's functioning, and that the use of the ICF-CY enhanced a focus on child participation and expanded their perspectives. In addition, it supported analyses and communication of children's special needs. In problem solving processes occurring in preschool settings, the ICF-CY can frame a child's needs by identifying both strengths and weaknesses in relation to the social and physical environment (Björck-Åkesson, 2018). The framework can serve in collaboration as a bridge between different adults around the child and systems providing support to improve child engagement (Castro and Palikara, 2018).

PURPOSE

The purpose of this study is to examine if child engagement in preschool—as assessed by the CEQ—can be conceptualized and understood through the ICF-CY and more specifically if the two engagement dimensions—core and developmental engagement as identified in a previous Swedish study—are possible to identify in the ICF-CY. The findings are expected to serve as support for preschool professionals to become aware of in which activities children in need of special support need extra stimulation to improve their engagement.

METHODS

Study Design

The design is exploratory using deductive qualitative content analysis operationalized on the basis of the ICF-CY. To identify child engagement as described by the content of the measure CEQ, the items were linked to the ICF-CY. Because it was not known how the ICF-CY can support the conceptualization of child engagement in preschool settings, specific challenges and solutions were acknowledged. As the study did not include research involving any human beings, ethical approval was not applied for.

The Measurement CEQ

The original CEQ includes 32 items, each one explained by a behavioral example to further clarify the intent (De Kruif and McWilliam, 1999). It is used by preschool teachers to record typical child behavior related to the time usually spent in activities. In this study, as in a previous study (Sjöman et al., 2016), some adaptations were made regarding the items and rating scale. Three of the original items (#7, 24 and 32) were omitted (**Table 1**). Even though the items could have been suitable for children in need of special support due to developmental delays, for instance children with autism spectrum disorders, they had been perceived by an expert panel as not suitable for general assessment in the Swedish preschool context. For example, *Continues repetitive movements to make sounds with an object* (#24) was considered to be more suitable during children's first year when Swedish infants usually receive care at home. For the same reason, the original behavioral example *The child says, "Ba-ba-ba-ba-ba"* intended to explain item #15 was changed to *The child imitates the sound of police sirens when playing with cars.*

The four point rating scale used in the original English version of CEQ records typical child behavior: (1) not at all typical, (2)

TABLE 1 | Excluded original CEQ items (De Kruif and McWilliam, 1999).

CEQ ITEMS WITH EXAMPLES	
7	Plays with objects in a simple manner (i.e., repetitive, changing).
	Example: The child bangs the toy car over and over again on the highchair tray.
24	Continues repetitive movements to make sounds with an object.
	Example: When the child discovers that the toy rattle, he or she makes it rattle again.
32	Tries to get adults to repeat things.
	Example: When the adult has done something the child likes, the child begs for more.

somewhat typical, (3) typical, or (4) very typical. The instructions specify that "typical" means that the child spends quite a lot of time in the activity (De Kruif and McWilliam, 1999, p. 520). With the intension to clarify what "typical" means, the Swedish rating scale was adapted to the following; (1) Almost never happens, (2) Sometimes happens, (3) Happens quite often, or (4) Happens very often. Related to the ICF-CY, "typical behavior" equals "performance," defined as what the child does in the preschool setting.

Considering the purpose to examine how the engagement in CEQ can be identified in the ICF-CY, findings from the previous study by Sjöman et al. (2016) were used. Core and developmental engagement had been identified through a principal component analysis with a two-factor solution (p. 1654) showing a high internal consistency for the two factors ($\alpha = 0.94$ for developmental engagement and $\alpha = 0.87$ for core engagement). The relations between items and engagement dimensions are displayed in Appendix 1 in Supplementary Material.

Identification of Content in CEQ and Engagement Dimensions in ICF-CY

Because the ICF-CY is presented as a universal and standardized language to describe functioning, it was considered possible to identify the content of the CEQ, i.e., dimensions of child engagement, by linking items to the classification (Stucki, 2005; WHO, 2007). To make linking processes systematic and consistent, established linking rules based on the ICF were used (**Table 2**) (Cieza et al., 2005). The eight general and six specific rules are intended for "describing, comparing, and contrasting information from outcome measures" (Fayed et al., 2011; p. 1948). As these rules were developed for adults, additional guidelines have been set up for children and youth in a number of studies (see e.g., Adolfsson, 2011; Klang Ibragimova et al., 2011; Castro, 2012; Chien et al., 2014; Jeglinsky et al., 2014). When Fayed et al. (2012) illustrated linking challenges specifically related to child health, they established that a manifest approach is usually not enough without an underlying latent content, which includes professional interpretations.

In this study, the content of CEQ was identified through a linking process based on the established ICF linking rules (Cieza et al., 2005) with some exceptions (**Figure 2**). To ensure that the interpretation could lean on a multidisciplinary background knowledge about child functioning, all three authors with different professional backgrounds were involved (Fayed et al., 2012). Before starting, the underlying factors by De Kruif and McWilliam (1999) were jointly reviewed and explained: Competence—the child acquires skills and uses them; Persistence—the child interacts with other persons or objects; Attention—the child keeps attention to what is going on around; and Undifferentiated behavior—the child interacts with the environment without differentiating his or her behavior. The purpose was to secure that every item could be understood in relation to the aim of the measure *and* of the underlying factors, which is in line with the established linking rule "e" (Cieza et al., 2005) (**Table 2**). Thereafter, the first and second author identified the intended aim of each item based on affiliation to an underlying factor and assorted them likewise.

The linking process was iterative with both manifest and latent procedures. The steps taken are displayed in **Figure 3**. A coding scheme was initially created and continuously revised to guide the linking process (Klang Ibragimova et al., 2011). All through the process, notified major and minor linking challenges related to preschool education issues and decisions on coding solutions were saved and summarized in table format (see Appendix 2 in Supplementary Material). "Major" means that an item was finally assigned a code in a different ICF-CY chapter than during the manifest coding. "Minor" means that the code was exchanged within a chapter.

