Interaction-Centered Model of Language and Behavioral Development

Chapter · April 2020

DOI: 10.4324/9780429453106

3 authors, including:

Jason C Chow
University of Maryland, College Park
56 PUBLICATIONS **512** CITATIONS
SEE PROFILE

Erin Stehle Wallace
Virginia Commonwealth University
5 PUBLICATIONS **25** CITATIONS
SEE PROFILE

Chapter 6: Interaction-Centered Model of Language and Behavioral Development

Jason C. Chow

https://orcid.org/0000-0002-2878-7410

Jennifer E. Cunningham

Erin Stehle Wallace

Abstract

The present chapter introduces an interaction-centered model of language and behavioral development that draws on ecological and transactional theory to provide guidance and recommendations for conceptualizing research and practice on issues related to language and behavior in classroom settings. We argue that these two constructs co-develop, and thus must be considered in tandem when designing and implementing supportive teaching practices. We identify effective classroom management and promoting language-rich instructional environments as primary mechanisms within the model, provide details of each component, and discuss next steps for research and practice.

Citation:

Chow, J. C., Cunningham, J., & Wallace, E. (2020). Interaction-centered model for language and behavioral development. In T. Farmer, B. Farmer, K. Sutherland, & M. Conroy (Eds.), Handbook of research on emotional & behavioral disabilities: interdisciplinary developmental perspectives on children and youth. Routledge. https://doi.org/10.4324/9780429453106

Language is a central skill to success in educational and social environments. It has been well established that children's language skills when they enter formal schooling predict academic achievement and social development in school (Chow, Ekholm, & Coleman, 2018; Duncan et al., 2007). Further, language ability remains relatively stable over the course of development (Bornstein, Hahn, Putnick, & Pearson, 2018), and unfortunately children who have delayed language skills are at substantially higher risk of facing lifelong challenges. For example, children who are diagnosed with language impairments in school face substantial vocational barriers when they enter the workforce (Conti-Ramsden, Durkin, Toseeb, Botting, & Pickles, 2018), and these individuals are more likely to report higher alcohol use, have contact with law enforcement, and exhibit aggressive behavior (Winstanley, Webb, & Conti-Ramsden, 2018). Thus, a concerted effort aimed at preventing these long-term and pervasive consequences that stem from early language difficulty is a public health issue. Fortunately, there are several language-based classroom practices that are linked to improvements in classroom behavior as well as general language skills and overall achievement. In this chapter, we (1) review the current literature on the associations between language skills and problem behavior and how behavior problems interfere with classroom success, (2) present a model that outlines key preventative mechanisms aimed at the prevention and remediation of language delays and challenging classroom behavior, and (3) discuss implications and recommendations for research and current practice.

Associations Between Language Skills and Behavior Problems

It is well-established that language ability significantly predicts later behavioral functioning. More specifically, delays in early language ability predicts later externalizing and internalizing behavior problems, attention problems, and social anxiety, as well as children's

mental health trajectories (Bao, Brownlie, & Beitchman, 2016; Brownlie, Bao, & Beitchman, 2016; Law, Rush, Clegg, Peters, & Roulstone, 2015; Peterson et al., 2013). Given that mental health of children and youth in our nation is a priority, a focus on the adverse effects of delayed language skills on social and behavioral functioning is timely (Law & Levickis, 2018). To effectively educate and support the academic and social-emotional development of all children in classrooms, specific attention to practices teachers can use to support children and youth who are at high risk for poor outcomes must receive increased attention.

There is a growing body of literature that has identified language and communicative ability as an important factor in the development of maladaptive classroom behavior (Chow & Wehby, 2018; Yew & O'Kearney, 2013). Children with emotional and behavioral disorders (EBD) often present low and clinically significant language performance (Benner, Nelson, & Epstein, 2002; Chow & Hollo, 2018; Chow & Wehby, 2017), and these language deficits are often under-identified (Hollo, Wehby, & Oliver, 2014), which carries important implications for researchers and practitioners alike. If children with EBD who also have clinically significant language problems are regularly going through school without their problems addressed, it is likely that their educational performance will continue to suffer regardless of the success of behavioral interventions.

Researchers argue that the relation between behavior and language is likely reciprocal in nature, in that children who have delayed language are more likely to exhibit problem behaviors with peers and adults because of their limited ability to express emotions and regulate their environment using appropriate communication (Roben, Cole, & Armstrong, 2013; Rescorla, Ross, & McClure, 2007). These behaviors may influence children's interactions with their teachers in a way that limits their exposure to complex language as well as opportunities to

practice and use more complex language themselves (Hollo & Chow, 2015; Qi, Kaiser, & Milan, 2006).

