CHILD DEVELOPMENT PERSPECTIVES

Young Children's Thinking About the Future

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ABSTRACT—***Thinking about the future has become a focus of study in both adult and childhood cognition. Of special interest is the capacity to mentally pre-experience future events that involve the self (or* episodic future thinking*) and how this capacity relates to other aspects of cognition, including memory. In this article, I review developmental psychologists' approaches to exploring this construct in preschool-age children. I highlight the strengths and limits of these approaches and suggest ways to further develop tasks that test future thinking. I then provide a brief overview of theories arguing for close links between episodic future thinking and memory, and episodic future thinking and theory of mind, along with relevant developmental data. I conclude by discussing challenges and directions in this area of research, including the need to identify more clearly the behaviors that reflect future thinking ability and when these develop.***

KEYWORDS—*future thinking; prospection; development; memory; theory of mind*

> If we retained all our other marvelous mental capacities but lost the awareness of the future time in which our lives are going to be played out . . . we would no longer be human as we understand humanness (1, p. 17).

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Few would argue with Tulving's (1) claim that thinking about the future is an essential part of what makes us human. Yet traditionally, more attention has been devoted to the study of memory than to the study of future thinking. However, this is changing, and the past decade has seen numerous studies of human and nonhuman animals' capacity to mentally project into the future, what has been termed *episodic future thinking/thought*, *episodic foresight,* and *prospection*. Moreover, research showing cognitive and neural overlap between adults' capacity to mentally re-experience the past (i.e., episodic memory) and pre-experience the future (i.e., episodic future thinking/prospection; e.g., 2, 3) has extended theories about memory, including the idea that past events comprise a database from which we construct possible futures (e.g., 4).

However, before the past decade, psychologists had begun to hint that episodic future thinking and future-oriented processes, more broadly, were critical to young children's development (e.g., 5–8). For example, Haith (7) argued that thinking about the future is fundamental to the emergence of planning, and Thompson et al. (8) pointed out the adaptive significance of children's ability to overcome conflict between their current and future desires (i.e., *future-oriented prudence*). These views have undergone significant theoretical and empirical elaboration (e.g., 9, 10) and dozens of articles, along with a special issue (11), have been published about young children's ability to think about the future.

In this article, I focus on research about the development of episodic future thinking in early childhood, though recent work with older children has also emerged (e.g., 12, 13). Although we still lack consensus about a precise term to describe children's ability to mentally project the self into the future, in this article, I use *episodic future thinking* (or sometimes just *future thinking*). I first outline *what* episodic future thinking is (i.e., how it has been defined) and *when* it develops. Although we know more about the *when* than the *how,* I also discuss mechanisms said to enable children to conceive of the future and their future selves. I conclude by addressing challenges in this area of research and suggest directions that may help researchers overcome some of these challenges.

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FUTURE THINKING: THE WHAT AND THE WHEN

Broadly defined, episodic future thinking is the capacity to mentally pre-experience future events that involve the self (e.g., 5). For example, it is reflected in children's abilities to envision what they might do at the park tomorrow, bring an item (e.g., teddy bear) that they may need later to grandma's, and save candy or toys for tomorrow or the next day. Although episodic future thinking may be involved in acts of imagination, planning, and prospective memory (i.e., remembering a future intention), it is conceived as a distinct capacity since these acts neither necessarily entail a mental projection of *self* into the future, nor are they always involved in episodic future thinking (10, 14); for example, a young child may be able to envision herself at the park (e.g., playing on the swings) without necessarily having the ability to *plan* for this event.

VERBAL METHODS

Consistent with this broad definition of episodic future thinking, the first attempts to study its development entailed asking children to verbally report future events involving the self (e.g., 15–17). For example, in one study, O'Neill and I (16) told 3-year-olds that they were going on a trip and needed to select items (e.g., Band-Aids, juice, etc.) to bring. When we asked children to explain their choices (e.g., "How come you chose Band-Aids?"), roughly 40% of their explanations referenced the future (e.g., "I might get hurt"), suggesting a nascent awareness of future possibilities in these young children.

In another study (17, experiment 2), researchers used a different approach, asking children to predict something that they would do *tomorrow*, and asking parents to rate the accuracy of their children's statements. Whereas the 4- and 5-year-olds' responses were relatively accurate (69% and 63%, respectively), those of the 3-year-olds were significantly less so (31%), suggesting that children's capacity to talk about future events improves between ages 3 and 5 (see also 15). In contrast, in other studies, 3-year-olds were more accurate when they were asked about specific events (e.g., what they would eat for breakfast the next morning; e.g., 18) or about events generated by a parent (e.g., "Tomorrow your mum said that you're going to the farmer's market. What can you tell me about this?" 19). This may be because both of these approaches scaffold or cue children's reports about the future, an interpretation that is consistent with research on episodic memory suggesting that giving children retrieval cues aids their recall (20).