As an initial step, the first author, knowledgeable about the ICF-CY but without previous experience of the CEQ, conducted a manifest linking process based on the established linking rules by Cieza et al. (2005) (see **Table 2**). Three exceptions were deemed suitable for this study: (1) The items were assigned one single code and not divided into several meaningful concepts (Specific linking rule "a"); (2) The examples were not assigned a specific code but were used to direct the linking (Specific linking rule "d"); and (3) The items were assigned codes on 2nd ICF-CY level, however considering the content outlined by the more detailed descriptions of categories on 3rd or 4th level (General linking rule 2). In case an alternative code would be possible, this was noted. For example, the CEQ #1 *Watches or listens to adults* (De Kruif and McWilliam, 1999), could be linked to either Focusing attention (d160) or Watching (d110) and Listening (d115). *Plays with adults who try to play with him,* could be linked to Complex interpersonal interactions (d720) or Engagement in play (d880).

In the next step, the first author together with the second author, a special educator knowledgeable about the CEQ, child development, and children's typical functioning in preschools, performed a latent procedure with interpretation of the underlying meaning of items. They thoroughly discussed the meaning of each item with consideration to the predefined, underlying CEQ factors by De Kruif and McWilliam (1999). Thereafter, all items were re-assorted into the original order and the factors were not further considered.

The third author, a psychologist and special educator proficient in the basic values behind the classification, carried out an independent linkage without consideration to the predefined

TABLE 2 | Summary of the general and specific linking rules by Cieza et al. (2005, see p. 214–215).

General rules		Specific rules	
1	Acquire good knowledge about the whole framework in ICF.	a	Identify all meaningful concepts within each item of the health status measure under consideration.
2	Link each meaningful concept to the most precise category in ICF.	b	The response options of an item are linked if they contain meaningful concepts.
3–4	Use specified codes, not so-called "other specified" or "unspecified" ICF categories.	c	The interval of time is not linked to the ICF.
5–6	Use "nd" (not definable) or "nc" (not covered) if information is insufficient or not part of the ICF.	d	If a meaningful concept of an item is explained by examples, both the concept and the examples are linked.
7–8	Refer to Personal factors as "pf" and diagnosis as health condition ("hc").	e	Define the aim with which the measure is used.

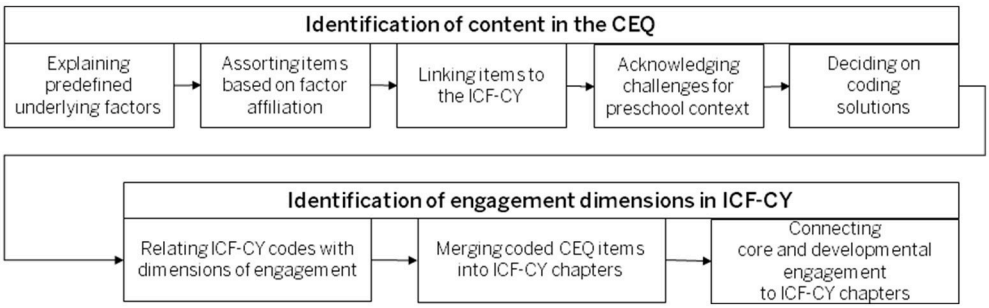

FIGURE 2 | Procedure to identify measure content and engagement dimensions. For more details about the linking process of items, see **Figure 3**.

factors. Four linkages differed and were discussed jointly by the three researchers in relation to the coding scheme. When consensus was obtained, the percentage inter-coder agreement on 2nd ICF-CY level was calculated twice after the latent process: (1) the first author's preferred code related to the one agreed upon jointly by the two researchers (65.5%), and (2) the preferred and alternative codes related to the agreed (90%). The interrater agreement with the third author was 86%. Due to these acceptable levels of agreement, no further judgement was performed.

To finally identify engagement dimensions in the ICF-CY, the CEQ items with assigned ICF-CY 2nd level codes and categories were related to 1st level codes, i.e., ICF-CY chapters, and integrated in the two-dimensional model of engagement (Sjöman et al., 2016) (Appendix 1 in Supplementary Material).

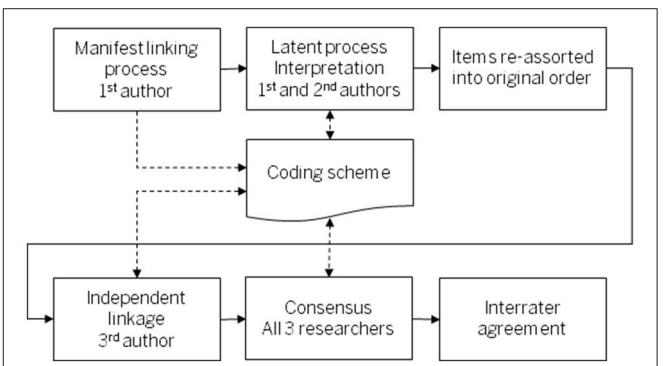

FIGURE 3 | The ICF-CY linking process of the 29 items in the adapted CEQ.

RESULTS

Child engagement in preschool could be conceptualized through the ICF-CY and the two dimensions core and developmental engagement were possible to identify. As described by the content of the measure CEQ, engagement became connected to five of nine chapters in the ICF-CY component Activities and Participation.

Child Engagement Conceptualized Through the ICF-CY

The 29 items of the CEQ were related to the five ICF-CY chapters; Learning and applying knowledge (d1; $n = 17$), General tasks and demands (d2; $n = 2$), Communication (d3; $n = 2$), Interpersonal interactions and relationships (d7; $n = 4$), and Major life areas/Engagement in play (d8; $n = 4$). Most items belonged to Learning and applying knowledge (**Table 3**; Appendix 1 in Supplementary Material). No CEQ items were related to the ICF-CY chapters Mobility (d4), Self-care (d5), Domestic life (d6), or Social life (d9).