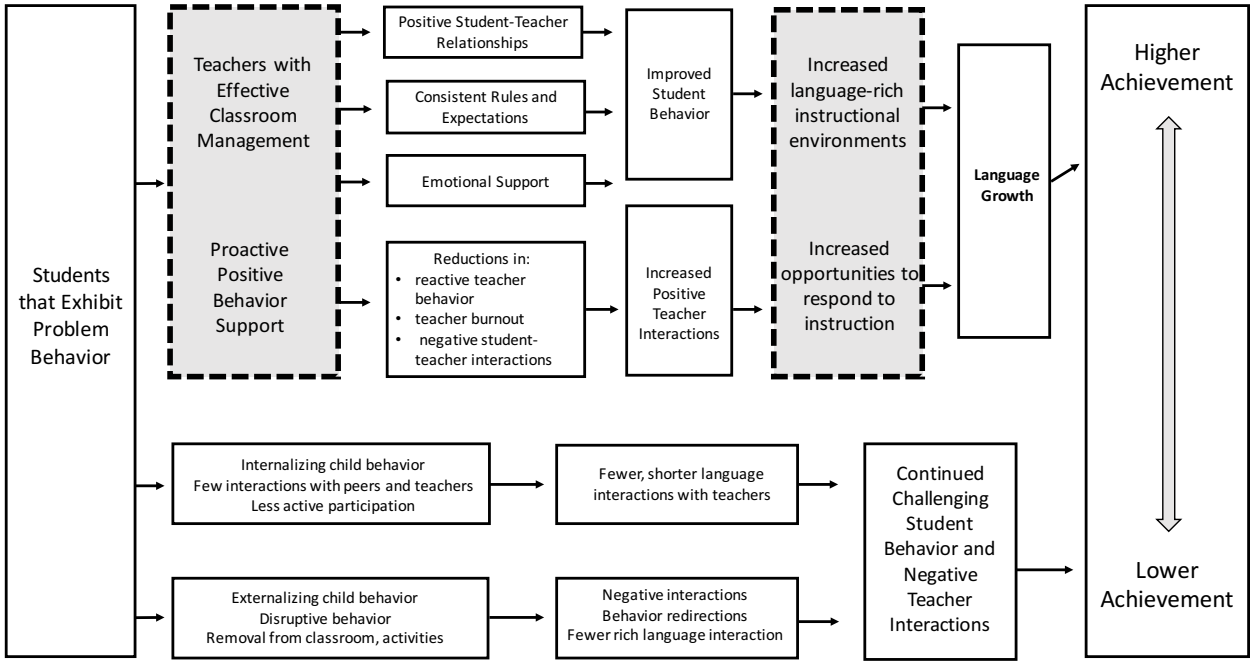

Figure 1. Interaction-centered model of language and behavioral development.

Teacher Language-Based Practices

Figure 1. Interaction-centered model of language and behavioral development.

The theoretical model presented in Figure 1 represents (1) the pathway by which problem behavior in the classroom negatively impacts achievement (bottom panel) and (2) the mechanisms by which teacher practices could ameliorate this negative relationship in the classroom (top panel). In this model, effective classroom management and proactive positive behavior support provide an environment that allows teachers to increase the language-rich environments and opportunities to respond to instruction for their students. Following Chow et al. (2018), we situate this integrative model within an ecological-transactional framework to contextualize our understanding of how language skills and problematic classroom behavior interact with each other within dynamic educational environments. The ecological model

(Bronfrenbrenner, 1994) views child development within a set of interrelated systems which are inseparable from learning and social-emotional development (Burns, Warmbold-Brann, & Zaslofsky, 2015; Chow & Wehby, 2018; Sutherland, Conroy, Abrams, & Vo, 2010). The transactional model (Sameroff, 2009) describes how language and communication skills may influence how children behave specific to both the interactions and the relationships they have with their teachers. The ecological-transactional framework emphasizes the dynamic relations between language skills and classroom behavior that highlights both the unique dyadic relationships and interactions individual students have with their teachers, and the integrated, nested systems of classroom learning environments. That is, the unique transactions that comprise individual teacher-student relationships may influence the overall ecology of the classroom, particularly in relationships where conflict, negative interactions, and problem behavior are present.

Why does problematic behavior interfere with classroom success?

Problem behavior interferes with student learning and these problem behaviors may influence the ways teachers interact with children in the classroom. Subsequently, teacher-child interactions may influence the rate of language learning in the preschool years, which ultimately impacts later academic engagement and achievement (Pentimonti et al., 2017; Perry, VandeKamp, Mercer, & Nordby, 2002). Problem behavior in the classroom can be broadly categorized as either internalizing or externalizing behaviors. Children with internalizing behavior problems are more likely to be anxious and withdrawn from social situations with peers and adults, whereas children with externalizing behaviors are more likely to exhibit aggressive behaviors towards others (Baker, Grant, & Morlock, 2008). Both internalizing and externalizing problem behaviors negatively impact a student's ability to succeed, but they are associated with

different types of language deficits (Hollo, Chow, & Wehby, 2018) and their expression may have differential influence on a child's interactions with their teachers. To illustrate, the topography of problem behavior a child exhibits differentially influences the type of interactions with adults and peers in the classroom. For example, because children who have internalizing problems are more withdrawn or anxious, they may be less likely to initiate to peers and adults and participate actively in the classroom (Hymel, Rubin, Rowden, & LeMare, 1990). Conversely, children with externalizing, disruptive classroom behaviors may be more likely to engage in negative interactions with others in the classroom (Shores et al., 1993). In turn, the manifestations of each of these types of problem behavior is predicted to change the quantity and quality of language interactions (Qi, Kaiser, & Milan, 2006). Within our model, both types of problem behavior in classrooms are likely to reduce the amount of high quality language that the child is exposed to and has the opportunity to practice, which ultimately decelerates language growth.

Mechanisms to Prevent Problem Behavior and Improve Achievement

The top panel of the model emphasizes two malleable dimensions of teacher practice that, in conjunction, promote positive behavior and language development: (1) effective classroom management, and (2) language-rich instructional environments. Moreover, the active integration of these dimensions can lead to reciprocal improvement and maximize the delivery and impact of language-rich instructional practices. While children who present persistent problem behaviors in the classroom also struggle with language and communication, there are some promising language and literacy practices that may support the improvement of classroom behavior as well as language growth. In theory, improving early language skills will not only improve later literacy skills, but may have the potential to alter the trajectory of maladaptive behavioral

development, given that higher language skills predict concurrent and future behavior (Chow et al., 2018). Therefore, our model emphasizes that a direct relation between the amount of high quality language and communication directed at or involving an individual child will be significantly predictive of that child's growth in language, and in turn, their academic performance.

