Vocabulary and Early Executive Function during Early Childhood: Revisiting Questions on the Nature of Thought and Language – Commentary on Bruce and Bell

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Bruce and Bell (2022) address an important and foundational question in the present review related to the nuanced and interconnected relationship between vocabulary and executive function (EF) across the first years of life. This is not a new area of inquiry, which, at the very least, hearkens back to classic proposals centering on the relationship between thought and language (e.g., Luria, 1979; Piaget, 1959; Vygotsky, 1986; Whorf, 1956). As Bruce and Bell note, EF and language are both foundational elements of cognitive development and there is a plethora of research reporting associations between the two in early childhood. So much so, that it is surprising that a review of this nature has not yet been tackled, making it likely to be a useful reference for future work. With their scoping review approach to examining the interconnected nature of EF and vocabulary, this review encourages the reader to reconsider the classic question of the nature of thought and language within the context of a more contemporary framework of EF from a developmental perspective. Their review provides a fresh take on the question and uncovers exciting potential relationships, limitations in the research, and future directions for the field.

Classic Perspectives in Thought and Language

The suggestion that language shapes the way we think, especially as it relates to self-regulation and EF, has been a topic of consideration for some time. Although very strong views grounded in linguistic determinism suggesting language is necessary for higher order cognition (e.g., Whorf, 1956) generally no longer seem dominant in the literature, these provocative ideas drew attention to the influence language may have on cognition. This strong hypothesis has its roots in linguistics and cross-cultural studies with adults, suggesting that conceptions of constructs such as space, time, and matter are largely shaped by the language one speaks. Given the focus on adult speakers and formal language systems, it may make sense that the proposal of a strong influence of language on thought was developed. Indeed, from the perspective of an adult with decades of experience with language, it may
be difficult to conceptualize thought without language. Presently, most empirical evidence appears to align with weaker versions of the Sapir-Whorf hypothesis related to linguistic relativism (i.e., the structure of language influences how one understands the environment; Whorf, 1956). Additionally, moving the question to consider what thought may look like earlier in the lifespan for young children who have not yet mastered their linguistic system, strong views of the thought and language relationship also seem less feasible.

For instance, Piagetian ideas on language shifted the view that language was more of a universal innate capacity (Chomsky, 1965) to the idea that language is constructed, with the proposal that language is built from more basic action-based knowledge representations (Piaget, 1959; Piattelli-Palmarini, 1980; Rieber, 1983). This development was important in the study of thought and language, as it provided a developmental context with the suggestion that language emerges as part of a more general underlying semiotic function responsible for all symbolic development (Rieber, 1983). Within this perspective, the importance of language to cognition is part of the large influence of the semiotic function, which marks the transition in thought from the sensorimotor to the preoperational stage (Piaget, 1959). Thus, language was viewed as a type of symbolic representation and means for studying thought. However, a common criticism of Piaget’s theory was that he did not credit language itself with enough importance as a process that influenced thought. Thus, although the constructivism approach to cognitive development revolutionized the field, one major proposed flaw in the theory was the neglect of the role that language plays on cognitive constructions (Nelson, 2000).

It was likely not until Vygotsky (1978) proposed the sociocultural perspective of cognitive development that language (and more specifically language development across time) was proposed to have a significant influence in the field of cognitive development. Further, Vygotsky (1986) and Luria (1979) suggested that an important development within language and cognition was language’s ability to facilitate the control of behavior (similar to the construct of EF today). Finally, many of the classic theories in cognitive development have had a strong influence on contemporary theories that consider and extend the relationship between language and cognition. Similar to Vygotsky, Nelson (1996) drew a distinction between cognition (individual representation) and communication (social representation). However, Nelson stressed that these processes develop interdependently (i.e., they begin around the same time and influence each other throughout development). Tomasello (1999, 2019) suggested that improved control of behavior comes from children’s internalization of the views of others within evaluative discourse. As children begin to appreciate and use the evaluations of others, they learn that they can evaluate their own behavior within a problem-solving context, which leads to improved self-control. Further, theories within EF suggest that language may be important to EF behavior as it allows for higher levels of representation and reflection on task-relevant information to help regulate behavior (Marcovitch & Zelazo, 2009; Zelazo, 2004, 2015), provides distance from the immediate context, encourages abstract representation of the problem (e.g., Carlson et al., 2005), and redirects attention to the relevant aspects of the task (Kirkham et al., 2003).

