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Fantasy orientation constructs and related executive function development in preschool: Developmental benefits to executive functions by being a fantasy-oriented child

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Abstract

This study explored unique constructs of fantasy orientation and whether there are developmental benefits for fantasy-oriented children. By age 3, children begin developing executive functions, with some children exhibiting high fantasy orientation in their cognitions and behaviors. Preschoolers ($n = 106$) completed fantasy orientation measures and executive function tasks, including parent and teacher questionnaires. Principal Component Analysis revealed four specific constructs within fantasy orientation (FO). Relations were examined between children's FO constructs and executive functions to determine if developmental benefits exist with being fantasy-oriented. Hierarchical linear regressions suggested that certain FO constructs are uniquely related to specific executive functions, such that there are potentially specific developmental benefits to being a fantasy-oriented child (i.e., inhibition and attention shift positively related to fantastical cognitions).

Keywords

attention shift, executive functions, fantastical entities, fantasy orientation, fantasy/reality distinction, imaginary companions, inhibitory control, pretend play

Research has discovered individual differences in children's engagement in fantasy. Some children are more reality-focused, engaging in more realistic play and not creating imaginary companions, whereas other children are more fantastical, engaging often in pretend play and creating imaginary companions (Sharon & Woolley, 2004; Singer & Singer, 1981, 1990; Taylor, 1999; Taylor & Carlson, 1997; Taylor, Cartwright, & Carlson, 1993). Openness to fantasy is a dimension of the openness personality trait, seen across ages (McCrae, 1993). Although the adult literature has investigated relationships between personality traits and intelligence (John & Srivastava, 1999), little developmental research has explored whether children's developing cognitive skills may be related to their fantasy orientation. Naturally, fantasy-oriented children participate more in pretense activities that utilize their developing cognitive skills (e.g., executive functions). For example, children use executive functions such as inhibitory control to suppress a thought and replace it with an alternative such as imagining their bedroom as a tree house in the rainforest. Attentional shift occurs when switching back and forth between fantasy and reality. Additionally, working memory allows children to remember which context they are playing in and to help them recall the appropriate play scripts. For these reasons, researchers have speculated that there is a developmental advantage to being a fantasy-oriented child (Sharon & Woolley, 2004; Taylor & Carlson, 1997), but research is needed to empirically investigate these relations.

Fantasy orientation

Fantasy orientation is a term that describes an individual's tendency to think and play in a fantastical world (Sharon & Woolley, 2004; Singer & Singer, 1990; Taylor, 1999; Taylor et al., 1993). Fantasy orientation seems to be an individual difference that is stable throughout childhood and even into adulthood (Woolley, 1997). Some children are more reality-oriented, whereas others are more fantasy-oriented. Children who are highly fantasy-oriented often engage in pretend play, explain their world through fantastical entities, such as referring to their bedroom as a fairy's castle, and sometimes even have imaginary companions. Measures of fantasy orientation assess children's creation of imaginary companion(s), tendency to engage in pretend play, and involvement of fantastical entities in their world (Taylor, 1999). Fantasy orientation can be assessed through child interviews as early as age 3 when children begin distinguishing fantasy from reality (Estes, Wellman, &

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Woolley, 1989; Sharon & Woolley, 2004; Wellman & Estes, 1986; Woolley & Wellman, 1990). Additionally, children's fantasy orientation can be observed in their play. Researchers, parents, and teachers observe great individual differences in children's fantasy orientation and play. Children who score low on fantasy-orientation measures often use real items in their play, such as building with blocks and playing board games, whereas children who score high on fantasy orientation measures often involve fantastical story lines, impersonations, and imaginary companions in their play (Singer & Singer, 1981).

Because of the individual differences exhibited in children's fantasy play, researchers have speculated that fantasy orientation is an umbrella term for several related thoughts and behaviors, including imaginary companions, role play, interest in fantastical toys and games, belief in fantastical entities, etc. Children who have been classified as high fantasy-oriented may participate in many of these behaviors, but not all. These individual differences may account for some of the inconsistent reports of fantasy orientation correlates, such as improved theory of mind and fantasy/reality distinction (Boerger, Tullos, & Woolley, 2009; Dierker & Sanders, 1996; Prentice, Manosevitz, & Hubbs, 1978; Sharon & Woolley, 2004; Singer & Singer, 1981; Taylor et al., 1993; Woolley, Boerger, & Markman, 2004). Thus, in addition to investigating whether fantasy orientation is related to executive function development, a goal of this research was to assess whether fantasy orientation is comprised of several constructs, and whether these sub-constructs differentially correlate with executive functions.