Effective Classroom Management

We argue that effective classroom management help to "set the stage" for positive child-teacher relationships, and a higher dosage of language learning opportunities within ongoing classroom activities and conversations. Proactive positive behavior support is preventive in nature, consistent and predictable, and framed in a positive manner. Features of classrooms with effective management practices in place include (a) positive behavioral expectations that are explicitly taught and modeled; (b) consistent and specific positive feedback for prosocial behavior and meeting behavior expectations; (c) organization of physical and temporal classroom environment to maximize engagement and increase independence; (d) explicit instruction on important prosocial skills to foster emotional regulation, friendship, and independent social problem solving; and (e) individualized supports for children with persistent problem behavior (Hemmeter, Fox, Jack, & Broyles, 2007; Hemmeter, Ostrosky, & Fox, 2006). These features are designed and can be tailored to support children's engagement and on-task behavior, independence, and social-emotional competence.

By employing effective classroom management practices, teachers can dedicate less of their time responding to problem behavior, redirecting, and re-engaging children, and more time forming positive relationships and engaging in play and conversation with children. That is, teacher-child interactions that are primarily focused on the behavior problems of a child are less

likely to include in the types of conversational and instructional interactions that foster language development. Positive teacher-child interactions are also essential, as children with lower language skills exhibit higher rates of problem behavior in classrooms where teachers provide lower levels of emotional support (Qi, Zieher, Horn, Bulotsky-Shearer, & Carta, 2019). Without effective classroom management practices in place to support child behavior and engagement, a teachers' ability to leverage naturally occurring opportunities and conversations throughout the day as opportunities to teach and model language may be limited.

Because classroom management is a top concern for practicing teachers (Greenberg, Putman, & Walsh, 2014), classroom management strategies are an important skill for teachers to master because they positively and preventatively support appropriate behavior, influence teacher-child relationships, and promote positive academic and social outcomes (Chow & Gilmour, 2016; Maggin, Pustejovsky, & Johnson, 2017; Simonsen, Fairbanks, Briesch, Myers, & Sugai, 2008). Thus, effective classroom management is central to our model, and can provide the necessary setting to effectively be able to integrate supplemental language-rich interactions and practices into children's daily learning environments.

Language-rich Instructional Environments

Classroom management and behavior support practices that foster engagement and positive teacher-child relationships serve as an important foundation for learning; however, these practices alone are not sufficient to support child language development. Paired with systematic and intentional language practices, the strategies outlined in the previous section can be leveraged to maximize child outcomes, and further support engagement and relationships. More specifically, the use of high-quality language support strategies can facilitate conversations and interactions between teachers and children that are positive, engaging, and capitalize on child

interests, which could act to foster positive relationships. The use of such strategies can enhance children's skill and confidence in communication with others, which can bolster their ability to more successfully navigate the classroom environment in their interactions with peers and adults.

Positive teacher child relationships marked by closeness and warm affect play a key role in children's overall development (Sabol & Pianta, 2012). There is evidence that teacher-child relationships in early elementary are strongly tied to both academic and social-emotional and behavioral outcomes in children, and that the quality of those early relationships is predictive of future outcomes extending into middle school (Hamre & Pianta 2011). Specifically, teacher-child relationships characterized as negative and marked by conflict were a significant predictor of poorer academic achievement and behavioral outcomes (Hamre & Pianta, 2001); whereas positive, close teacher-child relationships are predictive of stronger social skills and fewer reports of challenging behavior (Pianta, 1995). Teacher-child relationships can also be viewed as a potential protective mechanism, which can ameliorate the effects of other factors that place children at risk for delayed social, behavioral, and even academic delays (Sabol & Pianta, 2012). Relationships are built through positive, child-focused interactions between teachers and children in the classroom (Sabol & Pianta, 2012), and these relationships predict child behavior – particularly for younger children (Lei, Cui, & Chiu, 2016).

Communication and interaction-based strategies. In a recent analysis of the dimensions of the language learning environment in preschool classrooms, Justice and colleagues (2018) reported that teacher communication facilitating behaviors were the strongest predictor of child vocabulary development. In this study, the communication facilitation behaviors analyzed included (1) warm affect and looking expectantly to encourage conversation; (2) maintaining a slow pace to give children time to participate; (3) eliciting child contributions

and extending conversations using open-ended questions; and (4) encouraging and supporting talk among peers (Justice, Jiang, & Strasser, 2018). Because delayed vocabulary is associated with the development of problem behaviors (Henrichs et al., 2013; Chow & Wehby, 2018), increased use of teacher communication facilitating behaviors that increase child vocabulary is likely to support not only language development but also reductions in behavior problems.

Researchers have repeatedly demonstrated that one of the most important behaviors adults can do to facilitate language growth is to *respond contingently* to children's vocal initiations (Hoff & Naigles, 2002; Tamis-Lemonda, 2002). Teachers' responsiveness to children's initiations contributes to their language learning in early care and education environments in their early childhood years (Cabell et al., 2015; Giralometto & Weitzman, 2002). This interaction between teachers and children is of particular importance because vocabulary growth is associated with positive developmental trajectories of behavior (Westrupp et al., 2019). Another important consideration in facilitating quality conversations in the classroom is the provision of wait time, to allow children to be active participants. Particularly after being asked a question, it is key to for the teacher to pause and allow children to think and provide a response before following up immediately with a follow up question or comment (Wasik & Hindman, 2018; Hindman, Wasik, & Bradley, 2019). Provision of wait time can have positive impacts on child contributions to conversations, and thus increase opportunities to practice and receive feedback on language use (Hanna, 1977; Wasik & Hindman, 2018).

