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Planning in 3-Year-Olds: A Reflection of the Future Self?

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The ability to project oneself into the future in order to plan effectively, and to contemplate possible courses of action, is fundamental to one's existence. Yet few studies have had as their focus the development of children's ability to engage in this process. What we mean when we speak of children's ability to project themselves into the future is, specifically, how children begin to anticipate future events in which the self is mentally transported. This ability has been characterized as part of what comprises a *temporally extended self* (Moore, 1997, but see also Tulving, 1985; Tulving, Schacter, McLachlan, & Moscovitch, 1988; and Povinelli, 1995) and, specifically, with respect to the domain of the future, a *temporally extended future self* (hereafter referred to as the *future self*). We could contrast the notion of a future self with having knowledge of the future that may not be explicitly linked to the self. This latter type of knowledge may be more of a function of recognizing the pattern of past events and applying this knowledge to the future. For example, suppose you ask a 3-year-old child what she'll be doing for her birthday, and she replies, "I'm gonna eat cake." Is this reply reflective of her ability to place herself in this future event of "eating cake," or is she simply reciting this event as part of an impersonal script that describes what typically happens at birthday parties? Although, in theory, one can think about these two alternative notions of thought concerning the future, to our knowledge this distinction has rarely, if ever, been drawn. However, this same sort of distinction has been made with respect to past events.

For example, some authors (see Tulving, 1985; Tulving et al., 1988; Perner & Ruffman, 1995) have referred to this distinction as the difference between *knowing* versus *remembering* past events. The former is part of what Tulving (1985) characterized as semantic memory, whereas the latter is a function of the episodic memory system. For instance, a person can *know* that he or she used to drive a blue truck, without necessarily *remembering* any specific instances in which he or she did so (Tulving et al., 1988). Thus, if this distinction exists with respect to past events, it is not implausible to hypothesize that a similar distinction also exists with respect to future events. To determine whether this may be the case, we begin this chapter with a review of the literature that is related to children's understanding of the future.

Only a few studies exist that have had as their focus children's understanding of the future. These studies have used widely varying methodologies, which makes it difficult to directly compare the findings of each. At one end of the spectrum are naturalistic studies in which the focus has been children's talk about the future; at the other end are experimental studies that have looked at children's performance in delay-of-gratification and sequencing paradigms. Furthermore, not all of these studies have specifically tapped an understanding of the self with respect to the future. Despite this, we begin by looking first at the experimental work in this area and then at work that is more naturalistic.

As stated, experimental work has tended to examine children's understanding of the future in sequencing and delay of gratification tasks. There are many studies that have examined the development of sequencing abilities (e.g., Bauer & Thal, 1990, Friedman, 1990; O'Connell & Gerard, 1985); but only a few have explored children's ability to sequence future events. More typically, in infants, for example, researchers have looked specifically at their performance in elicited imitation paradigms, in which sequences of events are modeled with props by an experimenter, in front of the infant, and then infants are given the props and encouraged to imitate these events. Although the sequencing of past events is likely relevant to the ability to sequence possible future ones, such studies tell us little about children's ability to think into the future.

Friedman (1990), however, examined forward-sequencing abilities in preschool children. Specifically, he looked at how preschoolers begin to sequence events that are part of their daily routine. For example, Friedman gave children a forward-ordering task in which they had to place four cards that depicted "waking up," "eating lunch," "eating dinner," and "going to bed," in the order in which they occur in the day. Three-year-old children were below chance level in their ability to complete the task correctly; only by 4 years of age were children's performances beginning to exceed chance. However, it is not clear whether the difficulty that the 3-year-olds experienced was due to an

inability to project themselves into the future or whether other factors, such as a limited knowledge of the pattern of daily events, may have contributed to their difficulty.

Alternatively, Thompson, Barresi, and Moore (1997) examined how children between 3 and 5 years of age begin to deal with future situations in a delay-of-gratification paradigm. So, for example, in one of their experimental conditions, labeled "delay of self-gratification," children were given the option of obtaining one sticker immediately or two stickers in the future. Only by 4 and 5 years of age did children begin to prefer the larger delayed reward rather than the smaller immediate one. Thompson et al. suggested that the 3-year-olds were impeded in part "by the introduction of a situation in which they were required to imagine future desires which conflicted with their current desires" (p. 207). Yet it is unclear whether the 3-year-old children in this study were truly incapable of placing themselves in the future, or whether this ability may have been confounded with the ability to delay gratification. For example, obtaining one sticker immediately may simply have been more desirable for children than waiting to obtain two.