Executive functions

Executive functions (EF) are higher order, cognitive processes that assist in recognition and control of an individual's thoughts and actions (Carlson, 2005; Reed, Pien, & Rothbart, 1984). Executive functions are controlled by the prefrontal cortex and are instrumental in facilitating goal setting, self-planning, working memory, attention, and inhibition, which may be the most essential cognitive attainment in early childhood (Bialystok & Craik, 2010). There are various tasks that measure executive function development in childhood.

One executive function that develops during the preschool age is inhibitory control. Inhibitory control is defined as an individual's ability to stop or prevent an automatic, prepotent response and initiate an alternative response (Stroop, 1935; Wright, Waterman, Prescott, & Murdoch-Eaton, 2003). Prepotent responses are responses or actions that are well learned by an individual, have been solidly reinforced, and are automatically retrieved. Inhibitory control can be observed and measured as early as 3½ years old with the majority of its development occurring by age 6 (Diamond & Taylor, 1996). Measures of inhibitory control evaluate two main types of inhibition: (1) behavioral inhibition and (2) cognitive inhibition. Additionally, inhibitory control tasks differ as to whether they only ask children to delay an automatic response, or whether they present a conflict that requires both a delay and a subsequent alternate action. For example, the gift task (Kochanska, Murray, Jacques, Koenig, & Vandegeest, 1996) measures behavioral inhibition by assessing children's ability to delay self-gratification (e.g., suppressing the desire to peek at the gift being wrapped). Alternatively, the Animal-Stroop task (Wright et al., 2003) measures cognitive inhibition by assessing an individual's ability to suppress an automatic response (e.g., facial recognition of animal), and instead replace it with an alternative response (e.g., naming animal's body).

Working memory is a second executive function that refers to an individual's temporary mental storage that allows one to manipulate information to process arduous cognitive tasks (Baddeley, 1992). There are various tasks that measure working memory, such as the Backward Digit Span task (BDS; Halford, Maybery, & Bain, 1988). In this task, individuals hear digits read aloud and are asked to repeat them backward.

Attentional shift is a third executive function that consists of an individual's ability to manage attention sources and shift attention from one dimension to another dimension. There are various tasks that measure attentional shift, such as the Standard Dimensional Change Card Sort task (Standard DCCS, Frye, Zelazo, & Palfai, 1995; Zelazo, Müller, Frye, & Marcovitch, 2003). The purpose of the Standard DCCS is to examine how well participants perform when switching from one set of rules to another set of rules (e.g., switching cards sorted by color to sorting by shape).

Purpose of the current study

This study had two primary aims: first to investigate whether fantasy orientation measures comprise several constructs, and second to investigate whether these FO constructs individually correlated with executive functions. Researchers have speculated that fantasy-oriented children might have better control of executive functions because they switch between fantasy and reality so often (Estes et al., 1989; Golumb & Kuersten, 1996; Morison & Gardner, 1978; Woolley & Wellman, 1990, 1993). For example, children who are engaging in pretend play switch in and out of pretense when their play is interrupted. When they switch, they use inhibitory control to impede using pretend play scripts in real life. Children also have to shift their attention between their pretend play partner and the interrupter. Additionally, they use working memory to recall the rules of pretend play versus rules of real life. Thus, fantasy-oriented children might have more opportunities to practice executive functions, thereby displaying better executive function development than their peers.

Method

Participants

Participants were 106 preschool children who averaged 4 years and 11 months ($M = 59.30$, $SD = 6.25$; range = 48.4 months–74.5 months; 50 females and 53 males). Three participants were excluded from the sample because of incomplete sessions. Of the children, 73% were Caucasian, 23% were African American, and 4% were not specified. With regards to family income, 32% of the families had annual incomes less than $24,999, 50% ranged from $25,000 to $64,999, and 18% reported incomes of more than $65,000. Children were recruited from preschools in the Southeastern region of the United States.