Identification of Core and Developmental Engagement in the ICF-CY

The 29 items of the CEQ were unevenly distributed across the five ICF-CY chapters (2–17 items/chapter). Most items concerned basic learning (38%), such as learning through single actions or a

TABLE 3 | Distribution of CEQ items ($n = 29$) across ICF-CY chapters and how the two dimensions of engagement were identified in the ICF-CY.

CEQ items (%)	ICF-CY chapter	Engagement dimension (no.)	
		Core	Developmental
38	Basic learning (d1)	2	9
21	Applying knowledge (d1)	4	2
7	General tasks and demands (d2)	1	1
7	Communication (d3)		2
14	Interpersonal interactions and relationships (d7)	3	1
14	Major life areas (engagement in play) (d8)	2	2

single object (**Table 3**; Appendix 1 in Supplementary Material). When identifying items related to the two dimensions core and developmental engagement, a pattern could be explored. Basic learning-items were primarily related to developmental engagement whereas applying knowledge was more related to core engagement, such as focusing attention. Communication seemed exclusively integrated in developmental engagement, indicating the relation to the age of the child. Engagement in interpersonal interactions, on the other hand, seemed to be related to the core dimension. The four items linked to engagement in play were categorized as either core or developmental engagement, with the difference that development related items seemed to require a higher degree of initiative from the child to join in the activity.

DISCUSSION

This study investigated how child engagement in preschool can be conceptualized and understood through the ICF-CY. The connection to ICF-CY chapters, codes, and categories enabled identification of the two dimensions of engagement, core and developmental, that had been suggested by Sjöman et al. (2016).

Child Engagement Conceptualized Through the ICF-CY

Even though engagement is stressed to be a fundamental aspect of inclusion and practices in preschool (European Agency for Special Needs Inclusive Education, 2017a,b), several Swedish studies have shown that a majority of children in need of special support do not receive additional support to improve their engagement in preschool activities (e.g., Lillvist and Granlund, 2010; Lundqvist et al., 2016). One explanation might be a lack of common language on how to assess and identify opportunities and barriers for child engagement in preschool. As the ICF-CY aims to provide a compatible language to translate the content in measurements in a meaningful and concrete way (Stucki, 2005), it was chosen as a framework for analysis in this study. When used as a bridge to identify the content in CEQ, the classification showed its ability to conceptualize child engagement in preschool settings. The results revealed that engagement measured for these ages was mostly related to the ICF-CY areas Basic learning and Applying knowledge, belonging to the component Activities and Participation (see **Table 3**). This implies how important it is for preschool professionals to pay attention to these aspects in everyday activities for children in need of special support.

The linkage showed three missing areas for child engagement in preschool. Mobility (d4) includes to move around, which might be seen as a basic skill, such as the ability to walk. However, if one includes the aspect of self-determination, it adds an important area to consider. For children in need of special support due to developmental delays, for example, this skill provides the opportunity to independently move around and gain an understanding of what other children are experiencing and how to relate to them (Adolfsson et al., 2014). Self-care (d5) and Domestic life (d6) include activities such as toileting, eating, helping to do housework, and assisting others. These areas are overlooked in the CEQ but of great value to consider in the preschool context.

Core and Developmental Engagement in the ICF-CY

One of the challenges in the linking process was the association between the ICF-CY codes and the two engagement dimensions of CEQ. It was found that core and developmental engagement, representing different complexity of the child's engagement behavior in preschool settings, could be linked to the same ICF-CY 2nd level code and category (see Appendix 1 in Supplementary Material). Basic learning and Applying knowledge covered the majority of the CEQ items but were related to different dimensions of engagement (see **Table 3**). A child's engagement in basic learning can be expressed through less complex activities such as simple actions with a single object, e.g., the child bangs blocks with a toy hammer rather than chewing it (# 23). For children in need of special support, these types of engagement behavior are more common than complex engagement behavior, such as when a child tries out new ways of playing with objects (#9) (Sjöman et al., 2016). Even though these types of engagement behavior are related to the same 2nd level ICF-CY code (d131), they are differently identified by a more detailed ICF-CY 3rd level code (d1310/d1314) and belong to core and developmental engagement, respectively. The items related to developmental engagement seem to require further initiatives from the child, i.e., to not only play with toys in the way they are intended to but also to develop and find more interesting or complex alternative applications. The same was suggested as an explanation to the distribution of the four items linked to play. Another interesting difference related to engagement dimension concerns two of the items linked to Interpersonal interactions (CEQ #3 and #4). Both items regard how a child tries to get another person to do things and where it seems to be more complicated to activate another child than an adult. Considering that preschool teachers' rating of child engagement was the basis for the distribution of CEQ items over the engagement dimensions (Sjöman et al., 2016), this might explain the difference. These professionals know how children start communicating with adults already from very early ages,

and that the child–child interaction develops over time, which can mean a difficulty for some children in need of special support due to developmental delays, for instance children with autism spectrum disorders (Falkmer et al., 2015). This implies the importance for the preschool staff to pay attention to each child's way of playing and interacting with others and to be aware of how engagement can be stimulated differently for children with and without the need of special support. A Swedish longitudinal study (Sjöman, 2018) explored that engagement for children in need of special support increased over time when other children showed interest toward the child's actions and when the staff used approving behavior of the child's engagement with materials or activities. This increased path was especially strong for core engagement, i.e., less complex engagement behavior such as the child's attention and persistence, but not for developmental engagement (i.e., complex engagement behavior). Thus, in order to create an inclusive learning practice and design interventions with the purpose to improve engagement, it is important to consider how children act in preschool activities, e.g., if they are using materials just the way they are told to, or if they use their imagination and constructive skills to try out new ways of using it. Another consideration would be about attention which is reflected by four of the CEQ items. Three items are limited to the child's ability to focus attention (core engagement) whereas the fourth (#25) adds the time the child can concentrate on an activity (developmental engagement). Related to the ICF-CY, all four items are about applying knowledge, but the relation to engagement dimension tells the preschool teachers that the children's engagement and development could be improved if they stimulate them to stay in the activity for a longer time. This extra stimulation might be especially important for children in need of special support as they tend to spend less time with complex tasks (Sjöman et al., 2016).