If we now shift our focus to naturalistic data, we find that children as young as 2 years of age begin to talk about both the past and the future (Anglin, Ward, & White, 1999; Eisenberg, 1985; Nelson, 1989; Sachs, 1983). Sachs (1983) looked at the development of displaced reference in her firstborn child, Naomi, when Naomi was 17–36 months of age. Between 26 and 31 months of age Naomi began to talk both about events that had happened earlier in the day and about those that would happen later in the day. Sachs noted that Naomi seemed to be particularly concerned with the sequencing of these future events. For example, at approximately 29 months of age Naomi produced the following utterances (Sachs, 1983, p. 15).

> Mommy's away. Coming back again.
> (at bedtime) We'll have breakfast together.
> Gotta put a bandaid on a little later.
> I gotta feel better in the morning, when we have dinner in the morning.
> We gotta drive pretty soon.
> My mom will get up pretty soon.

These utterances suggest that, even at this young age, Naomi seemed to be aware not only of the future but also of future events that would involve the self. Between 32 and 36 months of age Naomi began to make more spontaneous references to the past and the future, which included events that had occurred, or would occur, at some time beyond the scope of the present day.

Katherine Nelson (1989) also documented the use of temporally displaced speech by a 2-year-old child, Emily, and similarly found that Emily's monologues included talk about both the past and the future. For example, the following narrative was constructed by Emily when she was 28 months of age.

> We are gonna...
> at the ocean.
> Ocean is a little far away.
> baw, baw, buh (etc.)
> far away...
> I think it's...
> couple blocks ... away.
> Maybe it's down, downtown,
> and across the ocean,
> and down the river,
> and maybe it's in,
> the hot dogs will be in a fridge,
> and the fridge (would) be in the water over by a shore,
> and then we could go in,
> and get a hot dog and bring it out to the river,
> and then sharks go in the river and bite me,
> in the ocean... (Nelson, 1989, p. 66)

In the previous narrative, Emily incorporated details told to her by her father but also included her own speculations about the particulars that might occur. For example, in talking about this event to Emily, her father had mentioned hot dogs but had not included information about refrigerators. Furthermore, Emily's mother reported that Emily had had no previous experience with the beach, or with eating hot dogs prior to her construction of this narrative. It is clear from her account that Emily has begun to develop a true concern for how an event that has not yet occurred will unfold.

More recently, Anglin et al. (1999) also documented, among a larger sample of 60 children, that temporally displaced speech about both the proximal and distal future shows a significant increase between the ages of 1.5 and 4.5 years. Naturalistic evidence thus suggests that by 2 and 3 years of age children engage in a substantial amount of talk about the future.

Finally, there is one area of previous research that comes closest to capturing not just an understanding of the future but the origins of the future self. Haith and Benson (1992) developed a parent-report questionnaire, the Development of Future-Oriented Processes Questionnaire, which was described by Benson (1994), to specifically examine the origins of future orientation in children between the ages of

9 and 36 months. They developed this questionnaire on the basis of preliminary interviews with mothers of 9- to 36-month-old children who were asked to provide examples of their child's behavior that seemed to suggest a nascent understanding of the future. For example, the mother of a 24-month-old boy reported the following: "One day I said to him, 'Tomorrow we are going to the zoo.' All of a sudden he ran to his room, laid down on his bed and closed his eyes—it seemed like he was thinking it would be tomorrow and we could go to the zoo when he opened his eyes" (Benson, 1994, p. 386).

The Development of Future-Oriented Processes Questionnaire provides more systematic data about the development of these types of behaviors. This questionnaire is filled out by the child's parent and contains two parts: one that focuses on the contextual factors in the family that may contribute to an understanding of the future and one that focuses on the child's behavior across various domains conceptualized as involving an understanding of the future. Questions in the family-context section seek to address parental beliefs about what the child understands about the future and parental theories of how the child will acquire knowledge about the future. Because we are more interested in the behavior of the child, we focus our discussion on the second part of this questionnaire. This section of the questionnaire assesses six domains of future understanding: Order, Routines, Planning, Expectation, Time, and Problem Solving. Parents are asked to rate the items in each of these domains on a 4-point scale that ranges from *very true* to *not at all true*. The Order domain assesses children's understanding of sequences; a sample question from this domain is, "My child understands that some things must happen before other things." The Routines domain includes items such as "My child goes through the same routine every night before bed." The Planning domain measures children's ability to prepare for the future, as captured in the item "My child does things that show preparation for the future (e.g., my child gets a toy to take to Grandma's)." The Expectation domain assesses the different types of expectations that children form from their daily experiences, for example, the item "My child knows what will happen later from the things that happen earlier." The Time domain assesses children's understanding of different aspects of time, such as the item "My child knows what later means (e.g., You can have a cookie later means not right now)." Finally, the Problem Solving domain looks at children's flexibility, goal orientation, and use of social agents in their problem solving, as captured in the following item: "My child will try to get a toy she or he wants even if it is way across the room."