Procedure

Children were individually interviewed for approximately 1 hour. All sessions were videotaped and consisted of the following measures, which were administered following the instructions provided in the referenced citations: two fantasy orientation interviews, a behavioral inhibitory control task, a cognitive inhibitory control task, a working memory task, an attentional shift task, and a task assessing receptive vocabulary. All measures were counterbalanced. Additionally, parent

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Table 1. Means and (standard deviations) of fantasy orientation constructs and executive function tasks.

	Mean (SD)	Overall range
Fantasy orientation constructs		
Cognitions		
IPP Talk	.53 (.50)	0–1
IPP Think	.78 (.78)	0–2
Entities		
Imaginary companion	.28 (.45)	0–1
Fantastical figures	3.86 (1.59)	0–7
Toys & games		
IPP Toys	1.21 (.59)	0–2
IPP Games	.75 (.78)	0–2
Pretense		
IPP Animal	.77 (.45)	0–2
IPP Person	.61 (.49)	0–1
Executive function tasks		
Animal-Stroop		
Matching reaction time %	1.84 (.57)	1.10–4.6
Stroop reaction time %	3.12 (.96)	1.61–7
Matching errors	1.36 (1.50)	0–7
Stroop errors	3.39 (2.38)	0–11
Gift task		
Attempt to peek	1.33 (.81)	0–2
Amount of peeks	1.23 (2.23)	0–12
First peek latency (seconds)	45.58 (19.14)	3–60
Card sort (SDCCS)		
Incorrect pre-switch	.33 (1.25)	0–9
Incorrect post-switch	1.05 (2.49)	0–18
Backward Digit Span (BDS) task	1.14 (1.07)	0–4

Note. $N = 103$.

and teacher questionnaires reported demographic information and children's fantasy behaviors and beliefs. The following are details about the measures and questionnaires.

Fantasy orientation measures. To measure children's fantasy orientation, Taylor and Carlson's (1997) Impersonation Interview, Singer and Singer's (1990) Imaginative Play and Predisposition Interview, and Taylor and Carlson's (1997) Imaginary Companion Interview were administered. These interviews asked children to report about the fantastical or realistic nature of their play, thoughts, pretense engagement, imaginary companions, and belief in fantastical entities. Higher scores indicate greater fantasy orientation. The parent and teacher of each child separately completed questionnaires that asked about children's beliefs in fantastical entities such as Santa Claus and the Tooth Fairy, and asked teachers/parents to rate children's overall fantasy orientation on a scale from 1–5 (Gilpin, 2009), with 1 indicating "strongly interested in reality (e.g., play sports)," to 5 indicating "strongly interested in fantasy (e.g., often engages in pretense, enjoys fantastical books, etc.)." Taylor and Carlson's (1997) Imaginary Companion Interview assessed whether or not children had imaginary companion(s), including invisible and personified objects/entities.

Executive function measures. To assess children's behavioral inhibition, each child participated in the *Gift task* (Kochanska et al., 1996). This task asked children to wait for 60 seconds and not peek while a gift was being wrapped for them. During the gift task, children's behavioral inhibition was measured in 3 ways, children's: (1) attempt to peek, (2) amount(s) of peeking, and (3) latency to first peek, if at all. Poorer behavioral inhibition skills were evident in more attempts to peek, more amounts of peeking, and lower latency to first peek.

To measure children's cognitive inhibition, children completed the *Animal-Stroop task* (Wright et al., 2003). Children were shown four counterbalanced blocks of 24 trials each (96 trials total), depicting animals (i.e., cow, duck, sheep, pig) with matching or mismatched (stroop) heads and bodies. Two of the blocks contained only matching images, and the other two blocks contained randomized stroop and control images. In all trials, children were instructed to name the animals' bodies, rather than the animals' faces, requiring children to inhibit their automatic response of facial recognition. Children were reminded of the instructions once at the beginning of each block, but were not prompted further. Both children's mean response time and their number of errors were recorded independently for the matching and stroop trials. The difference between the stroop and matching trials' reaction times and errors were calculated as percentages $\{[(\text{stroop-matching})/\text{matching}] \times 100\}$. Higher percentage scores indicated poorer cognitive inhibitory control, whereas lower percentage scores indicated better cognitive inhibitory control.