However, for the health and wellbeing of children, the complexity of activities might not be essential (Casey et al., 2012; Sjöman et al., 2016). Even less complex activities can highly engage children and improve their everyday functioning. For instance, if activities can be adapted to children's interests and communication skills, children in need of special support might increase their attention toward learning activities and improve engagement. In addition, the social skills (interpersonal factors) can be stimulated and increase the children's engagement if peers are encouraged to take part of activities together with children in need of special.

These examples show how the ICF-CY can serve as a common framework for persons in the proximal environment of a child (parents, preschool-teachers, decision-makers etc.) to enable decisions on interventions for the improvement of two important aspects of child engagement in preschool settings.

Utility of the ICF-CY in Assessment

As ICF-CY is presented as an interactive model, the different parts influence each other. From our perspective, one suggestion is that child engagement is an outcome, affected by factors included in all the other components of the interactive model. It means for example that improved body functioning can result in an improvement of participation and engagement, but it can also be the other way around (Rosenbaum and Gorter, 2012; Imms et al., 2017). **Figure 4** illustrates this suggestion with a tentative relationship between one of the questions in the CEQ (#27) and a sample of possible influencing factors (WHO, 2007). For example, when a child plays with other children, he/she improves body functioning, such as mental functions of language, and also skills at the activity level, such as acquiring language and interpersonal interactions. On the other hand, when cognitive functions increase, the child most likely will spend more time and be more engaged in play with other children.

Another example of interactivity between components regards how children's interests influence their engagement. Children develop skills out of what they are ordinarily doing, but they learn best if they are interested (Andersson, 2017). Rosenbaum and Gorter (2012) suggested that the ICF-CY model could be turned

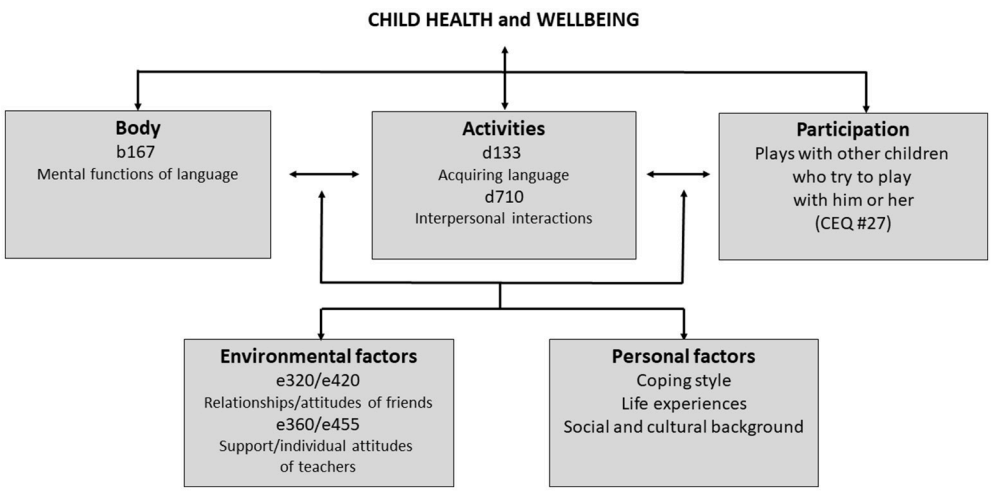

FIGURE 4 | Tentative interactive relationship between the ICF-CY dimensions related to CEQ #27.

"backwards," which would direct parents' and professionals' thinking away from a pure medical model of functioning. For instance, to support learning, children's interests, choices of enjoyable activities, and opportunities for participation should be considered in first hand rather than what professionals find most important to treat. Children's performance is partly dependent on what they can do at their best, but also what they like to do (Rosenbaum and Gorter, 2012). Activities that are experienced as fun work as facilitators for children's engagement and by doing activities often, their performance improves and most likely their body functions will be affected positively. Not only a child's interest is important for the child's performance. Vygotskij's theory of the zone of proximal development showed that children's development is most effective when the support is matched to their needs (Vygotskij, 1978). This puts them in a position to achieve success in an activity that they would previously not have been able to do. This way of thinking provides a clear view of the ICF-CY as an interactive framework for child functioning. During initial trials of the ICF-CY, it was actually suggested that the model should be changed placing participation first, starting from the child's and families experiences in everyday life (Adolfsson et al., 2007).

Methodological Discussion

The linking process was extensive and engaged researchers knowledgeable in child assessment and in the use of both the ICF-CY and CEQ. This contributed to thorough discussions about what each item "was or was not about" and aimed to ensure the reliability of the linking process (Öhrvall et al., 2013). To facilitate the understanding of the purpose of items, the examples had a great value. Fayed et al. (2011) stated that quality should be ensured through "an iterative process that integrates potentially competing views from various linkers with different perspectives" (p. 1948). As interpretations are deemed as apparent in all linkages, even when a manifest approach is described, different professional backgrounds and expertise could be a concern (Fayed et al., 2012; Öhrvall et al., 2013; Chien et al., 2014). In this study, however, the researchers' various experiences were perceived as supportive and could defend the interpretation of latent content in the items.

The linkages did not fully follow the established linking rules (Cieza et al., 2005). First, the items were not divided into more than one meaningful concept and assigned only one ICF-CY code (Specific linking rule "a"). The reason was that the size of meaningful concepts is related to the level of detail of contextualization and therefore, an item can be fragmented so that the aim seems to disappear if it is divided into smaller parts (Riva et al., 2010; Klang Ibragimova et al., 2011). In addition, the factors identified by De Kruif and McWilliam (1999) and Sjöman et al. (2016) would not have been comparable. Second, the examples were not linked (Special rule "d") but regarded as support for the linking. The third deviation from the established rules was that the items were not linked to the most precise ICF-CY category (General linking rule 2). A more detailed level was not deemed relevant due to the purpose to merge related codes. As stated by Öhrvall et al. (2013), results from linkage processes are often aggregated and presented in ICF-CY second-level categories when it seeks to comparison.