In an initial study (Benson, 1994), this questionnaire was given to 68 sets of parents whose children were within 2 weeks of one of the following six ages: 9, 12, 18, 24, 30, and 36 months. The parent who spent the most time with the child was asked to complete the questionnaire; in

most cases this was the child's mother. Results from the second part of the questionnaire (i.e., child's behavior) indicated that it had successfully captured changes in behavior between 12 and 36 months of age that seemed to reflect an understanding of the future. Parents reported high levels of child behavior at 36 months of age in the domains of Expectation, Routine, Problem Solving, and Order, but only moderate levels of planning behavior and behavior reflecting an understanding of time. The authors argued that children's poorer performance in these last two domains was not surprising, because the items in the Planning domain assess children's ability to prepare for the longer term future (i.e., later in the day) and, similarly, items in the Time domain assess whether children understand events occurring up to 1 week in the future. Nevertheless, there is a substantial increase between the ages of 12 and 36 months in both of these domains, which seems to corroborate the findings from naturalistic data showing that between 2 and 3 years of age children begin to talk about the more remote future.

Our literature review suggests that in some experimental settings, 3-year-olds experience difficulty with tasks that can be framed as requiring some understanding of the future (e.g., delay of gratification). However, it is not clear whether extraneous factors may have hindered the performance of these 3-year-olds or, even more important, the extent to which each task actually tapped an understanding of the future. To date, there is not nearly enough evidence to make a firm conclusion about 3-year-old children's understanding of the future in experimental settings. Turning to more naturalistic data, the picture that emerges is that 2- and 3-year-olds, in their talk and in their behavior, are clearly beginning to display, at the very least, a rudimentary understanding of the future. Thus, we believe that it is not unreasonable to search for the roots of an understanding of the future, and of the future self, in 3-year-old children.

Before we move on to an account of our own empirical work in this area it is worthwhile to discuss a taxonomy of "future thinking" that Haith (1997) proposed. Haith pointed out that one difficulty in studying the future lies in the fact that there exists no taxonomy for talking about it. This contrasts with the domain of past thinking, or memory, in which various subcategories have been developed, including iconic memory, short-term memory, and long-term memory. Haith conceptualized future thought as involving the following four categories: (a) the continuation of a repeating past (e.g., the ability to form an expectation of what will happen next in a set of repeating events), (b) the projection of past trends (e.g., scientific models that are based on the past, but project to an unprecedented future circumstance), (c) induction from observation (e.g., forming expectations about events on the basis of the experience of others), and (d) imagination and invention (e.g., the ability to imagine events that have never occurred before). Conceptualizing the future as based on projections or inductions from past events has also

been noted by other researchers. For example, it has been argued that one of the ways in which children begin to anticipate future events is by drawing on their knowledge of scripts (Hudson, Fivush, & Kuebli, 1992; Nelson, 1991). In fact, Nelson (1991) stated that "Accounts of future events are often remarkably similar to accounts of past events, save for the temporal markers. Indeed, our expectations of future events are usually based to a large extent on our generalizations from the past" (p. 113).

Within these categorizations of future thought there is no distinction drawn between processes that involve the self to a lesser or greater extent, or even not at all. Yet we argue that this distinction is an important one to draw, and we hypothesize that thinking about the future may rely on different processes depending on whether the self is explicitly involved. Of course, we do not simply mean whether the event that is being talked about involves the self, but rather, along the lines of the distinction between "knowing" and "remembering" past events, which we discussed earlier, whether the self is projected into these events.

We draw support for this hypothesis from neuropsychological research. In particular, Tulving (1985) made some striking observations of an amnesic patient, N.N., that are relevant to the distinction concerning the involvement of the self. First, at a general level, Tulving has found that N.N. has an excellent knowledge of chronological time, so, for example, he can accurately represent the units of time and their relation to one another. It is striking, however, that his knowledge of subjective time is highly impaired, which is evidenced by his complete inability to recount what he did "yesterday" or what he will do "tomorrow." When asked questions of this nature, N.N. cannot go beyond answering them with a simple "I don't know." However, what is more interesting for the sake of our argument is the following: If N.N. is asked to recount a script—for example, a "restaurant" script—he is able to do so with ease. Yet, at the same time, he cannot recount one single past event of having gone to a restaurant! N.N. is not only unable to recall past events, but he is similarly unable to predict any future ones. When questioned about what he plans to do after leaving the laboratory, or what he will do the next day, he is unable to respond and characterizes his resultant state as "blankness." For N.N. it is impossible to conceptualize personal events, both past and future. Tulving characterized this inability as reflecting a lack of *autonoetic consciousness*, which he defined as "the kind of consciousness that mediates an individual's awareness of his or her existence and identity in subjective time extending from the personal past through the present to the personal future" (p. 1). It is clear from Tulving's characterization of N.N. that N.N.'s ability to recount a script is in a very important way *independent* from the process required to recount a personal event or to

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project a self-relevant future one. Similarly, we could conceptualize N.N. as having the ability to delineate events in time (as reflected by his ability to recount a script) but impaired in his ability to subjectively place himself in these events, either in the past or in the future.