To measure children's attentional shift, they participated in the *Standard Dimensional Change Card Sort task* (Standard DCCS; Frye et al., 1995; Zelazo et al., 2003). In this task, children were given a set of cards that varied by two colors and two shapes (e.g., blue/red stars/squares). Children were asked to sort the cards first by color and then by shape or vice versa. Children only participated in each sort (i.e., color and shape) once. If the rules were not clearly understood, the experimenter reminded the children of the rules ($n = 6$) and provided feedback during pre-switch for the first 2 card sorts. Once children correctly sorted 5 cards consecutively, the experimenter provided the new set of rules. The number of cards that children sorted post-switch was tallied until children sorted correctly five cards consecutively. Scores indicate the number of incorrect card sorts the child sorted in order to sort 5 cards correctly consecutively. Lower scores indicate better attention shift performance (i.e., fewer incorrect card sorts). Note that both the pre- and post-switch tallies were recorded in the event that it was necessary to control for pre-switch performance. In this sample only a small subset of participants ($n = 6$) had 1 or more incorrect pre-switch card sorts after the instructions were explained, so pre-switch scores were not controlled for in the reported analyses.

To measure working memory, children completed the *Backward Digit Span task* (BDS; Davis & Pratt, 1996). The experimenter said a series of digits (0-9) (e.g., "5–2–4") and children were asked to repeat the digits backwards (e.g., "4–2–5"). Series started with two digits and increased one digit per series until the child was not able to repeat a series correctly. Scores indicate the number of digits a child correctly recalled, with higher scores indicating better working memory performance.

Results

First, items on fantasy orientation measures were examined to identify distinct constructs of children's fantasy orientation. Secondly, relations between children's fantasy orientation (i.e., fantasy orientation constructs) and performance on executive function tasks were explored to examine whether there were developmental (i.e., executive function) benefits to being fantasy-oriented. See Table 1 for means and standard deviations of the reported measures.

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Table 2. Hierarchical linear regression results of children's fantasy orientation components compared to performance on executive function tasks (ß reported).

Executive function tasks	Fantasy orientation components			
	Cognitions	Toys & games	Entities	Pretense
Animal-Stroop task: Reaction time %	3.247	−6.452	−11.445*	3.556
Animal-Stroop task: Errors	.001	.549*	469†	−.295
Gift task: Amount of peeks	−.003	.001	−.097	.101
Card sort (SDCCS) task: Post-switch	−.555*	.327	−.275	.042
Backward Digit Span (BDS) task	.046	-.273*	−.114	.098

Note. $N = 103$; * $p < .05$, † $p < .10$. Age in months was controlled for with all executive function task regression analyses, PPVT standard scores were controlled for with BDS ($r = .279$, $p = .005$) and sex was controlled for with Pretense ($r = -.246$, $p = .013$).

Fantasy orientation constructs

To categorize children's fantasy orientation into distinct components, a Principal Components Analysis (PCA) with varimax rotation was performed to assess which fantasy orientation items clustered together to form separate FO constructs. The scree plot identified 4 constructs. The first FO construct (''Cognitions'') consisted of two items from Singer and Singer's (1981) Imaginative Play and Predisposition Interview: whether children talk to themselves before going to bed and what children think about before going to bed (Eigenvalue = 1.699, factor loadings: .754 and .793). The second FO construct (''Entities'') included two components: the first question from Taylor and Carlson's (1997) Imaginary Companion Interview that assessed whether or not children had imaginary companion(s) and teachers' reports of children's belief in fantastical figures from Gilpin's (2009) fantasy orientation questionnaire (Eigenvalue = .956, factor loadings: .555 and .871). The third FO construct (''Toys and Games'') included two items from Singer and Singer's Imaginative Play and Predisposition Interview (1981) assessing children's favorite toy(s) and children's favorite game(s) (Eigenvalue = 1.224, factor loadings: .647 and .846). The fourth FO construct (''Pretense'') consisted of two items from Singer and Singer's (1981) Imaginative Play and Predisposition Interview: whether children pretend to be an animal or pretend to be a person other than themselves (Eigenvalue = 1.377, factor loadings: .677 and .722). The remaining items in the battery, such as the parent report of children's belief in fantastical figures and Singer's IPP item asking whether children pretend to be anything else, did not load onto FO constructs.

