

BRIEF REPORTS

The Emergence of the Ability to Track a Character's Mental Perspective in Narrative

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In comprehending stories, adults create mental models from which they follow the actions of the characters from the characters' different mental vantage points. Using a novel methodology, this study is the first to examine when children attain the narrative ability to track the mental perspective of characters. That is, when do children follow the actions of a story to different locations that a character is thinking about? The results of Study 1 demonstrate that this ability is nascent in 3-year-olds but adult-like by age 5. Study 2 demonstrates that 3-year-olds' difficulty is the result of the mention of the character's mental state per se rather than task complexity. Together, these studies shed new light on the development of narrative cognition in humans.

Keywords: narrative, preschoolers, mental/situation models, point of view, deixis

Harry found himself daydreaming about Hogwarts more and more as the end of the holidays approached; he could not wait to see Hagrid again, to play Quidditch, even to stroll across the vegetable patches to the Herbology greenhouses; it would be a treat just to leave this dusty, musty house . . . (Rowling, 2003, p. 145)

Reading this passage, it feels effortless for the adult reader to "go along" with Harry as he moves in his mind from his present location, to future activities at Hogwarts, and then back to his present location. Our ability to track the psychological vantage points of characters in stories is impressive, but most likely often taken for granted, given the ease with which it is accomplished. Our minds are remarkably adept at coordinating different viewpoints in a story (Banfield, 1982; Duchan, Bruder, & Hewitt, 1995; Wiebe, 1994): "We think of a story as unitary, and of various mental spaces that are defined relative to different spatial and temporal viewpoints as simply different 'perspectives' on that story, naturally belonging to a whole" (Turner, 1996, p. 123). But the apparent simplicity with which such temporally distinct mental viewpoints are differentiated and merged into a seamless whole is deceptive, for it must rely on a sophisticated representation of the events and multiple perspectives of characters within a story.

In the current study, the question of interest was, when do children follow the actions of a story to different locations that a

character is thinking about? Thus, if a character is physically present in one location but thinking about doing something in another location, would children, upon hearing what the character is thinking of doing, track the character to this *mental goal location*? Our study falls within a larger domain of studies in narrative cognition, conducted almost exclusively with adults, which investigate how readers construct what has been termed a *mental model* (Bower & Morrow, 1990; Glenberg, Meyer, & Lindem, 1987; Johnson-Laird, 1983) or *situation model* (with adults; van Dijk & Kintsch, 1983; Zwaan & Radvansky, 1998). This research suggests that rather than mentally constructing a representation of the text alone, a reader constructs a model of the situation described in the narrative. Narrators are viewed as telling a story from the perspective of the main character, and similarly readers are viewed as focusing attention on the protagonist, whose actions determine the "here and now" point (Bower & Morrow, 1990, p. 45), or deictic center (Duchan et al., 1995), in the narrative.

Early studies demonstrated that adult readers adopt the physical perspective of characters (e.g., visual or spatial location). Thus, a protagonist's movement through space could be thought of as a shifting "spot of light" that moves over parts of the reader's mental model (Bower & Morrow, 1990, p. 45). And indeed, readers are slower to recognize words denoting objects distant from, rather than close to, a protagonist (Glenberg et al., 1987) and resolve an ambiguous object referent by selecting the object closest to the current location of the protagonist, even if an object further away was mentioned more recently (Morrow, Greenspan, & Bower, 1987).

Rall and Harris (2000) conducted the first study to explore whether young children similarly adopt the spatial perspective of a character in a story. Three- and 4-year-old children were read short stories in which a protagonist was in a given spatial location (e.g., Little Red Riding Hood was in her bedroom). Then, the movement of another character (e.g., her mother) was described using one of two deictic verbs (e.g., her mother "came/went" in [the bed-

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room])—one consistent with the spatial perspective of Red Riding Hood (i.e., “came”) and one inconsistent with her perspective (i.e., “went”). Using a recall comprehension paradigm employed with adults (Black, Turner, & Bower, 1979), Rall and Harris (2000) demonstrated that, as young as age 3, children displayed the same adult pattern of accurate recall for consistent verbs and of substitution errors for inconsistent verbs, suggesting they were interpreting the narrative from the spatial perspective of the main protagonist. Ziegler, Mitchell, and Currie (2005) replicated Rall and Harris’s findings with older, 4-year-old children using less familiar stories and “good” and “bad” protagonists.