If we focus specifically on N.N.'s difficulties with the future, what becomes apparent is his inability to engage in any sort of future planning. In fact, Tulving (1985) himself stated that "episodic memory and autonoetic consciousness lead to more decisive action in the present and more effective planning for the future" (p. 10), so indeed, it is not surprising that N.N. is unable to plan. In fact, Haith (1997) recently put forth the following thought piece: "Imagine an individual who has no comprehension of the future, and you have imagined a person who is unable to plan" (p. 28). However, given the findings with N.N., this statement may be too general; more precisely, it may be that a notion of the future *self* is what is necessary to be a successful planner.

If planning may in fact require one to project *oneself* into the future, then young children's planning could potentially reflect this ability and, as such, provide a good forum in which to investigate the development of the future self. It would intuitively seem that this would be the case, yet Haith (1997) made the surprising observation that, in the existing literature, the future is rarely discussed with respect to planning. This is in spite of the fact that young children's ability to think about the future may limit the level at which they can plan (Haith, 1997), thus making it a crucial variable to consider in any study involving planning in young children.

The literature that exists with respect to children's planning has included such diverse methodologies as the Tower of Hanoi (i.e., Klahr & Robinson, 1981), mazes (i.e., Gardner & Rogoff, 1990), searching behavior (i.e., Wellman, Fabricius, & Sophian, 1985), and navigating through a pretend grocery store (Gauvain & Rogoff, 1989). This research has typically not been carried out with children younger than 4 years of age and, as noted, has not been linked to children's understanding of the future. There are, however, some exceptions. For example, Wellman et al. (1985) stressed that engaging in a goal-directed sequence may be a necessary component of planning but does not on its own constitute planning. Rather, they argued, what is necessary evidence of planned action is the ability to "look ahead," a concept on which we touch later. What we can garner from Wellman et al.'s account is that planning involves thinking into the future in order to create a goal-directed action sequence. Thus, it would seem crucial in any evaluation of young children's planning to obtain evidence that they are in fact thinking into the future or, in other words, looking ahead.

What is also surprising in much of the planning research is that the tasks that children are given rarely require planning in a manner that stresses the involvement of the self. For example, in tasks such as the

Tower of Hanoi, it is unclear whether children view these as explicitly involving the self. Even in real-world planning tasks given to children younger than 4 years (i.e., Hudson & Fivush, 1991; Hudson, Shapiro, & Sosa, 1995) it is unclear whether the self is being tapped. For example, Hudson et al. (1995) assessed how 3-, 4-, and 5-year-old children planned for two types of events: "going to the store" and "going to the beach." These researchers were specifically interested in whether children's general event representations could support their planning and thus chose to assess children's planning in familiar situations. In addition to obtaining children's plans for going to the store and going to the beach, Hudson et al. were interested in obtaining the children's scripts of these two events. Thus, each child was assigned to either a script condition or a planning condition. More interesting for our purposes is the planning condition. In this condition, children were first provided with a model plan for going to the zoo and, after hearing this, were required to provide their own plans for going to the beach and for going grocery shopping. Results indicated that the 3-year-olds provided fewer information units (e.g., "you go there," "you swim," etc.) in their plans than did the older children, and in general their plans were found to rely heavily on scripted knowledge.

Although this task was set in a "real-world" context, there is at least one reason why the actual involvement of the self is unclear. The model plan for going to the zoo that Hudson et al. (1995) presented to children was quite similar to a script. For example, the pronoun *you* was used throughout (e.g., "You have to get up early. And you have to bring your lunch and camera. And you have to buy tickets to go in..." p. 996). The use of the pronoun *you* may have contributed to the fact that the children's plans that are provided in the Appendix of the article also predominantly included the pronoun *you*. In fact, the use of *you* in the model plan may have led children to adopt a more impersonal mode in their planning. Relating this back to the distinction with N.N., if children were in fact structuring their plans similarly to how they would structure a script, then it is unclear whether the self was truly involved. It is interesting that there is at least one example given in which a child used *I* in a plan, but because children were assigned to either a planning condition or a script condition, and not both, it would be impossible to determine whether planning and script reports differed within children in terms of pronoun use (which could potentially be taken as evidence for differing levels of self-involvement when formulating a plan). Once again, it is difficult to determine how much of children's planning in this study was a genuine reflection of their ability to place themselves in these plans and how much was a reflection of their reliance on purely script-based information.