Pearson's Correlations were calculated between the four constructs. With the exception of a weak correlation between the ''Pretense'' and ''Entities'' constructs ($r = .27$, $p = .007$), no other correlations were significant. Thus each construct represented a unique aspect of fantasy orientation. Similar to analytical approaches in past fantasy orientation research (Sharon & Woolley, 2004), composite scores (i.e., mean of items' z scores) were individually calculated for these four FO constructs: ''Cognition,'' ''Entities,'' ''Toys and Games,'' and ''Pretense.'' Each of the FO constructs' composite scores was used in the following analyses to determine if individual FO constructs were related to children's executive functions.

Relations between fantasy orientation constructs and executive function skills

The following analyses examined how each fantasy orientation construct identified through PCA was related to children's executive function skills. See Table 2 for details of the regression analyses. Preliminary analyses revealed that the executive function tasks were not correlated with each other, with the exception of working memory and behavioral inhibition ($r = -.22$, $p = .03$, amount of digits recalled backwards inversely related to amount of gift task peeks). Thus, subsequent analyses compare FO constructs with individual executive function measures.

Fantasy orientation "cognitions" construct. ''Cognitions'' consisted of two items from Singer and Singer's Imaginative Play and Predisposition Interview assessing children's thoughts. ''Cognitions'' revealed a marginally significant relationship with children's attention shift skills, as measured by the Standard Dimensional Change Card Sort task. These data revealed that fantasy orientation was significantly related to attentional shift. Using hierarchical linear regression, controlling for children's age in months, ''Cognitions'' was related to children's ability to sort cards correctly post-switch in the Standard Dimensional Change Card Sort task, $F(2, 99) = 2.37$, $p = .099$, $\beta = -.555$, $p = .046$. That is, children who reported more fantasy related cognitions had better attention shift by sorting fewer cards incorrectly post rule shift during the card sort task.

Fantasy orientation "entities" construct. ''Entities'' consisted of two items, which included children's reports of whether or not they had an imaginary companion and teachers' reports about children's belief in fantastical figures. ''Entities'' displayed a significant relationship with children's cognitive inhibition skills, as measured by the Animal-Stroop task. Using hierarchical linear regression, controlling for children's age in months, ''Entities'' was significantly related to children's reaction times during the Animal-Stroop task, $F(2, 78) = 3.21$, $p = .046$, $\beta = -11.445$, $p = .030$. That is, as scores on this construct increased (i.e., increased reports of imaginary companions/belief in more fantastical entities), children demonstrated better cognitive inhibition skills with a smaller percentage difference in their reaction times between the stroop and matching trials.

Fantasy orientation "toys and games" construct. ''Toys and Games'' consisted of two items from Singer and Singer's Imaginative Play and Predisposition Interview assessing children's favorite toy(s) and game(s). ''Toys and Games'' displayed a significant relationship with children's cognitive inhibition, as measured by the Animal-Stroop task. Using hierarchical linear regression, controlling for children's age in months, ''Toys and Games'' was related to the amount of errors made during performance on the Animal-Stroop task, $F(2, 80) = 10.46$, $p < .001$, $\beta = .549$, $p = .043$. That is, as children reported more favorite fantasy related toys and games, they made more errors during the Animal-Stroop task, indicating poorer cognitive inhibition.

Additionally, ''Toys and Games'' displayed a significant relationship with children's working memory, as measured by the Backward Digit Span task. These data revealed a significant, inverse relationship between children's reports of favorite fantasy toys and games and working memory skills. Using hierarchical linear regression, controlling for both children's age in months and receptive vocabulary (PPVT, because it was significantly correlated

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with BDS, $r = .28$, $p = .005$), "Toys and Games" was significantly related to the amount of digits correctly recalled on the Backward Digit Span task, $F(3, 97) = 6.76$, $p < .001$, $\beta = -.273$, $p = .031$. That is, as favoring fantasy toys and games increased, fewer digits were recalled in the BDS working memory task, indicating poorer working memory skills.

Fantasy orientation "pretense" construct. "Pretense" was not found to be related to any of the executive function tasks using hierarchical linear regression controlling for age in months and sex (due to its correlation with "Pretense", $r = -.246$, $p = .013$)

Additionally from these data, the gift task (behavioral inhibition measure) was not related to any of the FO constructs using hierarchical linear regression.

Discussion

There were two purposes to this study. First, to examine variation within the fantasy orientation construct, and second, to determine if these constructs uniquely relate to children's developing executive functions.