The evidence supporting these communication and interaction based strategies highlight the importance of creating a context in which teachers and children can engage in extended, back and forth positive and productive exchanges. These exchanges afford children the opportunity to be exposed to adult models of more complex language, and provides teachers with the

opportunity to use strategies (described below) to elicit language from children. This feedback loop that occurs between adults and children during ongoing conversations is key to language development (Adamson, Kaiser, Tamis-LaMonda, Owen, & Dimitrova, 2019), and thus these foundational strategies for encouraging children to be active participants in conversations are essential to facilitating language in the classroom. Because the association between conversation and children's vocabulary development is well established (Cabell, Justice, McGinty, DeCoster, & Forston, 2015; Christ, Wang, & Chiu, 2011), engaging in conversations with teachers provides young children the opportunity to learn novel words and thus, expand their vocabulary (Christ et al., 2011). Furthermore, early childhood teachers who engaged in more multi-turn and child-initiated conversations with children provided significantly more opportunities for their children to practice semantically-contingent talk, which may play a significant role in increasing children's vocabulary learning (Cabell et al.). Children who engage in conversations are more likely to increase in their vocabulary because they are provided the opportunity to learn and use novel words. Increasing child language production through language-rich interactions not only provides children with more exposure to language modeling, but it reduces the opportunities for children to engage in behavior problems.

Linguistic input. Not only is global responsiveness to child communication important for language growth, *how* adults respond is important as well. Responses that contain semantically related information or an expansion of a child's utterance are associated with positive child language gains (Wasik, et al. 2006; Wasik & Hindman, 2011). Expansions and recasts of child language are components of several evidence-based language and communication interventions (Camarata, Nelson, & Camarata, 1994; Cleave, Becker, Curran, Van Horne, & Fey, 2015, Nelson, Camarata, Welsh, Butkovsky, Camarata, 1996; Roberts &

Kaiser, 2015; Whitehurst et al., 1988). The vocabulary and sentence structures that adults model for children are essential components of high quality language interactions (Hart & Risley 1995; Hoff, 2003; Huttenlocher et al., 2001). Adults who model diverse vocabulary and complex sentence structures have a more positive impact on child language development (Hoff, 2003; Ruston & Schwanenflugel, 2010). For example, Hadley and colleagues (2016) reported that the diversity of parents' noun phrase subjects used in conversations during play was a strong predictor of children's sentence diversity. Syntax development is strongly tied to children's academic achievement and reading ability (Catts, Fey, Zhang, Tomblin, 2001) and children's exposure to adult input that includes models of complex syntax is predictive of growth in child language development (Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002).

These relations between adult input and child language are not only noted in the growth of child language skills over time, but also within conversational and instructional interactions. Justice, McGinty, Zucker, Cabell, and Piasta (2013) reported that within teacher-child interactions, children's utterances were more likely to be syntactically complex immediately following a teacher utterance that contained complex syntax. This relation was found to be bi-directional, such that instances of teachers use of complex syntax was more likely to occur following a child utterance that contained complex syntax. These findings support the assertion that it is not just the nature of the linguistic input, but also the dyadic and dynamic interactions between adults and children that facilitate language growth (Chow, Ekholm, & Coleman, 2018; Justice et al., 2013). This is particularly important in the context of an interaction-centered model of language and behavioral development, as language interactions and behavioral interactions both provide opportunities to support positive, productive child outcomes in both domains. Thus, one way to enhance child language growth and comprehension can be to

respond to child initiations with comments and extensions that add syntactic or semantic complexity. Caregiver use of inferential language has also been found to influence growth in comprehension as well as vocabulary outcomes in children (Blank et al., 1998; Hindman et al., 2008; Hall, 2016), and child-directed speech predicts vocabulary development (Golinkoff, Can, Soderstrom, & Hirsh-Pasek, 2015; Rowe, 2008). Teachers' language may play similar supportive roles in child language development in the classroom. Using such strategies support teachers and children in engaging in longer exchanges, which can act as important feedback loops and opportunities to model complex language that is linked to the child's interests and focus. As teachers provide more opportunities for children to engage in language interactions, they reduce the opportunities for children with EBD to disengage from instruction. This is important, as language skills predict general engagement in students with EBD, and providing more opportunities to actively respond to teacher instruction buffers the negative impacts low language skills have on the classroom performance of children with EBD (Chow & Wehby, 2017).

Elicitation of child language. Finally, in creating a high quality language environment in the classroom, teachers must consider not only what they model in conversations, but what strategies they can use to elicit child language to provide opportunities for children to practice essential language skills. An important strategy for extending conversations and eliciting child language is the use of open-ended questions, in which children are expected to respond with answers more complex than a single word or a yes/no response (Wasik & Hindman, 2013; Wasik & Hindman, 2018). By using strategies that elicit language from children, teachers can engage children in longer conversations in which they have increased opportunities to respond to child language with feedback and models of increasingly complex and sophisticated language.

Teachers must also have strategies for engaging children in complex thought and language use during instructional activities, in a way that is sensitive to individual child needs (Pentimonti et al., 2017). In their analysis of early childhood teachers' use of scaffolding strategies during language and literacy lessons, Pentimonti and colleagues reported that teachers' use of three scaffolding strategies were predictive of child vocabulary gains: (1) generalizing (asking children to connect the instructional content to other experiences outside the current context); (2) reasoning (asking children to explain why something happened); and (3) predicting (asking children to predict an outcome). The use of such strategies can support longer conversational exchanges, as well as providing opportunity to model and elicit inferential or decontextualized language. In conversations with children in the classroom, teachers should consider how to balance literal talk (labeling, describing, etc.) and inferential talk (synthesizing, predicting, hypothesizing) both in the language they model, and in the types of questions and scaffolds they use to elicit child language (Sembiante, Dynia, Kaderavek, & Justice, 2017).

The use of these strategies provides conversational support for children, which increases likelihood of multi-turn conversations occurring (Pentimonti et al., 2017). The more conversations that occur, the more exposure children have to complex language, diversity of vocabulary, and novel words, which can improve vocabulary development and oral language which are both associated with higher academic engagement and lower rates of aggression in children with EBD (Chow & Wehby, 2017).