The study showed that the ICF-CY can be implemented in preschool research by supporting the conceptualization of child engagement in preschool context. However, challenges that have not been reported previously were explored and demanded solutions (Appendix 2 in Supplementary Material). Four major challenges concerned children's engagement in play and how to separate this from activities related to learning through play, making decisions, or interact with others, and also how children undertake tasks vs. acquire skills. Three minor challenges primarily concerned the distinction between categories related to a child's application of knowledge. The coding-solutions required consideration to examples given in each item of the CEQ in addition to descriptions following each ICF-CY category. When comparing challenges related to preschool context, they did hardly comply with the issues related to children's health as reported by Fayed et al. (2012).

The linking showed that child engagement of preschool children, as assessed by the CEQ, is exclusively related to the ICF-CY component Activities and Participation. For older children in primary school, researchers have described a three-part perspective including behavioral, emotional, and cognitive aspects (Fredricks et al., 2004; Skinner et al., 2008), which would be linked to Body functions. However, the focus on younger children (aged 1–5 years) in the present study might explain the lack of cognitive aspects in CEQ. This indicates that assessment of child engagement in preschool contexts could be extended by other measures in order to provide broader perspectives of the child's everyday functioning, for example, tests for cognitive functions; such as attention functions and self-regulation.

Limitations

This study focused on how child engagement in Swedish preschool context can be understood through the ICF-CY. Data were limited to the measure CEQ because it should involve global engagement (McWilliam, 1991; De Kruif and McWilliam, 1999) and had already been analyzed relative to engagement dimensions based on preschool teachers rating of children in a Swedish preschool context (Sjöman et al., 2016). It is not known how the dimensions work in other cultural contexts.

The three excluded CEQ items might mean a limitation, especially if the results are implemented in other contexts. Two of the excluded items (#7; #24) would most likely be linked to d1, Learning through simple actions with a single object (d131), and the third item (#32) would be linked to d7, Maintaining social interactions (d71041). Even though it is not known if these items are categorized as core or developmental engagement, the codes match other items and by that they do not add any area (ICF-CY chapter) in which preschool staff should be encouraged to provide extra stimulation for a child's engagement. Maybe more engagement instruments could have extended the understanding of areas of importance for preschool professionals to consider for children in need of special support. An ongoing Swedish project aiming to investigate child functioning in preschool and the relation between child characteristics and engagement (Granlund et al., 2015) included two more measures

linked to Activities and Participation; Strength and Difficulties Questionnaire (Goodman, 2001) and a brief ICF-CY code set. However, none of these instruments added any ICF-CY chapters (Adolfsson et al., 2016).

A previous validation study of the CEQ including children under the age of six, showed high congruence between parent and professional ratings of children, which would indicate that adults from different environments can judge a child's engagement equally well as long as they have an ongoing opportunity to observe the child's behavior (McWilliam et al., 1993; De Kruif and McWilliam, 1999). However, as engagement in preschool activities is related to involvement according to the ICF-CY, the level of engagement might be difficult to report distinctly based on the CEQ. The response alternatives are limited to child performance, i.e., preschool teachers' perceptions of typical behavior. To get this aspect, future research could also address children's own perspectives of engagement by other measures.

CONCLUSION AND IMPLICATIONS FOR PRACTICE

The present study shows that the CEQ did not provide a sufficiently holistic view of child functioning in preschool according to the interactive model of ICF-CY. The items of CEQ were related to five of nine chapters in the component Activities and Participation, whereas bodily and environmental aspects were not covered. This implies that complementary measures are needed to investigate and follow up children's everyday functioning in preschool. For instance, engagement is affected by the child's interests and perception of activity settings, but also to the child's basic skills including to shift and focus attention (Raver et al., 2012). Measuring engagement in educational settings, such as preschool, need to consider mutual influences between activities, participation, body functions, and contextual factors. By using the interactive model of ICF-CY when identifying content in different measures, missing areas can be detected. An investigator can then add measures to get a wider view of child functioning. On the other hand, by using many different measures, there might be a risk that children's functioning is divided into different factors without consideration of mutual influences.

Findings related to the two engagement dimensions point out the importance for preschool staff to pay attention to *how* children are doing things, not only *what* they are doing. The activities related to core engagement include basic skills that most likely will stay on the same level over time. The activities related to developmental engagement seem to set higher demands on the child with a level that most likely will change over time. This would be a topic for further investigation by longitudinal studies.

The use of the ICF-CY as a framework with a common language may lead to more open discussions among persons around the child (e.g., various professions, parents, and different service providers). It can also be used to clarify the different perspectives and knowledges of persons in the team around the child. For example, parents and preschool staff have knowledge about the child's functioning in everyday life and also about the environment around the child. Experts (physical therapists, occupational therapists, speech therapist, psychologist, etc.), on the other hand, have knowledge about child functioning in general and also specific information, e.g., about body functioning, language development, technical devices, and support and service systems. Through the opportunity to link measure content to a common framework such as ICF-CY, appropriate ways to assess child functioning can be jointly decided. It enables a broad and comprehensive perspective that can facilitate discussions about how to design and implement effective support to the child in everyday life in preschool and at home.

AUTHOR CONTRIBUTIONS

All authors agree to be accountable for the content of the work. They all collaborated in the planning, data analyses, and writing. As notified in the Method section, the three authors had different professional backgrounds and their involvement in the different steps of the linking process was essential and therefore explained in detail in the method section.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2018.00036/full#supplementary-material

REFERENCES

Adolfsson, M. (2011). *Applying the ICF-CY to Identify Everyday Life Situations of Children and Youth with Disabilities*. Doctoral thesis, Jönköping University, Jönköping.