Regarding the first purpose, previous researchers have speculated that there may be individual differences in the type of fantasy orientation that children display. For example, it is possible that a child who frequently engages in fantastical toy and game activities might not have imaginary companions and vice versa. Thus it is reasonable to speculate that fantasy orientation might be comprised of several distinct constructs. As hypothesized, Principal Component Analysis revealed four distinct fantasy orientation constructs in these data: (1) Cognitions (fantastical thoughts), (2) Entities (beliefs in fantastical entities such as Santa Claus, and presence of fantastical entities such as imaginary companions), (3) Toys and Games (favorite toys and games being fantastically themed), and (4) Pretense (engaging in pretense activities such as pretending to be an animal). With the exception of a weak correlation between "Entities" and "Pretense," these FO constructs were unrelated. These distinct FO constructs support the argument that fantasy orientation is an umbrella term that encompasses multiple aspects of fantasy behaviors and cognitions. Due to inconsistencies in correlates with fantasy orientation, researchers have speculated that individual differences exist in the composition of children's fantasy orientation (Boerger et al., 2009, Dierker & Sanders, 1996; Prentice et al., 1978; Sharon & Woolley, 2004; Singer & Singer, 1981; Taylor et al., 1993; Woolley et al., 2004; Woolley & Tullos, 2008). Future research should confirm these constructs, determine if they systematically resolve inconsistencies, and seek to determine if common patterns emerge in the makeup of children's fantasy orientation constructs.

Regarding the second purpose, this study examined whether fantasy orientation is related to developmental benefits, and specifically whether these benefits differ by fantasy orientation construct. This is an important distinction because specific developmental benefits, such as executive functions, may be related to a particular fantasy orientation construct but not others. These data revealed that certain aspects of fantasy orientation might be related to specific executive functions. Namely, fantastical cognitions were shown to be significantly related to better attention shift skills (i.e., Card Sort). Additionally, beliefs in fantastical/imaginary entities were significantly related to better cognitive inhibition (i.e., Animal-Stroop reaction times). However, fantastical activities, such as having favorite fantastical toys and games, were related to poorer cognitive inhibition (i.e., Animal-Stroop errors) and poorer working memory (i.e., Backward Digit Span task). And lastly, pretense was unrelated to executive functions in these data. These findings suggest that the cognitive aspects of fantasy orientation (thinking and belief) may be related to cognitive flexibility with respect to attention shift and cognitive inhibition. In contrast, these findings also suggest that behavioral aspects of fantasy orientation may not be as related to increased cognitive flexibility.

In addition to these aforementioned results, the FO "Toys and Games" construct's relations with children's cognitive inhibition and working memory skills were inverse. In other words, as children reported favoring more fantasy-related toys and games, they made more errors during the Animal-Stroop task and recalled fewer digits during the BDS task. Although measures of fantasy orientation include children's favor of fantastical toys and games, such activities may not be rooted in the same fantastical cognitions that seem to be related to improved cognitive skills. Thus, future experimental research examining causal links may examine whether some fantastical activities involve enough fantastical cognitions for increased exercise of executive functions, as these data suggest. Additionally, it is important to note that the relationship between fantasy orientation and working memory may become clearer as children's working memory skills develop further. In preschool-aged children, the BDS task greatly taxes children's executive function resources (Carlson, 2005). Although some 4-year-olds could complete the task, there was a large floor effect, with 28% of children not able to successfully perform the task to any degree. As children's executive functions mature with age, there might be a more apparent relationship between children's working memory and fantasy orientation. Given these points, further research is needed to explore the relationship of children's fantasy orientation activities, such as toy/game preference and pretense, and their executive functions.

Additionally executive functions have been considered more unitary in childhood compared to adulthood due to their interrelated development (Wiebe, Espy, & Charak, 2008; Wiebe et al., 2011). The executive function tasks included in this study were not correlated, with the exception of working memory and behavioral inhibition, perhaps due to the limited executive function battery comprising one measure of each skill. Accordingly, we chose to present the executive function data as distinct individual skills. However, future research of executive functions in young children could explore executive functions as a composited skill rather than individual higher order processing skills (Carlson, 2005; Reed et al., 1984).