What seems key then, in beginning to assess the development of the future self, is to design planning tasks that minimize script-based

demands as much as possible while at the same time that maximize the involvement of the self. This was precisely the goal in our first study reported here of the emergence of a future self among 3-year-old children. Thus, in designing our planning tasks we first ensured that children's performance would not simply reflect their ability to conjure up a script for an event and then use this as the basis for a plan. In other words, we did not want to give children a planning task that would rely heavily on a script, as then it becomes unclear whether children are going beyond thinking about the future as a recurrence of the past. Our second concern was that children plan in a manner that would force them to form a representation of the self as being involved in this future event. Two final concerns related to the difficulty and verbal requirements of the task. Because there exist virtually no established paradigms in which 2- to 4-year-old children's planning abilities are assessed (Benson, 1997), we needed to develop tasks that would place both age-appropriate problem-solving and verbal demands on 3-year-old children. Although it is well established in the literature that by the second year of life children are able to order events in time, it is a much harder feat for them to actually generate a sequence of events that will lead to a goal (Benson, 1997). In fact, there is evidence from children's abilities in other domains, such as the Tower of Hanoi, that even 4-year-olds are not able to form plans that involve more than two moves (Klahr & Robinson, 1981). Indeed, in our pilot work it quickly became apparent that delineating multistep future sequences was not within the capability of 3-year-old children. As a result, we limited our planning tasks to one-step actions instead of overwhelming children with multistep ones that they would most likely have difficulty executing (and for which they would thus be very unlikely to provide a plan). Finally, we designed these tasks in a manner that would not require children to provide elaborate verbal plans. In many instances, one-word plans were sufficient.

Thirty-six 3-year-old children participated in this study: eighteen younger 3-year-olds (range 3;3 to 3;7; M = 3;5) and 18 older 3-year-olds (range 3;8 to 4;0; M = 3;10). Children were given 8 one-step planning tasks, as well as two other tasks that are not discussed here (see Atance & O'Neill, 2001). Each one-step planning task required children to execute one action to achieve the goal. Thus, children were not required to provide a plan involving a series of actions but rather of one possible action that would achieve the goal. At the beginning of the session, an Elmo puppet was introduced to children under the pretext that he needed instruction in "playing these games." Children were told they would first need to tell Elmo how to play the game and only after to show him how. Thus, for each task, Elmo first asked children "Can you tell me how you're gonna...?" Immediately after children had provided an answer, Elmo provided the following reply: "That's a good idea; can

you show me?" By asking children to tell Elmo beforehand we hoped to establish whether children were in fact looking ahead, which is one of Wellman et al.'s (1985) planning criteria. The eight tasks that we discuss in this chapter were broken down into the following four categories:

Category 1: Body Action

Bell: Children were shown a bell that could be rung by pressing a knob on top. The experimenter demonstrated this action by using her hand. The children were then told that, in this game, they too should make the bell ring but that they could not use their hands. Elmo then asked children how they were going to do this (possible answer: "I'm gonna use my head"). In each task this question was repeated twice if necessary, before children were given the option of showing Elmo a solution.

Bucket: Children were shown a bucket and a Nerf ball, which were both placed on the floor by their feet. The experimenter demonstrated how the ball could be placed in the bucket by using her hand. The children were then told that in this game they should get the ball into the bucket but that they could not use their hands. Elmo then asked children how they were going to do this (possible answer: "I'm gonna use my feet").

Category 2: Action With Tool

Bunny: Children were shown a small plush bunny, and a bunny house, which were both placed on the table in front of them. The experimenter showed children how the bunny could be moved into the house by using her hand. The children were then told that they should get the bunny into the house without using their hands. At this point, children were provided with two tools: one that was more useful, a stick, and one that was less useful, a piece of string, and were told that they could use them if they wanted. Elmo then asked children how they were going to get the bunny into the house (possible answer: "I'm gonna use the stick").

Frog: Children were shown a plastic frog, which was placed at the edge of the table, and a bucket, which was placed on the floor underneath the frog. The experimenter showed the children how the frog could be pushed into the bucket, using her hand. The children were then told that they should get the frog into the bucket without using their hands. At this point, children were provided with two tools, one that was more useful, a ball, and one that was less useful, an elastic band, and children were told that they could use them if they wanted. Elmo then asked children how they were going to get the frog in the bucket (possible answer: "I'm gonna use the ball").

Category 3: Gaining Object

Box: Three boxes—red, blue, and yellow—were placed on the table in front of children. The experimenter told children that she was going to hide a sticker in the red box and then turned away from the child to do so. The experimenter turned back around and then placed the boxes back on the table in front of children. Elmo then asked children how they were going to retrieve the sticker (possible answer: "I'm gonna open it up").