Studies have also demonstrated that adult readers adopt the “psychological ‘vantage’ point” (Zwaan, 1999, p. 15) of characters in terms of such mental states as goals and plans (Morrow, Bower, & Greenspan, 1989; Trabasso & Suh, 1993), motivations (Graesser, Singer, & Trabasso, 1994), concerns (Özyürek & Trabasso, 1997), and emotional states (Gernsbacher, Goldsmith, & Robertson, 1992). In one such study (Morrow et al., 1989), participants learned a building layout and read short narratives that included critical sentences locating a character in a given room before stating that he or she thought about (some activity) in (another room). Subsequently, when participants were asked a question about the location of objects either in the character’s physical or mental location, response times were fastest for objects in the mental location.

The current study used a related, but novel, methodology for children that did not require the ability to read and incorporated the resolution of an ambiguous object referent. The question of interest was, when do children follow the actions of a story to different locations that a character is thinking about? Morrow et al. (1989) concluded from their studies that adult readers focus on whatever topic is foremost in a character’s mind and will focus more on the mental location than the physical location if the former is more relevant to the character’s goal or plan. The current study sought to find out at what age children also show a greater attentional focus to a character’s mental goal location (as we have termed it), as opposed to a character’s physical location, if the mental location is more relevant to a character’s goal.

Study 1

Method

Participants. Participants were sixteen 3-year-olds (mean age = 3 years 6 months, range = 3 years 2 months to 3 years 11 months, $n = 9$ girls, $n = 7$ boys), sixteen 4-year-olds (mean age = 4 years 5 months, range = 4 years 0 months to 4 years 11 months, $n = 8$ girls, $n = 8$ boys), and sixteen 5-year-olds (mean age = 5 years 5 months, range = 5 years 0 months to 5 years 9 months, $n = 7$ girls, $n = 9$ boys). Eight 3- to 4-year-olds were tested but dropped due to fussiness ($n = 1$), interference by the mother ($n = 2$), experimenter error ($n = 4$), or equipment failure ($n = 1$). Participants were drawn from a university child laboratory database recruited via advertisements in community locations. Forty-seven children were of European descent and one was of Asian descent, which is representative of the community in which the university is located. All children had less than 20% exposure to a second language according to parent report. Information on education and occupation of parents was not collected. Eight undergraduate students also participated.

Procedure. Children were seated at a table with the experimenter. The entire session was videotaped. On each of four experimental trials, children were told a short story about a boy, John, or a girl, Sally (depending on whether the child was a boy or girl, respectively), while being shown one of four sets of two 3-D models. Each model set depicted an overall setting (e.g., John/Sally’s farm) and two locations in this setting (e.g., the barn and field, see Figure 1) that corresponded to the two locations in the story for that trial. The models for each location were placed on the table, one to the left and the other to the right. In each of the two models in a set there was an identical target object located in the same topographical position relative to the model’s base (e.g., the cow in the barn and the field in Figure 1; the tree, table, and slide in Figures 2, 3, and 4, respectively). In addition to the set of farm locations (see Figure 1), the other three sets of locations were John/Sally’s park, house, and backyard (see Figures 2–4).

For each set of two locations, children were told a story in which John/Sally was physically in one of the two locations but was thinking about doing an action in the other location. For example, for the farm set, children were told: “This is Sally’s farm. This is the field [experimenter pointed to the field]. This is the barn beside the field [experimenter pointed to the barn].” Children were then asked to point to each location to ensure comprehension. Following this, the experimenter turned away from the model stimuli to look at the child and made no further head turns or eye movements toward the models. She continued, “Right now, Sally is in the field,” and children were asked to point to this location. The two critical target sentences establishing the character’s goal and the mental goal location followed: “She wants to feed a cow. She is thinking of feeding the cow in the barn because the cow in the field is not hungry.” The critical test question followed: “Can you point to the cow?”

The test question contained an ambiguous referent (i.e., a cow existed in both locations). It was predicted that if children focused on the character’s mental goal location (i.e., barn), then they would point to the cow there. However, if they were focused on Sally’s physical location (i.e., field), then they would point to the cow there. That is, their “fastest mental access” (Zwaan, 1999, p. 15) to a particular cow was hypothesized to differ depending on whether children would track a character to his or her mental goal location or would only consider the character’s physical location. Note that a doll was never used; children needed to imagine the character in the story. The mental/physical goal location and left/right placement of the two locations were counterbalanced. The scripts for the other three sets of locations are shown in Appendix A.