Next Steps for Research

We acknowledge much of the language practices research to date has been conducted in early childhood classrooms, while research in the area of EBD has focused more on school-age children. Future research should prospectively examine the nature of the co-development and

support of language and behavior across multiple age bands including preschool- and school-age populations. Future research should examine the role that individual child characteristics and teachers' perceptions of child skill play in predicting the provision of language support to individual children. This research should specifically target children with or at risk for EBD, as much of the current literature focuses on children with or at risk for language delays. Based on the theoretical model presented in this chapter, we hypothesize that children who exhibit internalizing and externalizing behavior problems are less likely to participate in and benefit from frequent, quality language interactions, as compared to their typically developing peers who exhibit appropriate on-task behavior. Understanding how teachers differentially distribute their language support across children may be another critical piece in understanding the lack of child effects found in many language-focused professional development interventions, particularly in classrooms serving children from low-income backgrounds where the prevalence of delays in language and pro-social development may be high (Qi & Kaiser, 2004). This information could inform not only our understanding of the underlying mechanism of the relationship between challenging behavior and decelerated achievement, but also support the development of professional development models that emphasize differential language facilitation strategies based on learner profiles. Tailoring an intervention in ways that support teachers in identifying child learner characteristics could help to maximize the effects of professional development models, and empower teachers to provide differentiated instruction to all learners in their classroom.

The field must also pay careful attention to the measurement of language and behavior. This is essential for research, because measure selection has a direct influence on how consumers interpret intervention effectiveness. Proximal measures that are aligned with intervention are

known to be associated with larger effect sizes than those of more distal measures (Cheung & Slavin, 2016; Hill, Bloom, Black, & Lipsey, 2008; Taylor et al., 2018). We recommend careful, prospective measure selection relative to the purposes of the study design and included outcome constructs. This may be particularly important in language and behavior research, because teachers of children with EBD underestimate their students' language skills (Chow & Hollo, 2018). Further, child language skills predict directly observed behavior problems in classrooms, but they do not predict teacher ratings of the same behaviors (Chow & Wehby, 2017). While this example presents discrepancies between teacher ratings and direct assessment (of both language and behavior), additional facets of concern include but are not limited to those involving rater (parent, teacher, peer), measure characteristics (e.g., alignment with intervention, norm-referenced), reliability, and appropriateness for the study sample.

We also must consider the ways in which we measure the language learning opportunities of individual children in the classroom, including interactions with peers, teachers, observational learning, and engagement in academic tasks and learning opportunities. Certain domains have relied heavily on single measures of a construct. For example, the Student-Teacher Relationship Scale (Pianta, 2001) is the predominant measure in the study of teacher-child relationships, and the field will benefit from additional measures to better inform the precision of the measurement of the construct as well as the sensitivity of a construct in which intervention aims to change. In addition, we rely heavily on rating scales of behavior (see Chow et al., 2018; Curtis, Frey, Watson, Hampton, & Roberts, 2018), and due to the qualitative differences between rating a child's general behavior and directly observing them in classrooms, discussions around how research captures the nature of problem behavior must be included in our work. Careful consideration of the environmental factors in research that is framed in classroom ecological

systems should be central to research as well, which includes teacher (e.g., attitudes, attributions, self-efficacy, burnout) and classroom (e.g., adversity, organizational variables) and school factors (e.g., administrative support, resources).

Concluding Remarks

Taken together, teacher practices can positively influence child behavior and engagement in the classroom setting, enhance teacher-child relationships, and provide the foundation for a high quality language learning environment. By intentionally and systematically applying these practices in the classroom, teachers can effectively interrupt the cyclical development of challenging behavior and decelerated language learning and academic achievement. Considering the strong association that exists between children's prosocial development and academic achievement, teachers and practitioners should consider how to approach these two domains of development together in a systematic and complimentary way, as opposed to addressing them in isolation. Professional development models should consider the influence that these variables have on the learning context within a classroom, and provide foundational support when needed to teachers both within and across domains in a way that maximizes effects for teachers, and subsequently the children they serve.

References

Adamson, L. B., Kaiser, A. P., Tamis-LaMonda, C. S., Owen, M. T., & Dimitrova, N. (2019). The developmental landscape of early parent-focused language intervention. *Early Childhood Research Quarterly*. doi:10.1016/j.ecresq.2018.11.005

Baker, J. A., Grant, S., & Morlock, L. (2008). The teacher-student relationship as a developmental context for children with internalizing or externalizing behavior problems. *School Psychology Quarterly*, *23*, 3-15. doi:10.1037/1045-3830.23.1.3

Bao, L., Brownlie, E. B., & Beitchman, J. H. (2016). Mental health trajectories from adolescence to adulthood: Language disorder and other childhood and adolescent risk factors. *Development and Psychopathology*, *28*, 489-504. doi:10.1017/S0954579415001054

Benner, G. J., Nelson, J. R., & Epstein, M. H. (2002). Language skills of children with EBD: A literature review. *Journal of Emotional and Behavioral Disorders*, *10*, 43-56. doi:10.1177/106342660201000105.

Bornstein, M. H., Hahn, C. S., Putnick, D. L., & Pearson, R. M. (2018). Stability of core language skill from infancy to adolescence in typical and atypical development. *Science Advances*, *4*(11). doi:10.1126/sciadv.aat7422.

Bronfenbrenner, U. (1994). Ecological models of human development. *Readings on the Development of Children, 2*, 37–43.

