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Caregiver cognitive sensitivity: Measure development and validation in Early Childhood Education and Care (ECEC) settings☆

Sharon Pauker, Michal Perlman*, Heather Prime, Jennifer Jenkins

Applied Psychology and Human Development, University of Toronto, Toronto, Ontario, Canada

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ABSTRACT

Cognitive sensitivity refers to a person's ability to create a cognitively stimulating environment when interacting with a less experienced partner while being attuned to this partner's emotional state. We developed the Educator Cognitive Sensitivity (ECS) scale to measure the quality of individual educator's interactions with children in Early Childhood Education and Care settings (ECEC). The ECS scale was designed to be easy to train and quick to administer. Three hundred and fifty educators from 135 classrooms in 69 ECEC providers in Toronto were observed and coded using the ECS scale. Results show that it has excellent internal consistency with all items loading onto a single factor. In terms of concurrent validity, it was moderately correlated to the different subscales of the Classroom Assessment Scoring System and a short form of the Infant/Toddler Environmental Scale-Revised. Variance Component Analysis revealed that the majority of variance in ECS scores is explained by differences between educators, calling into question the practice of assessing quality of interaction at the classroom level. The relatively efficient ECS scale is a promising new measure of interaction in ECEC settings.

1. Introduction

A large proportion of children in the United States and Canada spend significant amounts of time in Early Childhood Education and Care (ECEC) settings (e.g., Sinha, 2014; Statistics Canada, 2006; US Census Bureau, 2010). To understand whether these settings support children's development we need measures of quality that are theoretically and empirically based and efficient to administer. The goal of the present study was to adapt an existing measure of cognitive sensitivity, collected at the person (i.e., not classroom) level, to the ECEC context. Cognitive sensitivity refers to a person's ability to create a cognitively stimulating environment when interacting with a less experienced partner while being attuned to this partner's internal state, both cognitive and emotional. Below we explain how cognitive sensitivity fits within current thinking about quality in ECEC settings and what the new measure adds to the field.

1.1. How is quality defined and measured?

Quality in ECEC settings is typically conceptualized as consisting of process and structural quality indicators (Vandell & Wolfe, 2000). Process quality indicators reflect the quality of exchanges between educators and children, whereas structural quality features describe the aspects of the classroom that are more regulateable (Vandell, Belsky, Burchinal, Steinberg, & Vandergrift, 2010). While process quality appears to have a direct effect on children's outcomes, structural quality is thought to have an indirect effect, mediated by process quality (Friedman & Amadeo, 1999; NICHD, 2002). For example, NICHD (2002) found that educators' social competence mediated the correlation between educator/child ratios and children's engagement (Hestenes, Kontos, & Bryan, 1993) and cognitive outcomes.

Research findings suggest that process quality indicators, and educator–child interactions in particular, are key drivers of children's outcomes in pre-kindergarten settings (Mashburn et al., 2008). Process quality indicators were shown to correlate with children's cognitive activity (Howes & Smith, 1995), cognitive and language outcomes (NICHD, 2000) and children's behavior and social skills (Peisner-Feinberg et al., 2001). In pre-kindergarten education settings, Burchinal et al. (2008) found that when positive climate and high quality instruction were provided, children were more likely to make academic (language, literacy, math)

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* Corresponding author at: Applied Psychology and Human Development, OISE/UT, 252 Bloor Street West, Floor 9-231, Toronto, ON, M5S 1V6, Canada.
E-mail addresses: sharon.pauker@utoronto.ca (S. Pauker), michal.perlman@utoronto.ca (M. Perlman), heather.prime@mail.utoronto.ca (H. Prime), jenny.jenkins@utoronto.ca (J. Jenkins).

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and social gains concurrently and later on in kindergarten. This occurred within the context of sensitive, responsive, and respectful interactions that promoted children's communication and reasoning skills. Additionally, when educators provide high-quality emotional and instructional support children's developmental outcomes are better (Downer, Sabol, & Hamre, 2010; Pianta, La Paro, Payne, Cox, & Bradley, 2002). For example, the instructional support that educators provide to children in terms of the language they use, the quality of feedback, and the promotion of reasoning and analysis of information play a significant role in shaping children's receptive language, problem solving and early literacy skills (Mashburn et al., 2008). In fact, distal factors, such as teachers' educational attainment, have been shown to become non-significant once more proximal factors, such as educator–child interactions, are accounted for (Early et al., 2007).

However, not all studies find significant associations between measures of educator–child interactions and child outcomes. For example, in two recent systematic-reviews/meta-analysis, researchers found that measures that capture process quality showed few and weak associations with child outcomes (Perlman et al., 2016, for the Classroom Assessment Scoring System, CLASS; Pianta, Karen, LaParo, & Hamre, 2008, and Brunsek et al., 2017 for the Early Childhood Environment Rating Scale, ECERS/ECERS-R, Harms, Cryer, & Clifford, 2003; Harms, Clifford, & Cryer, 2014). Inconsistencies in findings may be due to variations and limitations in how quality of educator–child interactions is conceptualized and measured as discussed next.