Tube: A long, narrow, tube closed on one end and open on the other was shown to children, and then placed upright on the table in front of them. While the child was watching, the experimenter proceeded to drop a sticker into the upright tube. Elmo then asked children how they were going to retrieve the sticker (possible answer: "I'm gonna dump it out").

Category 4: Gaining Information

Water: Children were shown a bowl of water, and then Elmo asked them how they were going to find out if the water was cold or warm (possible answer: "I'm gonna put my finger in").

Ball: Children were shown a small rubber ball, and then Elmo asked them how they were going to find out if the ball was squishy or hard (possible answer: "I'm gonna squish it").

Thus, in all of these tasks children were asked to provide a verbal description of a future action that involved the self. Script-based demands were reduced in these tasks, as it was presumed that these were situations that children would have rarely, if ever, encountered. At the very end of the test session, children were administered the Test of Early Language Development–2 (TELD–2; Hresko, Reid, & Hammill, 1991) to obtain a measure of their language ability.

Children's performance on the eight planning tasks was coded along a *planning* dimension and along a *success* dimension. For the planning dimension, children received a score of 1 if they stated a means to the goal, before engaging in any goal-directed action. In addition, children's utterances had to include information about *how* to achieve the goal (see examples provided in task descriptions) as opposed to a simple intention *to* achieve the goal (e.g., "I'm gonna get it"). However, we did not require that children's plans be linguistically complex. So for example, in the bucket task, children were awarded a score of 1 if their plan simply contained the word *feet*. Examples of children's plans are provided in

TABLE 7.1
Sample Plans

Task	*Plan*
Bell	"Use my head" (4;0)
Bucket	"By using my feet" (3;7)
Box	"I'm gonna open up the box" (3;7)
Tube	"Dump it out" (3;10)
Water	"I'm just going to touch the water and see if it's cold or hot" (3;5)
Ball	"By squeezing it" (3;8)

Note. Numbers in parentheses are children's ages.

Table 7.1. Finally, plans that were only provided simultaneously as the child was carrying out a goal-directed action did not qualify as plans but instead were considered a verbal account of "on-line" action and were given a score of 0. If children did not state how they would achieve the goal, or provided a statement that did not meet the criteria presented above, then a score of 0 was also given.

Children's ability to execute a successful action (i.e., an action that was successful in achieving the goal) for each task was considered separately from their ability to provide a plan. For the success dimension children were given a score of 1 if they were able to achieve the goal (e.g., place the ball into the bucket without using their hands, retrieve the sticker from the tube, etc.). If children were not able to achieve the goal, then they received a score of 0. Thus, it was possible to obtain a score of 1 on either of these two dimensions without necessarily obtaining a score of 1 on the other. For example, if a child was unable to provide a plan, but was able to execute a successful action, then he or she was awarded a score of 1 on the action dimension and a score of 0 on the planning dimension.

The first dimension we analyzed was children's ability to provide a plan. First, to determine whether these tasks were appropriate for children in the 3-year-old age range, we required that at least 50% of the older 3-year-olds provide a plan on any given task. The percentage of younger and older children who planned across the eight tasks is shown in Table 7.2. Older 3-year-olds did not reach a planning criterion of 50%

TABLE 7.2
Percentage of Younger and Older Children Who Provided a Plan

	Trial							
Age	*Bell*	*Bucket*	*Bunny*	*Frog*	*Box*	*Tube*	*Water*	*Ball*
Younger	22	44	28	22	28	22	28	22
Older	72	78	39	39	50	67	72	50

TABLE 7.3
Percentage of Younger and Older Children Who Succeeded

	Trial					
Age	*Bell*	*Bucket*	*Box*	*Tube*	*Water*	*Ball*
Younger	50	39	100	78	89	50
Older	94	50	94	100	100	89

in either of the two tool tasks, and so we did not include these in any of the remaining analyses.

To determine if there was an age effect in children's planning, we conducted a 2-way repeated measures analysis of variance (ANOVA age by task). This analysis revealed a main effect of age only, such that across the six tasks older children provided a significantly greater number of plans than did younger children, $F(1, 34) = 14.56$, $p = .001$. The percentage of younger and older children who were successful in achieving the goal across the six tasks is shown in Table 7.3. A repeated measures ANOVA revealed significant main effects of age, $F(1, 34) = 11.86$, $p = .022$, in the expected direction; and of task, $F(1, 34) = 12.24$, $p < .001$; but these were qualified by a significant Age by Task interaction, $F(1, 34) = 2.72$, $p = .022$. The Age by Task interaction suggests that the younger children may have had difficulty achieving the goal in some of the tasks and thus were precluded from providing a plan. However, it is important to note that on the box, tube, and water tasks the younger children's success rates were 100%, 78%, and 89%, respectively. Thus, it is arguable that, at least on these tasks, younger children were evidencing difficulty in their planning per se, even when they were able to successfully achieve the goal. This difficulty is less pronounced in the older children. It appears that the older 3-year-olds in this study were often able to provide plans and, more important, were able to do so in contexts that were not completely familiar to them (i.e., were not script based). Thus, it appears that children's planning abilities are showing some improvement during the fourth year of life, although this claim must be qualified by the fact that, in some of the tasks, younger children evidenced more difficulty achieving the goal than did the older children.