These four different constructs of fantasy orientation corroborate previous researchers' speculations that there are different components that comprise fantasy orientation (Taylor et al., 1993; Taylor & Howell, 1973). This is important because it allows for researchers to better define what fantasy orientation is and to better assess individual differences in fantasy orientation. Additionally, these components of fantasy orientation can provide clearer definitions of fantasy orientation, allowing researchers to further explore relations with developing abilities, such as executive functions, theory of mind, and socialization. For example, children who exhibit high levels of cognitive aspects of fantasy orientation, such as having an imaginary companion, might display better cognitive skills, such as narration or theory of mind (Bouldin, Bavin, & Pratt, 2002; Taylor & Carlson, 1997; Trionfi & Reese, 2009). Future research may also consider whether certain fantasy orientation constructs contribute individually to social development (Gleason, 2002;

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Mauro, 1991; Nagera, 1969; Mathis, McInnis, Pierucci, & Gilpin, 2013; McInnis, Pierucci, & Gilpin, 2013; Taylor, Carlson, Maring, Gerow, & Charley, 2004).

Interestingly, the fantasy orientation constructs that were related to better executive functions, namely inhibition and attention shift, were cognitive aspects of fantasy orientation. Fantastical thoughts, such as creating an imaginary companion or a fantastical world, may be related to the development of the cognitive aspects of executive functions like cognitive inhibition and attention shift. Thus, these data suggest that fantasy orientation may not be related to the development of executive functions globally, but rather might have specific relations to developing executive functions. Additionally, not all aspects of fantasy orientation appear to be related to executive functions. For example, in these data, it is evident that cognitive, but not behavioral, aspects of fantasy orientation are related to executive functions. This makes sense conceptually as fantastical cognitions are linked with more cognitive executive functions. These relations are supported empirically by related literatures that demonstrate that other higher-order cognitions, such as bilingualism, are also related to advances in executive functions (Bialystok, 1999, 2011; Bialystok & Craik, 2010). Research in bilingual development has shown that bilingual children, compared to monolingual children, have advanced conflict inhibitory control skills (Bialystok & Craik, 2010; Carlson & Melzoff, 2008) and better attentional shift (Bialystok, 1999) because they often switch between the two languages. Similar to bilingual children who switch between two languages, fantasy-oriented children exercise executive functions when they switch in and out of pretense.

One important discussion point is the direction of relations between executive functions and fantasy orientation. Although the present data are only correlational, we have suggested that fantasy orientation possibly may influence specific developing executive functions. However, given that the direction of these relations remains unknown, it is also possible that children with better-developed executive function skills engage in more fantasy-oriented activities. This seems less likely, however, given the stability of fantasy-orientation throughout the lifespan versus the development of executive functions to maturity throughout childhood. Fantasy orientation is measured as a part of the openness personality trait with research suggesting lifespan stability; for example, adults with highly creative jobs, such as fiction writers, reported having imaginary companions during childhood (McCrae, 1993; Taylor, Hodges, & Kohányi, 2002). Conversely, research on executive functions demonstrates their developmental maturation as well as their malleability via experience (Bialystok & Craik, 2010; Diamond & Taylor, 1996; Gerstadt, Hong, & Diamond, 1994; Zelazo et al., 2003). For example, children who are bilingual develop executive function skills earlier than peers (Bialystok, 1999). Thus, we suggest that fantasy-oriented children exercise their cognitive flexibility more which might be, indirectly or perhaps causally, related to their developing executive functions. However, future longitudinal and experimental research is needed to shed light on the exact nature and directionality of these relations (c.f. Lillard et al., 2012).

In conclusion, these data suggest that fantasy orientation is comprised of distinct components, and that children's natural tendency to engage in components involving fantastical cognitions, but not fantastical activities, may be related to the development of specific cognitive skills, such as cognitive inhibition and attention shift. Thus, parents and teachers should not unduly discourage children's fantasy and imagination, as they may be related to the development of executive functions and other emerging skills. Additionally, relations between fantasy orientation and executive functions could possibly have long-term effects throughout the course of the lifespan. For example, high imagination during early childhood could be related to developmental benefits that remain apparent throughout the life span, such that stimulation from imagination in childhood could be related to the delay of dementia in adulthood (Bialystok & Craik, 2010; Stern, 2002). Additionally, fantasy orientation in adults, as observed by adults having creative hobbies and jobs, could be related to increased cognitive and behavioral performance by protecting individuals from age related decline. Future studies should explore whether childhood fantastical cognitions are related to any immediate and long-term cognitive benefits, and whether or not having a(n) creative/imaginative outlet as an adult is also related to improvement in executive functions.

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