Although assessing children's episodic future thinking using verbal reports offers advantages (e.g., ecological validity), children's competence may be masked by inadequate language abilities and understanding of temporal terms (e.g., *later*, *next week*; 20). To address this limit, researchers have developed paradigms that rely on behavioral rather than verbal responses (though a certain level of verbal comprehension is still required) which, in turn, have influenced the definitions and criteria argued to characterize future thinking ability.

BEHAVIORAL METHODS

To date, Suddendorf et al. and Tulving have advanced the most influential criteria that tasks to measure future thinking ability need to fulfill (1, 21, 22), perhaps illustrated most effectively by the spoon test (1). A young girl dreams about attending a party where a delicious chocolate pudding is served but, because she has no spoon, she cannot have any. The next night, before going to sleep, she takes a spoon to bed with her to avoid re-experiencing her disappointment. This behavior (i.e., getting the spoon) is said to be a convincing example of foresight because the act of getting the spoon is not cued by the immediate environment and addresses a need that will arise only in the future. Moreover, the problem itself (i.e., being at a party with chocolate pudding and no spoon) is assumed to be a novel one that the child would not have encountered before (1, 22–24).

Some of the most popular methods to test children's future thinking are based on the spoon test. For example, in one study (21), 3-, 4-, and 5-year-olds were given a puzzle board with no puzzle pieces (similar to the girl who has no spoon for the pudding) in one room. After several minutes, children visited another room. They were then told that they were returning to the first room and were presented with a set of items, including puzzle pieces, and instructed to choose one item to bring back to the first room. The control condition was identical except that the first room was empty (i.e., no puzzle board). Only 4- and 5-year-olds chose the puzzle pieces significantly more often in the experimental condition than in the control condition, suggesting that they had learned from past experience and adjusted their anticipatory behavior accordingly.

In the handful of studies that have used variants of the spoon test, by age 4, children selected the correct item to address a future problem at above-chance levels (see also 25 for a review of studies that used the spoon test in nonhuman animals and in children). However, in other studies (24, 26), memory (e.g., forgetting the original problem) rather than foresight, per se, accounted for 3-year-olds' failures on this task. More research is needed to determine the extent to which processes *specific* to future thinking lead to success on this kind of task. Researchers may also need to develop tasks that capture more effectively children's ability to mentally *pre-experience* a future episode since children's correct item choices in spoon tests may primarily reflect their knowledge about the future (e.g., puzzle boards require puzzle pieces; 27).

In an attempt to assess this pre-experiential component, one study (27) devised a task that not only required children to select items for future use but asked them to choose items needed in a particular spatial location/perspective within a future episode, since envisioning oneself in the future usually includes spatial information (e.g., imagining yourself sitting

across from, rather than beside, your friend at dinner tomorrow). Accordingly, after playing a tabletop soccer game, 3-, 4-, and 5-year-olds were told that they would play the game again the next day—but from a vantage point they had not experienced (i.e., the other side of the table). To do this, children had to recognize that they would need a box to stand on so they could reach the table (a straw to play the game was the other required item). Only 5-year-olds performed significantly above chance on this task, possibly because of the increased spatial demands or because children needed to select two, rather than one, necessary items.

Another behavioral approach by my colleagues and I (28) is based on a study that showed planning in scrub-jays, a blue, white, and gray jay that lives in the western United States (29). In our paradigm, 3-, 4-, and 5-year-olds visited each of two rooms twice. Only one room contained toys. Children were then brought to another location and told they would return to visit these two rooms when they were a year older. They were then shown a box of toys and asked where they would like to put them for next time. Only 4- and 5-year-olds chose the no-toy room significantly more often than chance. Because this task requires thinking ahead about *where* an item is needed rather than *what* item is needed, it seems less likely that children can succeed by associating the correct item (e.g., puzzle pieces) with the past problem (e.g., puzzle board), or because the correct item serves as a cue to or reminder of the problem.

In most of the behavioral tasks described thus far, future thinking improved significantly between ages 3 and 5. But these tasks are limited because they ask children to decide for a future that is not appreciably different (or removed) from the present (cf. 23). For example, selecting puzzle pieces to bring to an adjacent room or putting toys in an empty room are the correct responses whether children are deciding for now or sometime in the future. Researchers need to develop tasks in which an item that is useful now is not the same item that will be useful in the future. For example, children could be told about a scenario that requires sunglasses now (e.g., going outside to find a treasure during the day), but a flashlight later (e.g., going outside to find a treasure at night). However, such a design would need to ensure that children cannot succeed based on knowledge that sunglasses are appropriate for daytime and flashlights for nighttime, for example.