Brownlie, E. B., Bao, L., & Beitchman, J. (2016). Childhood language disorder and social anxiety in early adulthood. *Journal of Abnormal Child Psychology*, *44*, 1061-1070. doi:10.1007/s10802-015-0097-5

Burns, M. K., Warmbold-Brann, K., & Zaslofsky, A. F. (2015). Ecological systems theory in school psychology review. *School Psychology Review*, *44*, 249-261. doi:10.17105/spr-15-0092.1

Cabell, S. Q., Justice, L. M., McGinty, A. S., DeCoster, J., & Forston, L. D. (2015). Teacher–child conversations in preschool classrooms: Contributions to children's vocabulary development. *Early Childhood Research Quarterly*, *30*, 80-92. doi:10.1016/j.ecresq.2014.09.004

Camarata, S. M., Nelson, K. E., & Camarata, M. N. (1994). Comparison of conversational-recasting and imitative procedures for training grammatical structures in children with specific language impairment. *Journal of Speech and Hearing Research, 37,* 1414–1423. doi:10.1044/jshr.3706.1414

Catts, H. W., Fey, M. E., Zhang, X., & Tomblin, J. B. (2001). Estimating the risk of future reading difficulties in kindergarten children. *Language, Speech, and Hearing Services in Schools, 32*, 38-50. doi:10.1044/0161-1461(2001/004)

Cheung, A. C., & Slavin, R. E. (2016). How methodological features affect effect sizes in education. *Educational Researcher*, *45*, 283-292. doi:10.3102/0013189X16656615

Chow, J. C. (2018). Comorbid language and behavior problems: Development, frameworks, and intervention. *School Psychology Quarterly*, *33*, 356-360. doi:10.1037/spq0000270

Chow, J. C., Ekholm, E., & Coleman, H. (2018). Does oral language underpin the development of later behavior problems? A longitudinal meta-analysis. *School Psychology Quarterly*, *33*, 337-349. doi:10.1037/spq0000255

Chow, J. C., & Gilmour, A. F. (2016). Designing and implementing group contingencies in the classroom: A teacher's guide. *TEACHING Exceptional Children*, *48*, 137-143. doi:10.1177/0040059918757945

Chow, J. C., & Hollo, A. (2018a). Language ability of students with emotional disturbance: Discrepancies between teacher ratings and direct assessment. *Assessment for Effective Intervention*, *43*, 90-95. doi:10.1177/1534508417702063

Chow, J. C., & Wehby, J. H. (2017). Profiles of problem behavior in children with varying language ability. *Journal of Emotional and Behavioral Disorders*, doi:10.1177/1063426617733714

Chow, J. C., & Wehby, J. H. (2018). Associations between language and problem behavior: A systematic review and correlational meta-analysis. *Educational Psychology Review*, *30*, 61-82. doi:10.1007/s10648-016-9385-z

Christ, Wang, & Chiu. (2010). Using story dictation to support young children's vocabulary development: Outcomes and process. *Early Childhood Research Quarterly, 26*, 30-41. doi:10.1016/j.ecresq.2010.06.002

Cleave, P., Becker, S., Curran, M., Van Horne, A., & Fey, M. (2015). The efficacy of recasts in language intervention: A systematic review and meta-analysis. *American Journal of Speech-language Pathology, 24*, 237-55. doi:10.1044/2015_AJSLP-14-0105

Conti-Ramsden, G., Durkin, K., Toseeb, U., Botting, N., & Pickles, A. (2018). Education and employment outcomes of young adults with a history of developmental language disorder. *International Journal of Language & Communication Disorders*, *53*, 237-255. doi:10.1111/1460-6984.12338

Curtis, P. R., Frey, J. R., Watson, C. D., Hampton, L. H., & Roberts, M. Y. (2018). Language disorders and problem behaviors: A meta-analysis. *Pediatrics*, *142*(2). doi:10.1542/peds.2017-3551

Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., ... & Sexton, H. (2007). School readiness and later achievement. *Developmental Psychology*, *43*, 1428-1446. doi:10.1037/0012-1649.43.6.1428

Golinkoff, R. M., Can, D. D., Soderstrom, M., & Hirsh-Pasek, K. (2015). (Baby) talk to me: the social context of infant-directed speech and its effects on early language acquisition. *Current Directions in Psychological Science*, *24*, 339-344. doi:10.1177/0963721415595345

Greenberg, J., Putnam, H., & Walsh, K. (2014). Training our future teachers: Classroom management. Washington, DC: National Council on Teacher Quality.

Hadley, P. A., Rispoli, M., & Hsu, N. (2016). Toddlers' verb lexicon diversity and grammatical outcomes. *Language, Speech, and Hearing Services in Schools, 47*, 44-58. doi:10.1044/2015_LSHSS-15-0018

Hamre, B. K., & Pianta, R. (2010). Classroom environments and developmental processes: Conceptualization, measurement, & improvement. In J. L. Meece, & J. S. Eccles (Eds.), *Handbook of Research on Schools, Schooling and Human Development* (pp. 25-41). New York: Routledge. doi:10.3102/0013189X09332374.

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

Hanna, G. P. (1977). The effect of wait time on the quality of response of first grade children.

Thesis submitted for the Master's degree, University of Kansas, Lawrence, KA.

Harris, J., Golinkoff, R. M., & Hirsh-Pasek, K. (2011). Lessons from the crib for the classroom: How children really learn vocabulary. *Handbook of Early Literacy Research*, *3*, 49-65

Hart, B., & Risley, T. R. (1995). Meaningful differences in the everyday experience of young American children. *Paul H Brookes Publishing*.

Hemmeter, M.L., Fox, L., Jack, S., & Broyles, L. (2007). A program-wide model of positive behavior support in early childhood settings. *Journal of Early Intervention, 29*, 337-355. doi:10.1177/105381510702900405

Hemmeter, M.L., Ostrosky, M., & Fox, L. (2006). Social and emotional foundations for early learning: A conceptual model for intervention. *School Psychology Review, 35*, 583-601.