For two of the four experimental trials, the mental goal location (i.e., barn) was stated first, before the physical location (i.e., field), in the critical target sentence as in the above example. However, as a within-subjects variable, this ordering was manipulated and blocked. For the other two trials, the mental goal location was stated second and the physical location first (e.g., “The cow in the field is hungry, but she is thinking of feeding the cow in the barn.”). In these “mental goal second” sentences, the description of the object in the physical location was presented in a positive manner (i.e., hungry) to offset its being in the less recent, first-mentioned position. Adult participants received two trials (one in each sentence condition) with two randomly chosen sets of models.

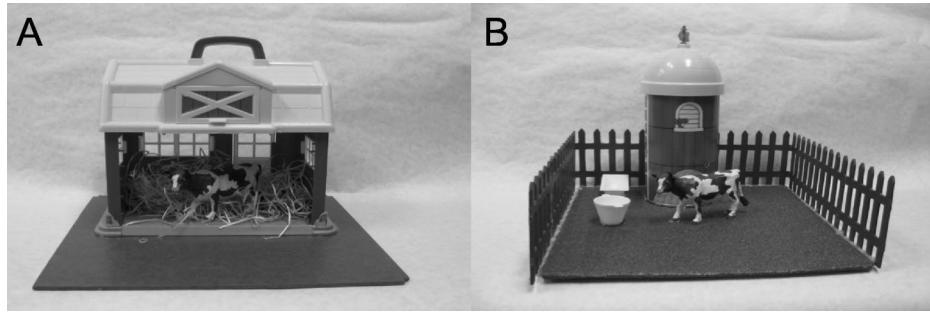


Figure 1. The two models used for the farm trial with the cow in (A) the barn and (B) the field.

Coding and analysis. All the videotapes were coded by two raters. A score of 1 was given for a point to the target object in the mental goal location (0 for a point to the object in the physical goal location). One instance in which a 3-year-old pointed to both target objects was scored as 0. Interrater agreement was 100%.

Results

As shown in Table 1, older children pointed to the target object in the character's mental goal location rather than the object in the character's physical location on a significantly greater percentage of the four experimental trials than did younger children: from a low of 62% ($M = 2.5$, $SD = 1.03$) among 3-year-olds to 81% ($M = 3.25$, $SD = 0.86$) and 88% ($M = 3.5$, $SD = 0.82$) among 4- and 5-year-olds, respectively. Adult performance was 88% ($M = 1.75/2$, $SD = 0.46$). A two-way mixed-model analysis of variance (Age \times Sentence Condition) confirmed a main effect of age, $F(2, 45) = 5.27$, $p = .009$, $\eta^2 = .19$. Five-year-olds chose the mental goal location as frequently as did the adults and did so significantly more often than did the 3-year-olds (Tukey's honestly significant difference, $p = .009$). Four-year-olds did not perform significantly differently from either the 3- or 5-year-olds. The percentage of children at each age choosing the target object in the mental goal location on all four trials increased significantly from 25% at age 3 to 50% and 60% at ages 4 and 5, respectively, $\chi^2(2, N = 48) = 6.18$, $p < .05$, two-tailed.

There was a greater tendency for children to point to the mental goal location when it was mentioned second rather than first in the critical target sentence (see Table 1), but neither this effect nor its interaction with age was significant. Moreover, 4- and 5-year-olds

pointed to the mental goal location significantly more often than expected by chance regardless of sentence condition, 4-year-olds, $t(15) = 2.74$, $p = .015$, and $t(15) = 6.71$, $p < .001$; 5-year-olds, $t(15) = 3.48$, $p = .003$, and $t(15) = 7.70$, $p < .001$ (all two-tailed). By contrast, for both sentence conditions, 3-year-olds did not choose the mental goal location more often than expected by chance, $t(15) = 1.46$, *ns*. Adult performance was also significantly above chance, $t(7) = 4.58$, $p = .003$.

These results strongly suggest that by 5 years of age children track a character's mental shifts to locations the character is thinking about in a manner similar to that of adults. But what about the 3-year-old children? Could their poorer performance have simply been the result of a difficulty comprehending the complex target sentences? A second study was designed to explore this possibility and provide further confirmation that it was the mental complexity related to the mention of a character's thought in the target sentences and not just the length or complexity of the task's target sentences that was the source of their difficulty.