Grounding the Study of Thought and Language into Multifaceted Component Processes

One of the strengths of the present review is the multifaceted approach to both language and EF when examining their relationship. Much of the classic theoretical work on language and thought approaches the question with a broad stroke focused on how language shapes the way we think. There is great value in tackling this question at a much smaller scale; narrowing focus to component processes of language (i.e., vocabulary) and cognition (i.e., EF) can help us better understand the complexity of this question and the numerous factors that likely contribute to the answer. Given the dramatic increase in the study of EF over the past few decades, we have a great deal more knowledge on its foundational nature and development since Vygotsky (1978) and Luria (1979) broached the questions of how language facilitated behavioral control. This nuanced and multifaceted review suggests that the answer to the question of how language (vocabulary) and thought (EF) are related is not an easy one and likely depends on multiple factors like age, measurement, and conceptualization – and likely other sociocultural factors often not addressed in present research like socioeconomic status, culture, and ethnicity. Further, this multifaceted approach draws attention to the lack of language research outside of vocabulary development and the potential for differences in expressive and receptive vocabulary contributions when examining this element of the language and cognition relationship. This is especially intriguing, as this highlights the current lack of knowledge in understanding multiple other pieces of lan-
guage that have been proposed to affect behavioral control (e.g., multilingualism, syntax, social pragmatic) and how the area of focus can limit the age range in which one can address this question, given the limitations in measurement.

The Value of Developmental Models to the Study of Thought and Language

Another important contribution of Bruce and Bell’s (2022) review is the developmental approach to the topic of language and cognition. Whorf’s (1956) work in linguistic determinism and linguistic relativity was primarily grounded in adult research, with Piaget (1959) and Vygotsky (1978) bringing this question to a more developmental context. The present review explores several models that emphasize the importance of longitudinal data and the possibility of an interdependent relationship between vocabulary and EF across the first few years of life. Their paper reveals several significant insights suggesting time and development is an important factor to consider in the relationship between thought and language. First, it seems that theoretically and empirically there is more work and support for a model suggesting a vocabulary $\rightarrow$ EF unidirectional relationship, consistent with Vygotskian (1978) theory based on the idea that language initially exists in a social context and eventually influences cognition when it becomes internalized (i.e., related to inner speech and how adults typically think to oneself through language). This could somewhat speak to Vygotsky’s (1978) and Luria’s (1979) enduring influence in the area of language and self-regulation, though it is important to note that there was some evidence for EF $\rightarrow$ vocabulary or bidirectional influences in language, suggesting the more contemporary and interdependent approaches may also be important to consider. Related to this, another important developmental consideration suggested by the authors was that it is entirely possible that the vocabulary-EF relationship changes across development. More specifically, their review points to a need for examining the language-EF relationship before the second year of life, as measures (e.g., receptive vocabulary may better capture development early in life) and frameworks may change especially during the rapid development of the first few years (e.g., suggestions of an emerging and initially unstable EF, Devine et al., 2019; Miller & Marcovitch, 2015). Given that both vocabulary and EF have been suggested as crucial to building a strong foundation for learning and development, understanding their early interdependent relationship could be especially important to better understand how we can capitalize on the impressive growth and plasticity that children show in the preschool years to help us build these foundational skills important to later development.

Moving Forward

Perhaps the most exciting element of Bruce and Bell’s (2022) review of vocabulary and EF is the revelation that there is still much left to be uncovered regarding the classic question of the relationship between thought and language. As the authors note, there seems to be a great deal of empirical support suggesting that a relationship between EF and vocabulary exists, but the inconsistent results suggest we do not yet know exactly how these two foundational skills relate and how it may change over time and across contexts. Their work suggests there is still much to be explored in this relationship and the answer is likely nuanced and complex. Revisiting this classic question with decades of accumulated knowledge in EF was enlightening to see how far we have come in tackling this question and the great opportunities for future research in this area.

Statement of Ethics

No ethical approval was required for the preparation of this manuscript, as no human or animal subjects were used.

Conflict of Interest Statement

The author has no conflict of interest to declare.

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Author Contributions

S.M. conceived of the ideas presented and contributed to the final manuscript.
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