Henrichs, J., Rescorla, L., Donkersloot, C., Schenk, J. J., Raat, H., Jaddoe, V. W., ... & Tiemeier, H. (2013). Early vocabulary delay and behavioral/emotional problems in early childhood: The generation R study. *Journal of Speech, Language, and Hearing Research, 56*, 553-566. doi:10.1044/1092-4388(2012/11-0169)

Hill, C. J., Bloom, H. S., Black, A. R., & Lipsey, M. W. (2008). Empirical benchmarks for interpreting effect sizes in research. *Child Development Perspectives*, *2*, 172-177. doi:10.1111/j.1750-8606.2008.00061.x

Hindman, A. & Wasik, B. (2008). Head Start teachers' beliefs about language and literacy instruction. *Early Childhood Research Quarterly, 23*, 479-492. doi:10.1016/j.ecresq.2008.06.002

Hindman, A., Wasik, B., & Bradley, D. (2019). How classroom conversations unfold: Exploring teacher–child exchanges during shared book reading. *Early Education and Development.* doi:10.1080/10409289.2018.1556009

Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. *Child Development*, *74*, 1368-1378. doi:10.1111/1467-8624.00612

Hollo, A., & Chow, J. (2015). Communicative functions of problem behavior for students with high-incidence disabilities. *Beyond Behavior*, *24*, 23-30. doi:10.1177/107429561502400304

Hollo, A., Chow, J. C., & Wehby, J. H. (2018). Profiles of language and behavior in students with emotional disturbance. *Behavioral Disorders*, doi:10.1177/0198742918804803

Hollo, A., Wehby, J. H., & Oliver, R. M. (2014). Unidentified language deficits in children with emotional and behavioral disorders: A meta-analysis. *Exceptional Children*, *80*, 169-186. doi:10.1177/001440291408000203

Hymel, S., Rubin, K. H., Rowden, L., & LeMare, L. (1990). Children's peer relationships: longitudinal prediction of internalizing and externalizing problems from middle to late childhood. *Child Development*, *61*, 2004-2021. doi:10.1111/j.1467-8624.1990.tb03582.x

Huttenlocher, J., Vasilyeva, M., Cymerman, E., & Levine, S. (2002). Language input and child syntax. *Cognitive Psychology*, *45*, 337-374. doi:10.1016/S0010-0285(02)00500-5

Justice, L. M., Jiang, H., & Strasser, K. (2018). Linguistic environment of preschool classrooms: What dimensions support children's language growth? *Early Childhood Research Quarterly*, *42*, 79-92. doi:10.1016/j.ecresq.2017.09.003

Justice, L. M., McGinty, A. S., Zucker, T., Cabell, S. Q., & Piasta, S. B. (2013). Bi-directional dynamics underlie the complexity of talk in teacher–child play-based conversations in classrooms serving at-risk pupils. *Early Childhood Research Quarterly, 28*, 496-508. doi:10.1016/j.ecresq.2013.02.005

Law, J., Rush, R., Clegg, J., Peters, T., & Roulstone, S. (2015). The role of pragmatics in mediating the relationship between social disadvantage and adolescent behavior. *Journal of Developmental & Behavioral Pediatrics, 36*, 389-398. doi:10.1097/DBP.0000000000000180

Law, J., & Levickis, P. (2018). Early language development must be a public health priority. *Journal of Health Visiting*, *6*, 586-589. doi:10.12968/johv.2018.6.12.586

Lei, H., Cui, Y., & Chiu, M. M. (2016). Affective teacher-student relationships and students' externalizing behavior problems: A meta-analysis. *Frontiers in Psychology*, *7*, 1-12. doi:10.3389/fpsyg.2016.01311

Maggin, D. M., Pustejovsky, J. E., & Johnson, A. H. (2017). A meta-analysis of school-based group contingency interventions for students with challenging behavior: An update. *Remedial and Special Education*, *38*, 353-370. doi:10.1177/0741932517716900

Nelson, K. E., Camarata, S. M., Welsh, J., Butkovsky, L., & Camarata, M. (1996). Effects of imitative and conversational recasting treatment on the acquisition of grammar in children with specific language impairment and younger language- normal children. *Journal of Speech and Hearing Research, 39*, 850–859. doi:10.1044/jshr.3904.850

Pentimonti, J. M., Justice, L. M., Yeomans-Maldonado, G., McGinty, A. S., Slocum, L., & O'Connell, A. (2017). Teachers' use of high-and low-support scaffolding strategies to differentiate language instruction in high-risk/economically disadvantaged settings. *Journal of Early Intervention*, *39*, 125-146. doi:10.1177/1053815117700865

Perry, N. E., VandeKamp, K. O., Mercer, L. K., & Nordby, C. J. (2002). Investigating teacher-student interactions that foster self-regulated learning. *Educational Psychologist*, *37*(1), 5-15. doi:10.1207/S15326985EP3701_2

Petersen, I. T., Bates, J. E., D'onofrio, B. M., Coyne, C. A., Lansford, J. E., Dodge, K. A., ... & Van Hulle, C. A. (2013). Language Ability Predicts the Development of Behavior Problems in Children. *Journal of Abnormal Psychology*, *122*, 542-557. doi:10.1037/a0031963

Pianta, R. C. (2001). *Student-Teacher Relationship Scale*. Lutz, FL: Psychological Assessment Resources, Inc.