Study 2

Method

Participants. The participants were sixteen 3-year-old children (mean age = 3 years 6 months, range = 3 years 0 months to 3 years 11 months; $n = 8$ girls, $n = 8$ boys). Four additional children were tested but dropped due to fussiness ($n = 2$), equipment failure ($n = 1$), and experimenter error ($n = 1$). Children were recruited as in Study 1, and their demographic characteristics were similar to those in Study 1.

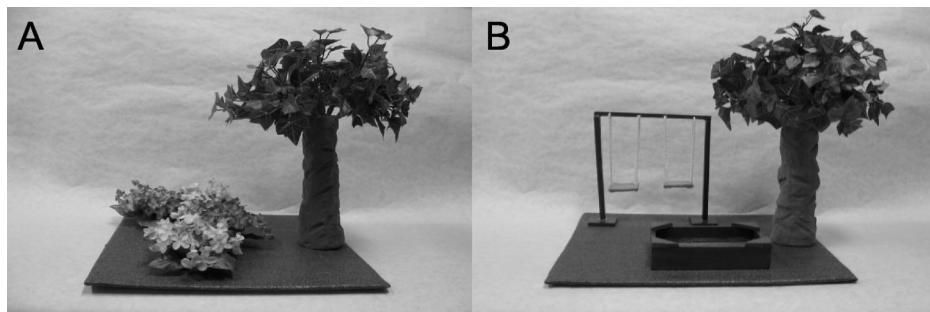


Figure 2. The two models for the park set with the identical target object, a tree, in (A) the garden and (B) the playground.

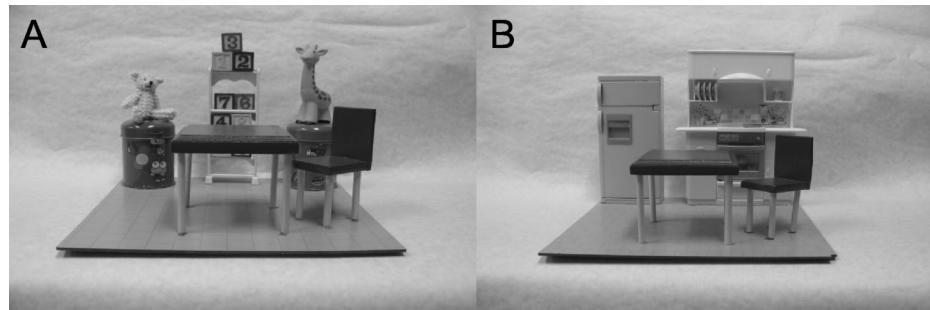


Figure 3. The two models for the house set with the identical target object, a table, in (A) the playroom and (B) the kitchen.

Procedure. Children were given an identical task to Study 1 except that the phrase “is thinking of [taking a certain action]” was replaced with “goes [and takes a certain action].” Thus, in this *goes* task, the character was said to have gone to the location that was, in the *thinks* task of Study 1, described only as a mental goal location. For example, for the farm trial, children were told, “Right now, Sally is in the field. She wants to feed a cow. She goes and feeds the cow in the barn because the cow in the field is not hungry.” As in Study 1, there were two trials each in which the goal location was presented first or second in the sentence (e.g., “The cow in the field is hungry, but she goes and feeds the cow in the barn”). See Appendix B for the scripts for the remaining three trials.

Coding and analysis. All the videotapes were coded by two raters and scored as in Study 1. One instance in which a 3-year-old pointed to both target objects was scored as 0. Interrater agreement was 100%.

Results

Overall, 3-year-olds chose the object in the mental goal location on 75% ($M = 3.0$, $SD = 0.97$) of the *goes* task trials compared to 63% of trials in the *thinks* task of Study 1. Their performance on the *goes* task also did not differ significantly depending on whether the goal location was mentioned first (72%) or second (78%) in the sentence. Although 75% was not a significant increase in performance compared to the *thinks* task of Study 1, 3-year-olds’ performance on the *goes* task was significantly above chance in contrast to being nonsignificantly so in the Study 1 *thinks* task, $t(15) = 4.14$, $p < .001$, and their performance here was comparable to that of the 4-year-olds in the original *thinks* task.

These results suggest it is a difficulty tracking a character’s mental state to a new goal location that is at issue for the youngest, 3-year-old children, rather than a broader difficulty with the general experimental task. When the target sentence was of similar length but presented a character as actually physically moving to another location, the 3-year-olds chose the target object in this new location. They had difficulty when the story moved to a different location in the character’s mind.

