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How does play foster development? A new executive function perspective

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A B S T R A C T

Around the world, children play. Does play support development? If so, how? One popular idea is that play fosters the development of higher-order cognitive abilities, such as executive functions. A contrasting view is that play fosters the development of cultural knowledge and skills rather than general capacities. We describe a third proposal: that play helps children acquire culture-specific executive function skills. We articulate three ideas of how this might work, synthesizing diverse literatures. We also discuss other activities children voluntarily engage in that overlap with play and may similarly help them acquire culture-specific executive function skills. We end by considering implications of these ideas and questions for future research. We suggest that play and related activities are most likely to support the development of culture-specific executive function skills if they are informed by cultural knowledge, values and practices.

Anyone who lingers with children understands that some things do not need to be taught: children play. Play is universal, although how, and how much, children play varies across cultures (Gaskins, 2013). Play has been viewed as a "fuzzy concept" (Chu & Schulz, 2020; Wittgenstein, 1958) that encompasses diverse activities—pretend play, exploratory play, games, rough-and-tumble play—that share at least some features, like being pleasurable, voluntary, autotelic, imaginative, and associated with positive affect and choice (Burghardt, 2011; Hirsh-Pasek et al., 2020; Howard & McInnes, 2013; Lillard, 2015). Play varies in the extent to which adults provide guidance or are involved (Gaskins et al., 2007; Zosh et al., 2018) and how much it is encouraged (Gaskins, 2013; Carlson et al., 1998). And while definitions tend to focus on what is observable, there is evidence that what counts as play can sometimes be subjective, as children and adults differ in what they perceive to be play (Howard, 2002; McInnes, 2019), and the same activity can be perceived as play or not-play, depending on the presence of specific characteristics, such as choice (Howard & McInnes, 2013).

The universality and generally positive characteristics of play suggest it is important to development. Among Western, educated researchers (and parents), play is thought to serve various cognitive capacities, including imagination, reasoning, creativity and more (Chu & Schulz, 2020; Harris, 2000; Hirsh-Pasek et al., 2009; Weisberg, 2015; Singer & Singer, 1990). One idea that has gained in popularity in recent years is that play supports the development of executive function (e.g., Carlson et al., 2014; Diamond & Lee, 2011; Schlesinger et al., 2020; Thibodeau-Nielsen et al., 2020; White & Carlson, 2016). *Executive function* refers to the cognitive capacity to regulate thought and behavior in the service of specific goals, and is subserved by prefrontal cortex and interrelated brain regions (Diamond, 2013; Zelazo et al. 1996). It is especially needed when acting in the face of habits and desires. Executive function is often further defined as comprised of three core components—working memory, inhibitory control, and cognitive flexibility (Diamond, 2013; Miyake et al., 2000; cf. Doebel, 2020; Karr et al., 2018; Miyake & Friedman, 2012). Performance on common laboratory measures of executive function aimed at these components improves dramatically in early childhood (Carlson, 2005; Doebel & Zelazo, 2015; Diamond and Taylor, 1996; Diamond, 2006; Jacques and Marcovitch, 2010). Recent accounts posit that play—especially

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pretend play—provides opportunities to exercise and strengthen these executive functions (e.g., Carlson et al., 2014; Diamond & Lee, 2011; White & Carlson, 2016). One specific idea is that pretend play, in which one projects some alternate vision onto reality in a spirit of play (Lillard, 2015), challenges executive function components in various ways (e.g., "inhibit[ing] acting out of character, remember[ing] their own and others' roles, and flexibly adjust[ing] as their friends improvise"; Diamond & Lee, 2011). Pretend play has also been proposed to strengthen executive functions by providing practice in inhibiting reality in favor of fantasy (e.g., acting as if a stick is a sword; Carlson et al., 2014; Thibodeau et al., 2016). Likewise, play more generally has been suggested to challenge executive functions through everyday games (e.g., following rules and inhibiting actions in a game of 'Simon Says', Diamond, 2014; Schlesinger et al., 2020). Others have suggested that play may strengthen executive function by providing children with opportunities to practice reflecting before acting (White & Carlson, 2016).

These ideas have appeal; however, accumulating empirical evidence suggests play may not foster developing executive functions in these ways. In the following sections, we review this evidence and then consider an alternative possibility for how play may foster executive function skills.