Adolfsson, M., Granlund, M., Björck-Åkesson, E., Ibragimova, N., and Pless, M. (2010). Exploring changes over time in habilitation professionals' perceptions and applications of the International Classification of Functioning, Disability and Health, version for Children and Youth (ICF-CY). *J. Rehab. Med.* 42, 670–678. doi: 10.2340/16501977-0586

Adolfsson, M., Pless, M., Björck-Åkesson, E., Ibragimova, N., and Granlund, M. (2007). *Development of ICF-CY Forms in Sweden*. MHADIE (Unpublished report).

Adolfsson, M., Westerberg, C., and Möller, K. (2014). Everyday life situations of school-aged children with severe disabilities: what are the goals for the future? An exploratory study. *J. Intell. Disabil. Diagn. Treat.* 2, 21–32. doi: 10.6000/2292-2598.2014.02.01.3

Adolfsson, M., Sjöman, M., Björck-Åkesson, E., Granlund, M., Simeonsson, J. R., and Bornman, J. (2016). "Using changes in ICF-CY qualifiers and codes

to describe change," in *Paper Presented at the International Conference on Cerebral Palsy and other Childhood-onset Disabilities/Challenge the Bounderies* (Stockholm).

Almqvist, L. (2006). Patterns of engagement in young children with and without developmental delay. *J. Policy Prac. Intell. Disabil.* 3, 65–75. doi: 10.1111/j.1741-1130.2006.00054.x

Almqvist, L., Sjöman, M., Golsäter, M., and Granlund, M. (2018). Special support for behavior difficulties and engagement in Swedish preschools. *Front. Educ.* 3:35. doi: 10.3389/feduc.2018.00035

Andersson, A. K. (2017). *Everyday Functioning in Six Year-Old Children Born Preterm. From a Child Perspective Towards the Child's Perspective*. Eskilstuna: Mälardalen University.

Aydogan, C. (2012). *Influences of Instructional and Emotional Classroom Environments and Learning Engagement on Low-Income Children's Achievement in the Prekindergarten Year*. Doctoral thesis, Vanderbilt University.

Belsky, J., Burchinal, M., McCartney, K., Vandell, D. L., Clarke-Stewart, K. A., and Owen, M. T. (2007). Are there long-term effects of early child care? *Child Develop.* 78, 681–701. doi: 10.1111/j.1467-8624.2007.01021.x

Björck-Åkesson, E. (2018). "The ICF-CY and collaborative problem solving in inclusive early childhood education and care," in *An Emerging Approach for Education and Care: Implementing a World-Wide Classification of Functioning and Disability,* eds S. Castro and O. Palikara (London: Routledge), 134–146.

Björck-Åkesson, E., Wilder, J., Granlund, M., Pless, M., Simeonsson, R. J., Adolfsson, M., et al. (2010). The International Classification of Functioning, Disability and Health and the version for children and youth as a tool in child habilitation/early childhood intervention - feasibility and usefulness as a common language and frame for practice. *Disabil. Rehabil.* 32, S125–S138. doi: 10.3109/09638288.2010.516787

Bronfenbrenner, U., and Ceci, S. J. (1994). Nature-nurture reconceptualised in developmental perspective: a bioecological model. *Psychol. Rev.* 101, 568–586. doi: 10.1037/0033-295X.101.4.568

Casey, A. M., McWilliam, R. A., and Sims, J. (2012). Contributions of incidental teaching, developmental quotient, and peer interactions to child engagement. *Infants Young Child.* 25, 122–135. doi: 10.1097/IYC.0b013e31824cbac4

Castro, S. (2012). *The Assessment-Intervention Process of Young Children with Autism: Contributions of the International Classification of Functioning, Disability and Health for Children and Youth*. Porto: University of Porto.

Castro, S., Granlund, M., and Almqvist, L. (2015). The relationship between classroom quality-related variables and engagement levels in Swedish preschool classrooms: a longitudinal study. *Eur. Early Child. Educ. Res. J.* 25, 122–135. doi: 10.1080/1350293X.2015.1102413

Castro, S., and Palikara, O. (2018). *An Emerging Approach for Education and Care: Implementing a World-Wide Classification of Functioning and Disability*. London: Routledge.

Cerniauskaite, M., Quintas, R., Boldt, C., Raggi, A., Cieza, A., Bickenbach, J. E., et al. (2011). Systematic literature review on ICF from 2001 to 2009: its use, implementation and operationalisation. *Disab. Rehabil.* 33, 281–309. doi: 10.3109/09638288.2010.529235

Chien, C.-W., Rodger, S., Copley, J., and Skorka, K. (2014). Comparative content review of children's participation measures using the International classification of functioning, disability and health–children and youth. *Arch. Phys. Med. Rehabil.* 95, 141–152. doi: 10.1016/j.apmr.2013.06.027

Chien, N. C., Howes, C., Burchinal, M., Pianta, R. C., Ritchie, S., Bryant, D. M., et al. (2010). Children's classroom engagement and school readiness gains in prekindergarten. *Child Dev.* 81, 1534–1549. doi: 10.1111/j.1467-8624.2010.01490.x

Cieza, A., Geyh, S., Chatterji, S., Kostanjsek, N., Üstün, T. B., and Stucki, G. (2005). ICF linking rules: an update based on lessons learned. *J. Rehabil. Med.* 37, 212–218. doi: 10.1080/16501970510040263

De Kruif, R. E. L., and McWilliam, R. A. (1999). Multivariate relationships among developmental age, global engagement, and observed child engagement. *Early Child. Res. Q.* 14, 515–536. doi: 10.1016/S0885-2006(99)00028-9

Drabble, S. (2013). *Support for Children with Special Educational Needs (SEN). European Union*. Available online at: https://www.rand.org/pubs/research_reports/RR180.html

Dunst, C. J., Bruder, M. B., Trivette, C. M., and Hamby, D. W. (2006). Everyday activity settings, natural learning environments, and early intervention practices. *J. Policy Prac. Intell. Disabil.* 3, 3–10. doi: 10.1111/j.1741-1130.2006.00047.x

