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Linguistic environment of preschool classrooms: What dimensions support children's language growth?

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ABSTRACT

Individual differences in young children's language acquisition reflect in part the variability in the language-learning environment that they experience, both at home and in the classroom. Studies have examined various dimensions of the preschool classroom language environment, including linguistic responsivity of early childhood educators, data-providing features of teachers' talk, and characteristics of the systems-level general environment, but no study has examined the unique contribution of each dimension to children's language growth over time. The goals of this study were to determine how best to represent the dimensionality of the preschool classroom's linguistic environment and to determine which dimensions are most strongly associated with children's language development. Participants were teachers in 49 preschool classrooms and a random sample of children from each classroom (330 children between 40 and 60 months of age, $M = 52$ months, $SD = 5.5$). Children's grammar and vocabulary skills were measured at three time-points, and the classroom linguistic environment was assessed with measures representing teachers' linguistic responsivity, data-providing features of teachers' talk, and systems-level general quality. Using exploratory structural equation modeling (ESEM), we determined that the classroom language environment is best characterized by a three-dimensional model. A multilevel latent growth model subsequently showed that only one of the three dimensions, teachers' communication-facilitating behaviors, predicted growth in children's vocabulary from preschool to kindergarten. Implications for teacher professional development are discussed.

1. Introduction

There are many universalities in young children's language acquisition, such as when children tend to speak their first word as well as when they start to use grammatical morphemes, yet there are also considerable individual differences, even within a relatively constrained cultural or linguistic context (Rowe, Raudenbush, & Goldin-Meadow, 2012). These individual differences reflect both the influence of nature on children's language development (i.e., one's genetics or biology) as well as the influence of nurture, representing the child's environment (Hayiou-Thomas, Dale, & Plomin, 2012). Interestingly, longitudinal twin studies show that from birth to about age five, the dominant influence on language growth is the child's environment, accounting for about 60–70% of the variance in language skills, as compared to about 25% for genetic factors (the unaccounted-for remainder reflects non-shared environmental factors and error) (Spinath, Price, Dale, & Plomin, 2004). Over time, the dominant role of the environment for influencing children's language skills tends to diminish, with the contribution of genetics becoming increasingly prominent into adolescence (see Hayiou-Thomas et al., 2012). Some speculate that this shift reflects the decreasing variability of children's environments as they become older and progress through the curricula of formal schooling (Hayiou-Thomas et al., 2012). That is, prior to formal schooling, there is considerable variability in the language-learning environment that children experience, and this variability appears to have significant implications for children's early linguistic trajectories.

1.1. Children's learning–learning experiences in early-education settings

Over the last several decades, numerous studies have sought to document variability in young children's language-learning environments, including studies of both the home and preschool settings (Dickinson & Smith, 1994; Girolametto & Weitzman, 2002; Justice, McGinty, Zucker, Cabell, & Piasta, 2013; Landry, Smith, & Swank, 2006; Yoder & Warren, 1999). This work has examined various dimensions of children's language-learning environments, often for the purpose of understanding the relations between a specific dimension of the environment and children's language development. Dimensions often

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investigated within the early-education setting include (1) linguistic responsivity of early childhood educators, (2) data-providing features of teachers' talk, and (3) systems-level general environment; each will be reviewed in turn. Although research to date suggests that each dimension is associated with children's language growth, a key limitation of this literature is that no study has examined the distinctiveness of these dimensions nor the unique contribution of each dimension to children's language growth over time. The primary goal of the present study is to address these limitations by identifying what specific dimension(s) of the preschool language-learning environment is instrumental to advancing children's language growth. In addressing this goal, we focus specifically on early childhood classrooms serving children from low-income homes. Because children from low-income homes often exhibit significant gaps in their language skills relative to more advantaged peers, the preschool classroom environment can be especially important for supporting their language acquisition (LoCasale-Crouch et al., 2007). Thus, the results of this work may be extremely relevant to settings that serve children from disadvantaged backgrounds.

There are significant practical implications for improving our understanding of the language-learning environments of early-education settings, and whether there are specific malleable dimensions of the environment that seem especially influential to children's language growth. For instance, some studies have suggested that teachers' use of questions and comments when interacting with children are especially important (Girolametto & Weitzman, 2002). Professional-development offerings, teacher-education coursework, and published curricula draw upon such findings to provide evidence-based guidance to educators who work in early-education settings. For instance, one professional development program offered to early educators heavily emphasized the use of teacher questions as a way to improve children's language in the classroom (Powell, Diamond, Burchinal, & Koehler, 2010). Although trained teachers improved in their use of this language-facilitating strategy, it appeared to have little benefit to children's language growth over time (Powell et al., 2010). The present study is likely to have direct bearing on the types of strategies we encourage teachers to use in their classrooms, by pin-pointing those dimensions of the classroom environment that positively affect children's language growth.