A brief review of recent literature on the influence of play on executive function

Targeted but sustained play interventions do not seem to improve children's performance on standard executive function measures (Adam et al., 2022; Gibb et al., 2021; Rosas et al., 2019; Thibodeau et al., 2016; Thibodeau-Nielsen et al., 2020; for an earlier review see Lillard et al., 2013). For example, a much-cited study found children in a fantasy pretend intervention over five weeks showed higher scores on working memory and cognitive flexibility measures than a non-imaginative play condition; however, the increases were not statistically greater than increased observed in a control condition, and no intervention effects were seen on inhibitory control performance (Thibodeau et al., 2016). An attempted replication study using a much larger and more diverse sample found no confirmatory evidence of positive effects of pretend play on executive function (Thibodeau-Nielsen et al., 2020). Another recent study found no effects of a six-week play intervention involving games that exercise executive function in an experimental group relative to a control group (Gibb et al., 2021). A 10-week study involving 15 hours of pretend play also found no effects on executive function task performance (Adam et al., 2022). A much-cited study by Tominey and McClelland (2011) did not find confirmatory results supporting positive effects of circle time games that were expected to exercise executive functions; both their treatment and their control group doubled their executive function scores over eight weeks. Two further studies limited to children from low-income backgrounds found inconsistent results (McClelland et al., 2019; Schmitt et al., 2015).

Brief role play interventions have been cited as improving children's persistence and cognitive flexibility (White & Carlson, 2016; White et al., 2017; Shachnai et al., 2022); however, these studies do not provide compelling evidence that role play was the active ingredient. For example, in one study in which children were instructed to role play as a famous scientist who worked hard, differences in persistence were found between role play and baseline conditions, but not between role play and exposure to information about a famous scientist in the absence of a role play induction (Shachnai et al., 2022). Similarly, studies have reported that role playing as a motivating character (like Batman or Dora the Explorer) increased children's persistence and cognitive flexibility in comparison to children in control conditions (White & Carlson, 2016; White et al., 2017); however, it is unclear whether children's persistence increased due to role playing or to increased motivation due to their exposure to motivating, competent characters.

Results of more comprehensive interventions focusing on play have been mixed. For example, some randomized controlled tests of Tools of the Mind, which emphasizes pretend play, have found positive effects on executive function performance (e.g., Blair & Raver, 2014; Diamond et al., 2007; Diamond et al., 2019) and others have reported limited, null, and even negative results (e.g., Clements et al., 2020; Nesbitt & Farran, 2021; Morris et al., 2014; Solomon et al., 2018). Some of these Tools implementations were play-focused add-ons to existing curricula (e.g., Clements et al., 2020), which might account for some results; in other cases teachers chose not to fully implement the program (see Diamond & Ling, 2016; Nesbitt & Farran, 2021 for discussions).

Taken together, the foregoing findings suggest play may not foster executive function development in the ways that have been previously theorized, or at least not in the ways that have been operationalized in studies. However, as we argue in the following sections, play may still have an important role in the development of executive function skills. Gaining insight into this role, however, requires that we first broaden our conception of executive function skills.

(Re)defining executive function

Instead of defining executive function skills as a small set of core executive functions[1] that are best measured by common laboratory tasks, we define them as diverse skills requiring the regulation of cognitive processes in the service of goals that are fundamentally

[1] As we discuss elsewhere (Doebel, 2020), since the publication of Miyake et al. (2000), executive function has increasingly been defined reductively as three components that support more complex executive functions, but the empirical support for this conceptualization is weak. Miyake et al.'s initial factor analysis suggested three separate-but-related executive functions largely because of the three classes of tasks that were included in their analysis, which were selected in part due to pragmatic considerations. Moreover, the apparent structure of executive function varies depending on the tasks included in a study, and reported patterns vary across studies and appear to be affected by publication bias (Miyake & Friedman, 2012; Karr et a., 2018). Latent variable approaches also produce results that are inconsistent with the expected prominent role of the environment in the development of executive function skills in early childhood (Camerota et al., 2020). Full discussion of these issues is beyond the scope of the paper.