European Agency for Special Needs and Inclusive Education (2017a). *Inclusive Early Childhood Education: Literature Review*. eds F. Bellour, P. Bartolo and M. Kyriazopoulou (Odense). Available online at: https://www.european-agency.org/

European Agency for Special Needs and Inclusive Education (2017b). *Inclusive Early Childhood Education: New Insights and Tools – Final Summary Report*. eds M. Kyriazopoulou, P. Bartolo, E. Björck-Åkesson, C. Giné and F. Bellour (Odense). Available online at: https://www.european-agency.org/

Falkmer, M., Oehlers, K., Granlund, M., and Falkmer, T. (2015). Can you see it too? Observed and self-rated participation in mainstream schools in students with and without autism spectrum disorders. *Develop. Neurorehabil.* 18, 365–374. doi: 10.3109/17518423.2013.850751

Fayed, N., Cieza, A., and Bickenbach, J. (2012). Illustrating child-specific linking issues using the child health questionnaire. *Am. J. Phys. Med. Rehabil.* 91, S189–S198. doi: 10.1097/PHM.0b013e31823d53cf

Fayed, N., Cieza, A., and Bickenbach, J. E. (2011). Linking health and health-related information to the ICF: a systematic review of the literature from 2001 to 2008. *Disabil. Rehabil.* 33, 1941–1951. doi: 10.3109/09638288.2011.553704

Fredricks, J. A., Blumenfeld, P. C., and Paris, A. H. (2004). School engagement: potential of the concept, state of the evidence. *Rev. Educ. Res.* 74, 59–109. doi: 10.3102/00346543074001059

Fuhs, M. W., Farran, D. C., and Nesbitt, K. T. (2013). Preschool classroom processes as predictors of children's cognitive self-regulation skills development. *Sch. Psychol. Quart.* 28, 347–359. doi: 10.1037/spq0000031

Goodman, R. (2001). Psychometric properties of the Strengths and Difficulties Questionnaire (SDQ). *J. Am. Acad. Child Adolesc. Psychiatry* 40, 1337–1345. doi: 10.1097/00004583-200111000-00015

Granlund, M. (2013). Participation – challenges in conceptualization, measurement and intervention. *Child Care Health Dev.* 39, 470–473. doi: 10.1111/cch.12080

Granlund, M., Almqvist, L., Gustafsson, P. A., Gustafsson, B. M., Golsäter, M., Prozchowska, M., et al. (2015). *Tidig Upptäckt – Tidig Insats: Slutrapport [Early Detection – Early Intervention:Final Report]*. Available online at: http://ju.se/download/18.7d241c5015334a41afbaaf9/1456998747634/TUTI+Rapport+till+Socialstyrelsen.pdf. Jönköping University/CHILD

Hamre, B. K., and Pianta, R. C. (2001). Early teacher–child relationships and the trajectory of children's school outcomes through eighth grade. *Child Dev.* 72, 625–638. doi: 10.1111/1467-8624.00301

Howes, C., and Smith, A. B. (1995). Relations among child care quality, teacher behavior, children's play activities, emotional security, and cognitive activity in child care. *Early Child. Res. Q.* 10, 381–404. doi: 10.1016/0885-2006(95)90013-6

Imms, C., Granlund, M., Wilson, P. H., Steenbergen, B., Rosenbaum, P. L., and Gordon, A. M. (2017). Participation, both a means and an end: a conceptual analysis of processes and outcomes in childhood disability. *Dev. Med. Child Neurol.* 59, 16–25. doi: 10.1111/dmcn.13237

Jeglinsky, I., Brogren Carlberg, E., and Autti-Rämö, I. (2014). How are actual needs recognized in the content and goals of written rehabilitation plans? *Disabil. Rehabil.* 36, 441–451. doi: 10.3109/09638288.2013.797511

Klang Ibragimova, N., Pless, M., Adolfsson, M., Granlund, M., and Björck-Åkesson, E. (2011). Using content analysis to link texts on assessment and intervention to the International Classification of Functioning, Disability and Health - version for Children and Youth (ICF-CY). *J. Rehab. Med.* 43, 728–733. doi: 10.2340/16501977-0831

Kontos, S., and Keyes, L. (1999). An ecobehavioral analysis of early childhood classrooms. *Early Child. Res. Q.* 14, 35–50. doi: 10.1016/S0885-2006(99)80003-9

Ladd, G. W., and Dinella, L. M. (2009). Continuity and change in early school engagement: Predictive of children's achievement trajectories from first to eighth grade? *J. Educ. Psychol.* 101, 190–206. doi: 10.1037/a0013153

Lee, A. M. (2011). Using the ICF-CY to organise characteristics of children's functioning. *Disabil. Rehabil.* 33, 605–616. doi: 10.3109/09638288.2010.505993

Lillvist, A. (2010). *The Applicability of a Functional Approach to Social Competence in Preschool Children in Need of Special Support*. Doctoral, Örebro University, Örebro.

Lillvist, A., and Granlund, M. (2010). Preschool children in need of special support: prevalence of traditional disability categories and functional difficulties. *Acta Paediatr.* 99, 131–134. doi: 10.1111/j.1651-2227.2009.01494.x

Lundqvist, J., Allodi Westling, M., and Siljehag, E. (2016). Characteristics of Swedish preschools that provide education and care to children with special educational needs. *Eur. J. Spec. Needs Educ.* 31, 124–139. doi: 10.1080/08856257.2015.1108041

Luttropp, A., and Granlund, M. (2010). Interaction – it depends – a comparative study of interaction in preschools between children with intellectual disability and children with typical development. *Scand. J. Disabil. Res.* 12, 151–164. doi: 10.1080/15017410903175677

McWilliam, R. A. (1991). Targeting teaching at children's use of time. *Teach. Except. Child.* 23, 42–43. doi: 10.1177/004005999102300409

McWilliam, R. A., and Bailey, D. B. (1992). "Promoting engagement and mastery," in *Teaching Infants and Preschoolers with Disabilities,* eds D. B. Bailey and M. Wolery (New York, NY: Macmillan), 229-—253.