1.2. Frequently examined dimensions of early-education classrooms

1.2.1. Linguistic responsivity

The first dimension of the early-education environment examined in this study was caregivers' linguistic responsiveness. From a language-facilitation perspective, linguistic responsivity is observed when adults are sensitive to and reflective of the child's interests and/or utterances during conversations, often referred to as "following the child's lead" (Girolametto & Weitzman, 2002). For instance, when looking at a book together, an adult can be linguistically responsive by expanding the child's utterance (child: "bug", mother: "it's a big bug!") rather than diverting the child's focus to something else in the book (child: "bug", mother: "look at this mouse!"); such behaviors are referred to variously as expanding, extending, recasting, and contingent responding (Landry et al., 2006; Landry, Smith, Swank, Assel, & Vellet, 2001; Tamis-LeMonda, Bornstein, & Baumwell, 2001). Importantly, the frequency with which mothers and teachers use linguistically responsive behaviors during interactions has been linked to children's language growth over time (Cabell, Justice, McGinty, DeCoster, & Forston, 2015; Landry et al., 2006; Nicely, Tamis-LeMonda, & Bornstein, 1999; Yoder & Warren, 1999).

Adults' responsivity behaviors can be differentiated into those behaviors that serve to promote children's engagement in communication routines, referred to as communication-facilitating behaviors, and those that seek to provide advanced linguistic models, referred to as language-developing behaviors (Girolametto, Pearce, & Weitzman, 1996; Girolametto & Weitzman, 2002; Piasta et al., 2012). The former, communication-facilitating behaviors, are specific behaviors that adults use to create and sustain children's participation in multi-turn conversations and time spent in joint engagement. When engaging in extended periods of conversation with young children, adults often have to take an active role in maintaining the interaction, such as looking at the child expectantly to encourage him to contribute or to ask open-ended questions to cue a conversational turn (Adamson, Bakeman, & Deckner, 2004). In preschool settings, the frequency with which teachers are observed to use these strategies is associated positively with the complexity of children's talk during interactions with their teachers (Girolametto & Weitzman, 2002) as well as children's vocabulary growth during an academic year (Cabell et al., 2015). The latter, language-developing behaviors, represent responsivity behaviors that serve to model for children advanced forms of language. Perhaps the most well-studied language-developing behaviors are recasts and expansions, in which an adult responds to a child's utterance with a more syntactically (recast) or semantically complex (expansion) form (Fey, Cleave, Long, & Hughes, 1993).

Experts offer several reasons why linguistic responsivity serves to stimulate language growth among young children. First, with respect to communication-facilitating behaviors, experts suggest that these responsive behaviors allow the child to maintain rather than shift her current attentional focus, thus maximizing the allocation of cognitive resources towards the child's current attentional allocation (Landry et al., 2006). Additionally, these responsive behaviors enhance the child's understanding of the intentional nature of communicating (i.e., that talking to another recruits their interest and engagement), which serves to motivate the child to talk more often (Yoder & Warren, 1999). Second, with respect to language-developing behaviors, especially recasts and expansions in which adults extend children's utterances with syntactically or semantically complex forms, experts argue that these provide children with a direct contrast between the child's form and the adult's more complex form (Proctor-Williams & Fey, 2007). Because the adult's extension maintained the child's referential focus, thus limiting working memory demands, the child's attentional resources can focus on processing distinctions in the adult's form. Such theories are important for interpreting the considerable empirical evidence indicating that adult use of communication-facilitating and language-developing strategies are beneficial to young children's language development within various early caregiving settings, including both home and preschool settings.

1.2.2. Data-providing features of teacher talk

The second dimension of children's language-learning environment examined in this study is the "data-providing features" of adults' talk when interacting with children (Hoff, 2003; Hoff & Naigles, 2002; Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002). Data-providing features of input are relatively granular aspects of adult talk that provide children with crucial information about linguistic forms and functions. From a very young age, children employ biologically endowed computational processes to the input to which they are exposed, often referred to as statistical learning (Marcus, Vijayan, Rao, & Vishton, 1999; Saffran, 2003; Saffran & Wilson, 2003). These processes allow children to extract information from their environment to acquire a seemingly infinite range of linguistic forms and functions that are never directly taught to them, such as marking verbs for tense and marking nouns for plurality.

Crucial for such processes is that the environment provide a sufficient corpus of data (i.e., input) for the child to analyze, including a sufficient number of different word types and syntactic forms (Hoff & Naigles, 2002). Indeed, variability in these data-providing features of adult talk within the home environment is associated with young children's development of both vocabulary and grammar. For instance, Hoff (2003) showed that the number of different words mothers used when talking with their 2-year-olds was positively associated with children's vocabulary skills (r = 0.22), whereas Huttenlocher