shaped by cultural knowledge, norms, and values (Doebel, 2020). On this view, skills such as shifting, inhibitory control, and working memory (updating) are three of many ways of regulating cognitive processes that vary in how they manifest within and across cultures. Importantly, particular executive function skills may appear more or less (domain) general, depending on the extent to which they are used across diverse contexts and domains. Standard laboratory executive function measures can be reinterpreted, on this view, as measuring skills in using control in particular ways that are common and valued in a specific cultural context. Take for example a frequently used measure of executive function in children: the Day-Night Stroop task (Gerstadt et al., 1994), in which children are instructed to say "day" to a picture of a moon and "night" to a picture of a sun, for several trials. Young children frequently "perseverate" on the task, saying "day" to the sun and "night" to the moon (Gerstadt et al., 1994; Montgomery and Koeltzow, 2010). This task may be best suited to measuring inhibitory control as it is practiced and valued in Western, educated, industrialized societies, as it takes for granted certain conceptual connections, experiences, and expectations related to following adults' instructions and arbitrary commands, and thinking and responding in ways that conflict with common sense (i.e., doing the opposite of what one would be naturally inclined to do). On our view, when children perform poorly on such a measure, it may not simply be because they have a neurologically-based inhibitory control deficit; rather, using executive function in this particular way may be a bad fit with their background cultural knowledge, values, and skills (Gaskins & Alcalá, in press).

How does play support the development of executive function skills?

With this perspective in mind, one can imagine that play (e.g., exploratory play, pretend play and role play) may serve an important role in fostering the development of culture-specific executive function skills. We articulate three ideas of how this might work. We also discuss activities that children engage in that overlap with play in some characteristics (e.g., the presence of choice, the pursuit of interests for pleasure) and that appear to similarly support culture-specific executive function skills. We end by discussing the implications of these ideas.

Idea 1: Play fosters culture-specific executive function skills via practice

It has long been suggested that play helps the young practice skills in a low-stakes context, in preparation for later real-world demands (Bock & Johnson, 2004; Groos & Baldwin, 1901; Lillard, 2017a). We extend these earlier ideas by suggesting that one reason play helps, beyond providing a safe context for learning, is by motivating the practice of specific ways of using executive function. In play, children seem to voluntarily take on cognitive demands, often setting and pursuing their own goals, and even creating novel problems to solve (Chu & Schulz, 2020). Children also often make choices and pursue personal interests in play, which increases positive affect (Howard & McInnes, 2013; Lillard, 2017b) and willingness to take on more cognitive demands (Ackerlund Brandt et al., 2015; Iyengar & Lepper, 1999). Using executive function is inherently cognitively demanding, yet humans voluntarily engage in demanding tasks when they find it meaningful to do so (Inzlicht & Campbell, 2022). Children, in pursuing their own interests and problems in play, pursue activities that are meaningful to them, likely reducing the threshold for engaging cognitive effort. Older children may more consistently avoid cognitive effort in some contexts (Niebaum & Munakata, 2020), possibly because they are better than young children at monitoring cognitive demands. However, another possibility is that to the extent that young children may be approaching tasks playfully, perhaps because they perceive a task as play (e.g., a task that involves fun choices, Howard & McInnes, 2013), children may find cognitive effort to be less aversive.

Cultural research finds that children across many traditional cultures spontaneously pretend to engage in various domestic and social routines and scripts observed in daily life, such as caring for children, completing household chores, cooking meals and going to the store (Gaskins, 2013). As children get older, the proportion of time spent in such activities lessens, as they acquire adult-like competence (Bock & Johnson, 2004). Similar patterns are observed in cultural comparisons within the United States (Farver & Shin, 1997). We suggest that many of these activities have inherent executive function demands, especially but not limited to when one is first learning them (e.g., maintaining and following ordered steps and procedures in cooking a meal; initiating, monitoring, and switching among subtasks in the completion of household/childcare tasks; recalling and updating shopping lists; and maintaining and monitoring roles and rules in common social interactions; see also Gaskins & Alcalá, in press). Play may support children's practice using executive function in these and other ways.

Causal evidence that role play fosters the practice of executive function skills is scarce; however, in one ambitious study, children who engaged in drama games with elements of pretend play (24 half-hour sessions across eight weeks) showed better emotion regulation outside of play than did children in a control group (Goldstein & Lerner, 2018). The children did not make choices regarding the themes and roles of the play in which they engaged, which limits the inferences one can draw about pretend play "in the wild" and whether it would similarly support emotion regulation; nevertheless, the study provides causal support for the idea that pretend play may be a vehicle for practicing specific executive function skills that may then be used and further developed beyond the play context.

There are other activities children readily engage in that may serve the same purpose, but that would not conventionally be classified as play. In spontaneous social imitation, for example, children may gain practice using executive function in specific ways that support its use later on. Infants spontaneously imitate a model's effort and generalize it to new situations (Leonard, et al., 2017). Children also engage in *over*imitation (Nielsen, et al., 2014), reproducing more details in a sequence than are necessary to accomplish a goal. In overimitation, children may gain practice that reduces executive demands when children later engage in similar complex routines (Rybanska et al., 2018).