In terms of language ability, older 3-year-olds obtained significantly higher scores on the TELD–2 than did the younger 3-year-olds, $F(1, 34) = 6.48$, $p = .016$. Younger children's mean score was 44.7, whereas the mean score of the older children was 49.3. To examine if a relation existed between children's language ability and their planning abilities, we computed correlations, with age partialed out, for each of the six tasks. Planning scores for four of these tasks (box, tube, ball, and water) were significantly correlated with children's scores on the TELD–2 (see Table 7.4). This indicates that children's ability to provide a plan was related to

TABLE 7.4
Correlations Between TELD–2 and Planning Scores, Controlling for Age

Task	*TELD–2*
Bell	.30
Bucket	.15
Box	.38*
Tube	.44*
Water	.43*
Ball	.33*

Note. TELD–2 = Test of Early Language Development–2; *$p < .05$.

their language abilities but was not solely governed by this factor. In fact, we argue that there were at least two reasons why it was not the case that children were limited in their planning because the language that was necessary to convey a plan was beyond their grasp. First, as a group, 94% of the younger 3-year-olds, and 83% of the older 3-year-olds, scored above average on the TELD–2. Second, the verbal plans that children were required to produce in order to score a 1 on this dimension did not need to be linguistically complex. For example, simply providing the word *feet* for the bucket task was sufficient for a child to obtain a score of 1. Rather, we believe that additional cognitive factors may have played a role in children's ability to provide a plan. We speculate as to the nature of these factors later.

We compared planning and success scores across the six tasks, and the results indicate that both younger and older 3-year-olds were more likely to successfully achieve the goal than they were to provide the corresponding plan. So, were children's planning scores related to their success scores, or were these two variables somewhat independent one from the other? To address this question, we looked at several conditional probabilities, which determine the probability that one event will occur given that some other event has also occurred. The probability that a child succeeded across the six tasks, given that he or she had not provided a plan, was .67. Thus, it is clear that planning cannot be viewed as the cause of a child's success, because children succeeded two thirds of the time when they had not provided one. Likewise, it was not the case that being able to achieve the goal was sufficient in allowing children to provide a plan. Across tasks, the probability that a child had provided a plan, given that he or she had succeeded, was .54. Were being able to achieve the goal all that was required to provide a plan, then we would expect this probability to be 1. Why, then, were children who were able to achieve the goal unable to provide a plan? In the context of our tasks, these children may have been able to exhibit their knowledge

by successfully acting to obtain the goal but were unable to reflect on the current situation and project themselves the necessary one step into the future to explicitly represent the means to the goal—that is, children may not have needed to draw on the future self to succeed in our tasks. However, was it the case that children *did* need to do so in order to provide a plan?

To answer this question, it is important to consider the processes that may underlie children's ability to provide a plan. Because our tasks required only one step to obtain the goal, we believe that children may have relied on either of two processes in formulating what we coded as a plan. First, children may have looked one step into the future to contemplate an action that would achieve the goal and then provided the corresponding plan. Second, children may simply have "seen" this same action without looking one step ahead, akin to having the solution "pop into mind." In each case, the outcome is the same: Children provide what appears to be a plan and then go on to obtain the goal. What is important to note, however, is that these two *processes* are different: The first requires looking ahead to formulate a plan, whereas the second does not. One could argue that in the latter instance the child is not providing a true plan but rather an atemporal verbal solution. These two processes fit well with Searle's (1983) notion of a prior intention versus an intention-in-action, respectively (for a review of others who have made this similar type of distinction, see Astington, 1999). In the first case, an action is caused by a prior intention, such that one thinks and then acts. On the other hand, within Searle's notion of intention-in-action, the action need not be caused by a prior intention; one can simply act intentionally without having planned the act. Related to this latter instance, children in our study, for example, need not have formulated a prior intention, or plan, but may simply have had a solution pop into their minds. Thus, it is only the action itself that can be labeled intentional.