This sort of manipulation would paint a broader picture of the contexts that tax young children's ability to make adaptive decisions about the future, and would also address the issue of partial knowledge on any given task (cf. 10). For example, 4-year-olds may succeed only when the future they are asked about does not conflict with the present, whereas, by age 5, such conflict does not pose difficulty. However, this may hold true only insofar as the conflict does not pertain to physiological states (e.g., thirst): In a recent study, 3- and 7-year-olds indicated that they liked pretzels and were given some to eat. After consuming the pretzels, they were asked what they would prefer to have the next day: pretzels or water. Even 7-year-olds predicted incorrectly that they would want water as opposed to pretzels tomorrow when they were thirsty today (30). The authors point out that this occurred despite children having indicated earlier that they liked pretzels and previous data showing that most children who are not thirsty prefer pretzels to water when their choice is for "right now."

FUTURE THINKING: THE HOW

One influential theory about the mechanisms underlying future thinking ability is that we flexibly recombine details from past events to simulate future episodes (e.g., 4, 31). This theory is supported by research with adults in which people's ability to remember past events overlaps cognitively and neurally with their ability to pre-experience future ones (e.g., 2), and by studies in which children's abilities to recount what they did yesterday correlate with their abilities to predict what they will do tomorrow (e.g., 17). However, we know less about how both *semantic* memory (our knowledge about the world) and episodic memory interact to allow children to mentally project themselves into the future (e.g., 32).

Other cognitive capacities that are said to be necessary for or related to thinking about the future and mental time travel, more broadly, include theory of mind and executive functioning (e.g., 31, 33), temporal reasoning (e.g., 34), and language/narrative ability (20). Of these, the link between theory of mind and thinking about the future has received the most attention, with some arguing that a core brain network is activated when people self-project into the future (and the past) and into the minds of others (i.e., theory of mind; 33).

My colleagues and I tested whether episodic future thinking (e.g., 15, 17) and theory of mind (e.g., false belief) tasks were related in 3-, 4-, and 5-year-olds (35). Although children's performance improved with age on most tasks, after controlling for age and language, performances on the theory of mind and episodic future thinking tasks were unrelated. We argued that this was because our episodic future thinking tasks did not require the same kind of perspective shift (or self-projection) as the theory of mind tasks. For example, envisioning what one might do tomorrow (e.g., 17) may not require children to explicitly contrast their current and future perspectives in the same way that a false belief task requires children to explicitly contrast their perspective (e.g., belief that object is in location A) with the conflicting perspective of another person (e.g., belief that object is in location B). As such, researchers may need to match more effectively the demands of the episodic future thinking and theory of mind tasks.

LOOKING AHEAD: CHALLENGES AND DIRECTIONS

One of the biggest challenges in this area of research is reaching a consensus about the criteria to assess future thinking and,

accordingly, the methods to test it. Although the spoon test is a move in the right direction, researchers should continue to develop methods—including ones inspired by behaviors in naturalistic settings—that reflect the broad nature of future thinking ability. Researchers may want to create a developmental taxonomy that outlines various future-oriented behaviors, when they develop, and whether these particular developments reflect the maturation of other related processes (e.g., theory of mind; cf. 36). The ensuing picture will likely be complex but will also shed light on the behaviors and underlying processes that reflect humans' capacity to think about the future. Such a taxonomy may also help address the extent to which *episodic* future thinking is dissociable from what has been termed *semantic* future thinking (e.g., 5), though certain forms of future thinking may also fall on a continuum between semantic and episodic (e.g., 37, 38).

Most of the work on episodic future thinking has focused on the self, which is logical because the *self* figures prominently in all accounts of this ability. Yet for this very reason, researchers should determine whether thinking about one's own future differs from thinking about the future of another person. Although predicting strong overlap between thinking about one's own versus another person's future (e.g., 33) is valid theoretically, in recent work in my lab (39; see also 27), children predicted changes in another child's future preferences more accurately than their own. This suggests that different underlying processes may characterize reasoning about future *preferences* in the self and in another person.

A related theme is the extent to which children's current behavior may reflect thought about the future welfare of others. For example, by age 2, children behave empathically (e.g., 40), so we might expect that something akin to future-oriented empathy (e.g., moving a scary object that might frighten a younger sibling) emerges early and is worth studying.

Thinking about the future and acting with the future in mind are highly adaptive abilities that have gained attention in psychology, including the study of human development. Although much remains to be determined about the behaviors that reflect future thinking and when these develop, converging evidence suggests that, by age 4, children act in a way that shows concern for both their current and future selves.

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