Why might engaging in pretend play be important for practicing executive skills when children already gain practice via imitation? One idea, suggested by both Piaget (1991) and Montessori (1989), is that pretend play may occur more when children are prohibited

from involvement in or even direct observation of real activities (Montessori, 1989; Piaget, 1991). For example, a child may pretend to mix ingredients and cut up vegetables with a pretend knife because they are not permitted to do the real thing. Cultural research finds that the boundary between play and real activities is less distinct in some societies, where children may, for example, use a play kitchen to prepare real food, gaining real competence in food preparation (Lancy, 2016). In several experiments children showed a preference for doing the real thing versus pretending to do it (Taggart et al., 2018; Taggart et al., 2020). Thus, realistic pretend play may be particularly important for developing culture-specific executive function skills when children cannot engage in real activities.

Idea 2: Exploratory play provides conceptual knowledge that supports culture-specific executive function skills

Play may also foster the rapid acquisition of cultural knowledge that then opens the door to the development of new executive function skills. It has been argued that young children fail to use executive function to regulate their actions despite having relevant knowledge to guide them, much like patients with frontal lobe deficits (e.g., so-called "knowledge-action dissociations"; Diamond & Taylor, 1996; Zelazo et al.,1996). For example, on the Dimensional Change Cart Sort task, children are instructed to sort cards according to a particular dimension (e.g., shape) and demonstrate that they understand how to do so, yet younger children persistently fail to sort correctly after the switch, even when the experimenter repeats the new rules on each sorting trial, and even when children themselves can state the rules and how to sort by them (Doebel & Zelazo, 2015; Kirkham et al., 2003; Zelazo et al., 2003). However, young children may be more limited by their lack of knowledge than previously considered.[2] Specifically, cultural knowledge may foster cognitive representations that support culture-specific executive function skills. For example, a child who has substantial experience with colored three-dimensional blocks may be more capable of using executive function to maintain a representation of a hidden block, or to mentally manipulate configurations of blocks to plan a block tower. Infants are better able to find hidden objects when the hidden objects are familiar (Shinskey & Munakata, 2005), and object familiarity also helps children perform better on perspective taking tasks (Borke, 1975). Similarly, a child who is exposed regularly to numerical information may be more effective at maintaining and manipulating digits than doing the same with words. Consistent with this idea, children and adults recall and manipulate information more effectively when it is relatively familiar (Brady et al., 2016; Starr et al., 2020). Familiar information may support executive function skills not simply by making it easier to maintain task-relevant information, but also by freeing up executive function capacity so that it can be used to address additional demands (e.g., representing more aspects of the task, maintaining more information, manipulating information in new ways).

Exploratory play may be a key way that such cultural knowledge is rapidly acquired. By freely exploring their environment and the objects and affordances within it, children not only quickly gain rich knowledge about the world (Schulz & Bonawitz, 2007; Evans et al., 2021; Herzberg et al., 2021), they also gain cultural knowledge that can then be applied in goal-directed activities. Preschool, museum, and home, environments are all shaped by cultural values and practices. For example, at home a child may be given colorful blocks of various shapes that can be fit into a "shape sorter", fostering exploration and learning about shapes and colors. In a museum, children are afforded opportunities to acquire scientific concepts, for example, exploring how connecting gears of different sizes makes objects move faster or slower (Callanan et al., 2020). Children playfully explore such environments and acquire cultural knowledge in the process.

In other cases, the environment includes unfettered access to cultural tools used by adults that a child can learn to use via exploratory play. For example, in many societies children are given access to knives to play with, and are not supervised or instructed on how to use them (Lancy, 2016). Through trial and error, and also by observing others and trying out what they see, such children become competent users of these and other cultural objects early in life. Without the predilection to engage in hands-on exploration children might not easily acquire these skills, particularly in an environment where teaching is not prevalent. Yet even when instruction is provided, children tend to explore more if the instruction is light—when others are guiding and not directive (Medina and Sobel, 2020). Children also augment their exploration based on what they already know, pursuing what they find interesting, meaningful, and not too complex (Kidd et al., 2012; Wang et al., 2021). In Western middle-class contexts, learning from exploratory play tends to be related to caregiver language, behaviors, and educational background (Acosta et al., 2021; Callanan et al., 2020; Medina and Sobel, 2020; Sobel et al., 2021). For example, children have been found to explore more systematically when caregivers use more causal language, and caregivers with higher education and STEM knowledge and interest use more causal language with their children during exploratory play (Callanan et al., 2020). The importance of the caregiver in Western contexts is likely in part explained by the kind of knowledge being acquired and the improbability that it can be gained via observation and exploratory play without feedback or guidance.