There are also linguistic data that support the distinction between a prior intention and an intention-in-action. First of all, early in development, children use terms such as *will* and *gonna* to mark their own and others' future actions (Astington, 1999), which fits well with the notion of a prior intention. However, Gee (1985) looked more closely at 3- and 4-year-old children's use of these terms and provided evidence that they are not used in the same way. Gee found that children used the term *gonna* to refer to temporally distant future events for which they had formed a mental representation. In fact, it was often the case that the event in question did not get fulfilled. Gee suggested that the use of *gonna* served to "organize certain experiences for the self by projecting them as plans" (p. 206) and that it is this activity-type of planning that functions to separate the intention (plan) from the ensuing action. It is in this sense that one can consider the intention as divorced, or dissociated,

from the proposed action. This dissociation between action and intention was not found by Gee to be as marked in children's use of *will*. In fact, children's use of *will* appears to be more similar to Searle's (1983) notion of intention-in-action. Finally, this proposed dissociation between intention and action also was noted by Wellman (1990), who claimed that it is between 3 and 6 years of age that children begin to conceive of people as mentally constructing an intention, separate from the intentional act itself. In light of this distinction between a prior intention and an intention-in-action, is there any evidence in our data that children's plans were reflective of a prior intention?

To address this question we examined the linguistic constructions of children's plans. Each plan was analyzed to determine whether children had used future-oriented language. The future-oriented terms *gonna, will, can, have to,* and *if* appeared in children's plans. Younger children's plans included these terms 40% (12/30) of the time, whereas older children's did so 29% (20/70) of the time. More important though, is that only 20% (6/30) of the younger children's plans and 13% (9/70) of the older children's plans included the term *gonna*. This linguistic analysis does not provide compelling support for the claim that children were projecting themselves into the future in their plans. Instead, it appears that children's stance when formulating these plans may have been relatively atemporal in nature.

There are several reasons why our tasks may have, unfortunately, fostered plans that reflected only intention-in-action. First, because they involved only one step, it may have been possible for children to "see" the answer without having to look ahead to formulate a plan. It is clear that this process would not reflect Searle's (1983) notion of a prior intention, or Gee's (1985) notion of creating a mental representation of a future event. Second, a number of our tasks may have prompted such an automatic solution to the problem (e.g., box = open up) that children may have been prevented from taking the time to contemplate the action before providing their "plan."

This may imply that in order to tap children's ability to state a plan with a prior intention it is necessary to present children with situations in which the end state cannot simply be obtained by seeing the solution or by relying on an automatic response. However, this must be accomplished while remaining in the realm of one-step actions, because multistep sequences are outside of a 3-year-old's capability. To achieve this, it may be necessary to have children plan for remote, hypothetical events. We discussed elsewhere (Atance & O'Neill, 2001) a task in which children are required to anticipate future needs that are both hypothetical and remote. Because in this case the action does not get carried out, children's plans are more likely to reflect prior intentions. We believe that planning for an event that is both hypothetical and remote may be more conducive to the child formulating a mental

representation of it, in a manner that precludes, for example, simply "seeing" a solution, wherein no clear boundary between intention and action may exist.

Another context in which children may find it easier to dissociate intention and action, by virtue of the social environment in which the activity is set, is drawing. For example, from early on, children are given experience stating an intention, or a plan, before they begin to draw (Gearhart & Newman, 1980). This is part of a social routine in which children's parents, teachers, and even peers solicit this type of information from them. This is in sharp contrast to the context of the one-step tasks. In the latter case, it is unlikely that children in their everyday lives are asked about their plans for such actions as opening boxes, placing balls into buckets, or tipping over tubes to obtain stickers. In fact, we are currently assessing children's planning behavior in a drawing context in the hope that this may shed some light on the development of the future self.

At this point we return to Tulving's patient, N.N., to speculate about how he would perform in the one-step tasks. We hypothesize that if N.N is able to "see" the solution to a given task, then it would be possible for him to provide this plan verbally, as this process can be achieved atemporally. In doing so, we would not expect that N.N. would use future-oriented terms such as *gonna*, but rather would provide solutions that resemble the one-word solutions that children provided (e.g., he might say "dump it out," but not "I'm gonna dump it out"). On the other hand, if N.N. does not see the solution to a given task, then we believe that he would not be able to provide a plan, as this would require him to look into the future—an ability that N.N., of course, does not possess.

At this point, Haith's (1997) statement "imagine an individual who has no comprehension of the future, and you have imagined a person who is unable to plan" (p. 28) must be qualified. In one-step planning tasks it may be possible to provide what appears to be a plan without necessarily having a corresponding understanding of the future. As we have argued, children who provided one-word solutions, such as "feet," may fit this description. Because of this, using planning tasks as a window to reveal children's understanding of the future, and of the future self in particular, is a tricky enterprise. At one extreme, multistep sequences prove too difficult for this age group, whereas at the other extreme, one-step actions may not be tapping any understanding of the future self. Although 3-year-old children may indeed have a conception of the future self, one-step planning tasks of the kind we used do not appear to be able to reveal this understanding. However, as we outlined earlier, there appear to exist several other promising methods that may successfully tap children's notion of the future self, and these are where we are currently directing our focus.

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