McWilliam, R. A., Scarborough, A. A., and Kim, H. (2003). Adult interactions and child engagement. *Early Educ. Dev.* 14, 7–28. doi: 10.1207/s15566935eed14012

McWilliam, R. A., and Ware, W. B. (1994). The reliability of observations of young children's engagement: an application of generalizability theory. *J. Early Interv.* 18, 34–47. doi: 10.1177/105381519401800104

McWilliam, R., Snyder, P., and Lawson, S. (1993). "Dependability and factorial validity of the Children's Engagement Questionnaire: a broad-based child status measure for early intervention," in *Paper Presented at the DEC Conference* (San Diego, CA).

Metcalfe, L. A., Harvey, E. A., and Laws, H. B. (2013). The longitudinal relation between academic/cognitive skills and externalizing behavor problems in preschool children. *J. Educ. Psychol.* 105, 881–894. doi: 10.1037/a0032624

Öhrvall, A.-M., Krumlinde-Sundholm, L., and Eliasson, A.-C. (2013). Exploration of the relationship between the Manual Ability Classification System and hand-function measures of capacity and performance. *Disabil. Rehabil.* 35, 913–918. doi: 10.3109/09638288.2012.714051

Pellegrini, A. D., and Bjorklund, D. F. (1998). *Applied Child Study: A Developmental Approach.* Hillsdale, NJ: L. Erlbaum Associates.

Pramling Samuelsson, I., and Johansson, E. (2006). Play and learning—inseparable dimensions in preschool practice. *Early Child Dev. Care* 176, 47–65. doi: 10.1080/0300443042000302654

Raver, C. C., Carter, J. S., McCoy, D. C., Roy, A., Ursache, A., and Friedman, A. (2012). Testing models of children's self-regulation within educational contexts: implications for measurement. *Adv. Child Dev. Behav.* 42, 245–270. doi: 10.1016/B978-0-12-394388-0.00007-1

Riva, S., Bullinger, M., Amann, E., and von Mackensen, S. (2010). Content comparison of haemophilia specific patient-rated outcome measures with the international classification of functioning, disability and health (ICF, ICF-CY). *Health Qual. Life Outcomes* 8, 1–14. doi: 10.1186/1477-7525-8-139

Rosenbaum, P., and Gorter, J. W. (2012). The "F-words" in childhood disability: I swear this is how we should think! *Child Care Health Dev.* 38, 457–463. doi: 10.1111/j.1365-2214.2011.01338.x

SFS (2010). *The Swedish Education Act* (2010:800).

Shonkoff, J. P., and Phillips, D. A. (2000). *From Neurons to Neighborhoods: The Science of Early Childhood Development*. Washington, DC: National Academy Press.

Simeonsson, R. J. (2006). "Defining and classifying disability in children," in *Workshop on Disability in America, a New Look: Summary and Papers*, eds M. J. Field, A. M. Jette, and L. Martin (Washington, DC: The National Academies Press), 67–87.

Simeonsson, R. J., Leonardi, M., Lollar, D., Björck-Åkesson, E., Hollenweger, J., and Martinuzzi, A. (2003). Applying the International Classification of Functioning, Disability and Health (ICF) to measure childhood disability. *Disabil. Rehabil.* 25:602. doi: 10.1080/0963828031000137117

Simeonsson, R. J., Sauer-Lee, A., Granlund, M., and Björck-Åkesson, E. (2010). "Developmental and health assessment in rehabilitation with the ICF for Children and Youth," in *Rehabilitation and Health Assessment. Applying ICF Guidelines,* eds E. Mpofu and T. Oakland (New York, NY: Springer), 27–46.

Sjöman, M. (2018). *Peer Interaction in Preschool: Necessary, But Not Sufficient: The Influence of Social Interaction on the Link Between Behavior Difficulties and Engagement Among Children with and Without Need of Special Support*. Doctoral Degree, Jönköping University, School of Education and Communication, Child.

Sjöman, M., Granlund, M., and Almqvist, L. (2016). Interaction processes as a mediating factor between children's externalized behaviour difficulties and engagement in preschool. *Early Child Dev. Care* 186, 1649–1663. doi: 10.1080/03004430.2015.1121251

Skinner, E., A., Kindermann, T. A., and Furrer, C. J. (2008). A motivational perspective on engagement and disaffection: conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educ. Psychol. Meas.* 69, 493–525. doi: 10.1177/0013164408323233

Skolinspektionen (2017). *Förskolans Arbete Med Barn I Behov av Särskilt stöd [The Work with Children in Need of Special Support in Preschool Context]. Stockholm: The Swedish Schools Inspectorate.* Available online at: https://www.skolinspektionen.se/sv/Beslut-och-rapporter/Publikationer/Granskningsrapport/Kvalitetsgranskning/sarskilt-stod-forskola/ (Accessed December 7, 2017).

Swedish National Agency for Education (2010). *Preschool Curriculum Lpfö 98 Revised 2010.*

Swedish National Agency for Education (2015). *Statistik om förskolan [Statistics on Preeschool]*. Retrieved from The Swedish National Agency for Education. Available online at: http://www.skolverket.se/statistik-och-utvardering/statistik-i-tabeller/forskola

Stucki, G. (2005). International Classification of Functioning, Disability, and Health (ICF): a promising framework and classification for rehabilitation medicine. *Am. J. Phys. Med. Rehabil.* 48, 733–740. doi: 10.1097/01.phm.0000179521.70639.83

WHO (2001). *International Classification of Functioning, Disability and Health.* Geneva: World Health Organization.

WHO (2007). *International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY)*. Geneva: World Health Organization.

Vygotskij, L. S. (1978). *Mind in society: the Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press.

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