Children may perceive their activities as play even when exploration is somewhat constrained by adults, particularly if children can make choices (Howard & McInnes, 2013; Lillard, 2017b). Children who have opportunities to choose to engage with materials that provide substantial knowledge about dimensional concepts like shape, number, and color tend to perform better on standard executive function measures (Lillard & Else-Quest, 2006; Randolph et al, 2022). The knowledge children gain from engaging with these materials may foster using executive function on standard lab tasks by strengthening children's dimensional representations. Experimental research is consistent with this possibility, finding that dimensional knowledge fosters flexibility on the Dimensional Change Card Sort, which requires shifting between conflicting dimensions (Bardikoff and Sabbagh, 2021; Lowery et al., 2022; Perone et al., 2015). Thus, play, and activities that share features with it (e.g., choice and the pursuit of one's interests), may foster knowledge that contributes to

[2] While some have suggested that knowledge representations play a role in the emergence of executive functions (Munakata, 1998; Munakata et al., 2012), these accounts have emphasized developmental changes to prefrontal cortex, rather than specific knowledge or experiences.

culture-specific executive function skills.

Idea 3: Role play supports the acquisition of social knowledge that allows children to regulate their behavior according to social norms

Play may also support developing culture-specific executive function skills by helping children make sense of their social world and allowing them to regulate their behavior in ways that are consistent with cultural norms and expectations. In pretend play children often appear to be trying to make sense of their social world, choosing themes that they seek to understand more deeply by dramatizing and interpreting them (Vygotsky, 1967; see Gaskins, 2013, for discussion). Vygotsky provided the example of sisters pretending to be sisters and behaving according to rules that fit the situation, as they see it (e.g., dressing alike, holding hands, acting the same and being treated the same). In playing sisters, the real sisters not only practice rules that emanate from the "sisters" concept, but also increase their conscious understanding of their own relationship, opening up the possibility of applying this understanding outside of play to regulate their behavior in culture-specific ways. In other words, "[c]hildren are able to express (and through that expression, come to organize and gain awareness of) knowledge they would not have conscious access to outside of play" (Gaskins, 2013, p. 232).

Cultural research has documented many instances of children spontaneously engaging in role play in ways that would be expected to foster their understanding of the social relationships, roles, and rules that permeate their culture (Farver & Shin, 1997; Gaskins, 2013; Lancy, 2007; Roopnarine, 2011). Experimental findings on this are limited. In one study, children who were instructed to take on the role of a character who "is really good at working hard" (White et al., 2017, p. 1566) used more control on a challenging task than children in a control condition who were simply instructed to ask themselves if they were working hard. Role playing may have inspired children to interpret and follow the rules of what it means to be a hard worker (i.e., focusing and persisting on a challenging task). However, as noted earlier, children were role playing as a competent character, and the lack of a control condition in which children heard about a competent character but did not role play precludes strong inferences about what drove children's performance in the role play condition.

Cultural research indicates that internalized norms help children exercise control (e.g., to delay gratification; Lamm et al., 2018; Yanaoka et al., 2022). Children in Japan delay gratification longer for food than for gifts, whereas children in the United States delay longer for gifts than for food, consistent with different social norms related to delaying for food and gifts in each culture (Yanaoka et al., 2022). Children from a small subsistence farm community that are socialized into a society defined by strict social hierarchy show longer wait times on a self-imposed delay task than children from a middle-class (Lamm et al., 2018). Pretend play may help children understand and regulate their behavior in terms of such culture-specific social norms. For example, a child may pretend to prepare lunch for some dolls and tell them that they have to wait until everyone is ready before starting to eat, and then reprimand them when they do not wait. This kind of interpretive play may help the child deepen their understanding and awareness of the rule that one should wait for others before starting to eat, making it easier to engage control at the next mealtime.