Pianta, R. C., Steinberg, M. S., & Rollins, K. B. (1995). The first two years of school: Teacher-child relationships and deflections in children's classroom adjustment. *Development and Psychopathology, 7*, 295-312. doi:10.1017/S0954579400006519

Piasta, S. B., Justice, L. M., Cabell, S. Q., Wiggins, A. K., Turnbull, K. P., & Curenton, S. M. (2012). Impact of professional development on preschool teachers' conversational responsivity and children's linguistic productivity and complexity. *Early Childhood Research Quarterly*, *27*, 387-400. doi:10.1016/j.ecresq.2012.01.001

Qi, C.H., & Kaiser, A.P. (2004). Problem behaviors of low-income children with language delays: An observation study. *Journal of Speech, Language, and Hearing Research, 47*, 595-609. doi:10.1044/1092-4388(2004/046)

Qi, C. H., Kaiser, A. P., Milan, S., & Hancock, T. (2006). Language performance of low-income African American and European American preschool children on the PPVT–III. *Language, Speech, and Hearing Services in Schools*, *37*, 5-16. doi:10.1044/0161-1461(2006/002

Qi, C. H., Zieher, A., Lee Van Horn, M., Bulotsky-Shearer, R., & Carta, J. (2019). Language skills, behaviour problems, and classroom emotional support among preschool children

from low-income families. *Early Child Development and Care*. doi:10.1080/03004430.2019.1570504

Rescorla, L., Ross, G. S., & McClure, S. (2007). Language delay and behavioral/emotional problems in toddlers: Findings from two developmental clinics. *Journal of Speech, Language, and Hearing Research*, *50*, 1063-1078. doi:10.1044/1092-4388(2007/074)

Roben, C. K., Cole, P. M., & Armstrong, L. M. (2013). Longitudinal relations among language skills, anger expression, and regulatory strategies in early childhood. *Child Development*, *84*, 891-905. doi:10.1111/cdev.12027

Roberts, M., & Kaiser, A. (2015). Early intervention for toddlers with language delays: A randomized controlled trial. *Pediatrics, 135*, 686-93. doi:10.1542/peds.2014-2134

Rowe, M. L. (2008). Child-directed speech: relation to socioeconomic status, knowledge of child development and child vocabulary skill. *Journal of Child Language*, *35*, 185-205. doi:10.1017/S0305000907008343.

Ruston, H. P., & Schwanenflugel, P. J. (2010). Effects of a conversation intervention on the expressive vocabulary development of prekindergarten children. *Language, Speech, and Hearing Services in Schools, 413*, 303-313. doi:10.1044/0161-1461(2009/08-0100)

Sabol, T. J., & Pianta, R. C. (2012). Patterns of school readiness forecast achievement and socioemotional development at the end of elementary school. *Child Development*, *83*, 282-299. doi:10.1111/j.1467-8624.2011.01678.x

Sameroff, A. (2009). The transactional model. In A. Sameroff (Ed.), *The transactional model of development: How children and contexts shape each other* (pp. 3-21). Washington, DC, US: American Psychological Association. doi:10.1037/11877-000

Sembiante, S., Dynia, J., Kaderavek, J., & Justice, L. (2017). Teachers' literal and inferential talk in early childhood and special education classrooms. *Early Education and Development, 29*, 14-30. doi:10.1080/10409289.2017.1362916

Shores, R. E., Jack, S. L., Gunter, P. L., Ellis, D. N., DeBriere, T. J., & Wehby, J. H. (1993). Classroom interactions of children with behavior disorders. *Journal of Emotional and Behavioral Disorders*, *1*, 27-39.

Simonsen, B., Fairbanks, S., Briesch, A., Myers, D., & Sugai, G. (2008). Evidence-based practices in classroom management: Considerations for research to practice. *Education and Treatment of Children, 31*, 351-380.

Sutherland, K. S., Conroy, M., Abrams, L., & Vo, A. (2010). Improving interactions between teachers and young children with problem behavior: A strengths-based approach. *Exceptionality*, *18*, 70-81. doi:10.1080/09362831003673101

Taylor, J. A., Kowalski, S. M., Polanin, J. R., Askinas, K., Stuhlsatz, M. A., Wilson, C. D., ... & Wilson, S. J. (2018). Investigating science education effect sizes: Implications for power analyses and programmatic decisions. *AERA Open*, *4*. doi:10.1177/2332858418791991.

Vernon-Feagans, & Bratsch-Hines. (2013). Caregiver–child verbal interactions in child care: A buffer against poor language outcomes when maternal language input is less. *Early Childhood Research Quarterly, 28*, 858-873. doi:10.1016/j.ecresq.2013.08.002

Wasik, B. A., Bond, M. A., & Hindman, A. (2006). The effects of a language and literacy intervention on Head Start children and teachers. *Journal of Educational Psychology*, *98*, 63-74. doi:10.1037/0022-0663.98.1.63

Wasik, B. A., & Hindman, A. H. (2011). Improving vocabulary and pre-literacy skills of at-risk preschoolers through teacher professional development. *Journal of Educational Psychology*, *103*, 455-469. doi:10.1037/a0023067

Wasik, B. A., & Hindman, A. H. (2013). Open-ended prompts: Fostering conversations with children. *The Reading Teacher, 67*, 302–311.

Wasik, B.A., & Hindman, A.H. (2018). Increasing preschoolers' vocabulary development through a streamlined teacher professional development intervention. *Early Childhood Research Quarterly.* doi:10.1016/j.ecresq.2018.11.001

Weizman, Z. O., & Snow, C. E. (2001). Lexical output as related to children's vocabulary acquisition: Effects of sophisticated exposure and support for meaning. *Developmental Psychology*, *37*, 265. doi:10.1037/0012-1649.37.2.265

Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child Development, 69*, 848–872. doi:10.1111/j.1467-8624.1998.tb06247.x

Winstanley, M., Webb, R. T., & Conti- Ramsden, G. (2018). More or less likely to offend? Young adults with a history of identified developmental language disorders. *International Journal of Language & Communication Disorders*, *53*, 256-270. doi:10.1111/1460-6984.12339

Yew, S. G. K., & O'Kearney, R. (2013). Emotional and behavioural outcomes later in childhood and adolescence for children with specific language impairments: meta- analyses of controlled prospective studies. *Journal of Child Psychology and Psychiatry*, *54*, 516-524. doi:10.1111/jcpp.12009