Frequently used measures of quality, such as the Infant Toddler Environment Rating Scale and its Revised form (ITERS/ITERS-R; Harms et al., 2003) and the Early Childhood Environment Rating System and its Revised forms (ECERS/ECERS-R; Harm and Clifford, 1985; Harms et al., 2003, 2014) examine multiple aspects of the child's environment. However, researchers have found substantial overlap between the items on these scales (Bisceglia, Perlman, Schaack, & Jenkins, 2009; Perlman, Zellman, & Le, 2004; Scarr, Eisenberg, & Deater-Deckard, 1994). This suggests that there may be more efficient ways to capture classroom quality.

Another limitation is that these measures generally assess quality at the classroom, rather than individual educator-level. For example, the quality of educator/child interaction has been explored in ECEC settings using the Classroom Assessment Scoring System (CLASS; Pianta et al., 2008). This measure captures three main classroom characteristics: emotional climate, management, and instructional support (La Paro, Pianta, & Stuhlman, 2004). Similar to the ECERS-R/ITERS-R mentioned above, the CLASS assesses interactions at the classroom level, rather than the interaction styles of individual educators. However, ECEC classrooms are staffed by multiple adults. Generating classroom level scores requires coders to aggregate the interaction styles of different educators within a classroom in a way that has yet to be tested empirically. As a result, similar classroom level scores may represent very different profiles of educator interaction styles. For example, a classroom with three educators who all have medium cognitive sensitivity scores could have a similar CLASS score to one with an educator with low, medium, and high cognitive sensitivity scores. However, children in these classrooms may have very different experiences.

To begin to understand how the interaction styles of individual educators come together to form classroom quality, interaction quality must first be measured at the educator level. One educator level measure is the Caregiver Interaction Profile (CIP) scale (Helmerhorst, Riksen-Walraven, Vermeer, Fukkink, & Tavecchio, 2014). Helmerhorst et al. (2014) report that the majority of the variance in educator–child interactions is found at the educator-level. Thus, the interaction styles of educators within a classroom seem to vary significantly calling into question the practice of aggregating quality of interaction across educators to the classroom-level.

Finally, existing measures are very labor intensive in terms of training and implementation times. For example, the ECERS-R/ITERS-R takes 3–5 h to administer per classroom. The CLASS requires a 3-h observation period and includes a meticulous manual and coding system. Measures like the CLASS and ITERS-R/ECERS-R have made a major contribution to research on ECEC settings and have been instrumental in shaping policy discussion and research about quality in ECEC settings. Nonetheless, there is a need for a psychometrically sound observational instrument designed to efficiently assess *individual* educators' interaction styles. Our goal was to develop such a measure ensuring that it is efficient to collect so that it can be used for both research and quality improvement purposes. Given the theoretical and empirical support for the importance of educator/child interactions in general, and the construct of cognitive sensitivity in particular, to children's socio-cognitive development, we focused on it as the construct of interest.

1.2. Developmental research and theory point to cognitive sensitivity as a promising construct and measure

The significance of adult-child interactions to children's development has both theoretical and empirical support. A highly influential theory in child development, the bioecological model of development (Bronfenbrenner & Morris, 1998), describes child development as a product of an individual's characteristics and features of his/her environment. This model serves as a framework for understanding the importance of stimulating and responsive caregiver-child exchanges to children's social, cognitive, and language development (NICHD & Duncan, 2003). Furthermore, the parenting literature suggests that children's social and cognitive development is established through multiple social interactions, in which the child takes an active role (Rogoff et al., 1993). These social exchanges are more likely to be internalized when the "expert" (e.g., parent or educator) operates within the child's *zone of proximal development*; which represents the distance between what a child is able to do on his/her own and what they are capable of when assisted by a more competent partner (Fernyhough, 2008; Vygotsky, 1978). Knowledgeable partners, such as teachers and parents, can foster a cognitively stimulating environment by correctly assessing the child's current cognitive level and sensitively responding in accordance with that knowledge (Prime, Pauker, Plamondon, Perlman, & Jenkins, 2014). Parental sensitivity toward children's cognitive *and* affective states promotes children's social and cognitive development (Bernier, Carlson, & Whipple, 2010; Laranjo, Bernier, Meins, & Carlson, 2010). Prime, Perlman, Tackett, and Jenkins (2014) adopted the term Cognitive Sensitivity to describe such responsiveness, and developed an observational measure that captures an individual's ability to correctly assess the knowledge and state of mind of his or her partner while cooperating to reach a shared goal. Given growing interest in this construct we focused on it in developing our new measure.

Prime, Perlman, et al. (2014) defined Cognitive Sensitivity as being comprised of three overlapping skills: Mutuality Building, Mind-Reading and Communicative Clarity. In order to make these terms more accessible to early child educators and other professionals we refer to them also as: back-and-forth interaction, understanding children's thoughts and feelings, and speaking to children using language they can understand. Below we describe each one and apply it to the ECEC context.

Mutuality building (back-and-forth interaction) refers to positive, cooperative relationships in which both partners are mutually responsive to one another (Aksan, Kochanska, & Ortmann, 2006). In the classroom environment, this skill manifests itself in the educator's ability to invite children into tasks by picking up on their