This perspective bears some resemblance to the "emergence" view of theory of mind, in which it is proposed that children use executive function to practice, reflect on, and learn from social interactions that would then support the cognitive flexibility to take on another's perspective (see Benson et al., 2013). On the view proposed here, however, it is play that supports social knowledge acquisition, which in turn shapes how executive function can be used, rather than executive function skills supporting social knowledge acquisition. Thus, play may foster culture-specific executive function skills (i.e., regulating one's behavior according to culture-specific roles, rules, and norms) by fostering children's understanding of their social world.

It is possible that children may also acquire this understanding outside of play; for example, children interpret social rules, for example, when caring for siblings and assuming the voice of a parent. However, play contexts may be unique in that children have typically chosen to take on those roles, perhaps targeting roles they are especially trying to understand (Kidd et al., 2012), and active choice is a particularly good driver of development (Ackerlund Brandt et al., 2015; Iyengar & Lepper, 1999; Montessori, 1967).

Implications and questions for future research

We have argued that play may support development by fostering the acquisition of diverse culture-specific executive function skills. In play, children: (a) voluntarily practice using executive function in specific ways that they then can apply outside of play; (b) acquire conceptual knowledge that supports using executive function in culture-specific ways; and (c) deepen their social knowledge, fostering using executive function in ways that are consistent with cultural rules, norms, and values.

To what extent is play special in supporting development in these ways? The universality of play suggests it might be an adaptation with unique benefits to human development. These benefits may not be specific to developing executive function skills, as play may support development in other ways (Chu & Schulz, 2020; Weisberg, 2015; but see Lillard et al., 2013); however, we propose that play may be an important pathway to the development of diverse executive function skills for a variety of reasons. The first is that children often cannot participate in real activities, and play allows them to practice skills they otherwise would not. Play may also uniquely motivate children to take on cognitively demanding activities that can foster the development of executive function skills. When an activity is perceived as play, children enjoy it more (Diamond, 2016; Howard & McInnes, 2013). Finally, role play may be particularly useful for deepening knowledge of roles, rules, and values (Gaskins, 2013).

Yet while play may be valuable to developing culture-specific executive function skills, this does not mean that the same or similar benefits could not be conferred by activities that share some but not all features with play. Given the many ways children need to learn to use executive function, which can vary greatly across cultures, it makes sense that there would be multiple mechanisms supporting such learning. For example, some of the benefits of play may be experienced when children spend time in less-structured activities in which they can make choices and pursue their own interests. Prior research examining opportunities for less-structured time in the

context of leisure and home activities indicates associations between time and diversity in less-structured activities and lab-based executive function measures (Barker et al., 2014; Stucke et al., 2022). Similarly, in some schooling contexts children exercise choice and pursue interests, gaining practice and acquiring cultural knowledge that likely fosters culture-specific executive function skills (Diamond & Ling, 2016; Lillard, 2017b).

On the other hand, it is possible that play is crucial for developing certain executive function skills. The idea that role play may be necessary for deep understanding of and identification with social roles, values, and norms has not yet been tested. As discussed, much of the previous research examining role play and executive function has been premised on the idea that exercising executive function in one context might foster using it in a different context (e.g., from a fantasy context to a lab-task context). Other work examining role play that has involved social norms (e.g., working hard and using effort) has not used close control conditions that account for non-role play factors. Moreover, prior work has almost always involved children being directed to engage in role play, raising the question of whether what has occurred in the intervention is actually play. Research finds that children are less likely to perceive activities as play when adults are involved and choice is restricted (Howard, 2002), which in turn limits their enjoyment and, perhaps, persistence (Howard & McInnes, 2013). Future research can test whether freely-chosen role play supports the acquisition of social knowledge that, in turn, fosters culture-specific executive function skills.

On our view, play without opportunities to observe or otherwise learn about cultural values, norms and practices would not be expected to aid the development of culture-specific executive function skills. That is, play ideally will allow children to practice, understand, and interpret that which is important to functioning successfully and independently within their culture. In some contexts, this may mean having the opportunity to observe as adults demonstrate valued skills, behaviors, and social roles. In other contexts, it may mean a more active role for adults in ensuring that children are exposed to valuable cultural knowledge.

Conclusion

We have argued that play may foster practice and knowledge that leads to the development of culture-specific executive function skills. Some of the benefits of play may be experienced in activities that are not defined by adults as play (e.g., activities involving choice or engaged in “for fun” but that are not necessarily observable to adults as play), and some may be unique to play (e.g., role play). These are key questions for future research. We suggest that play and related activities are most likely to be beneficial to the development of culture-specific executive function skills when children have choice and their activities are informed by cultural values, norms, and practices.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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