An alternative interpretation of the results might be that younger children have more difficulty than older children in resolving the ambiguity of the request. The results do not lend much support to this interpretation. First, in both studies, children did not query the request (e.g., Which/What cow?) as one might expect if children were trying to resolve the ambiguity. Instead, they responded quickly and without any apparent confusion, suggesting a focus on one cow at the time of the request. Second, the request was equally ambiguous in Study 2, yet the 3-year-olds performed better.

General Discussion

Exploring the development of children’s situation models offers a new window into their earliest developing comprehension and production of narratives and, importantly, an alternative to methodologies requiring the verbal construction of story elements. The results of these two studies are the first to demonstrate that, consistent with the mental or situation model approach to narrative as explored in adults, 5-year-old children attend to characters’ mental goal states and will track a character’s thoughts to a mental goal location irrespective of the character’s actual physical location. When posed with an ambiguous request that required 5-year-

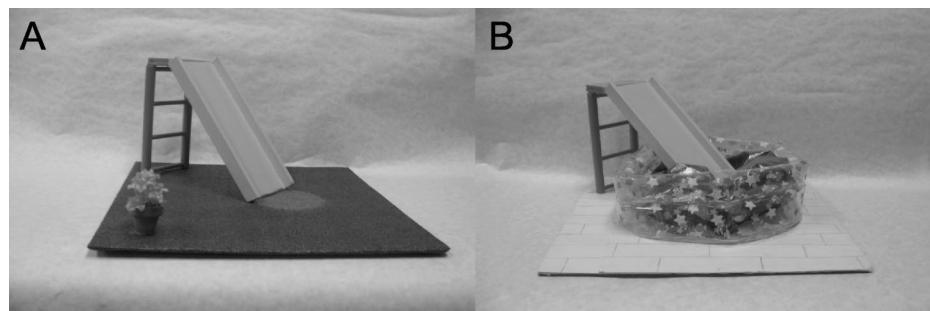


Figure 4. The two models for the backyard set with the identical target object, a slide, in (A) the grass and (B) the pool.

Table 1
Percentage of Trials on Which the Object in the Mental Goal Location Was Chosen by Children Over All Four Trials and the Two Trials in Each Sentence Condition

Trials	Age group (years)		
	3	4	5
All	63	81*	88*
Mental goal location mentioned 1st	63	75*	82*
Mental goal location mentioned 2nd	63	88*	94*

* $p < .05$.

olds to point to one of two identical objects located in a character's physical or mental goal location, they significantly more often pointed to the object in the mental goal location immediately following the mention of the character's thought of going to this location. In contrast, 3-year-olds needed to be told that a character had physically moved to this second location before they would point to the target object in this other location significantly more often than by chance.

Our results extend the findings of the two previous studies (Rall & Harris, 2000; Ziegler et al., 2005) in two main ways. First, the previous studies established a systematic capacity for preschool-age children to take the visual and spatial perspective of a character. Our study goes a step further by demonstrating that by 5 years of age, children also show a systematic capacity to take the mental perspective of a character in a story.

Our results also extend previous findings with respect to the issue of whether children are indeed "stepping into the shoes" of the character, so to speak, or taking a more external view of the scene as an observer. In the previous studies, as the authors concede, a child's choice of deictic verb could be alternately explained both by the child viewing the scene from the protagonist's own visual/spatial perspective or by adopting the protagonist's location as a physical landmark from which movement was coded as approaching or retreating. Our results, however, lend themselves more easily to an interpretation that 5-year-old children have the capacity to step not only into the shoes but also into the mind of a character. For, given that all of the "movement" was taking place in the character's own mind, a shift in focus of attention to the mental goal location must have resulted from a consideration of the character's thoughts. For the 3-year-old children, determining whether they were stepping into the shoes of the character is more difficult. Given that they only tracked the character to the second location when the character physically moved there, they were possibly adopting a more external view of events.

How might these results, and the transition observed, be explained given other cognitive skills developing during the preschool period? The following account is necessarily speculative, but findings from the literature on children's developing understanding of other minds may help to explain this transition in part. Such research has demonstrated a clear increase in the ability to understand the mental verbs, such as *think* (Bartsch & Wellman, 1995; Moore & Furrow, 1991), and the implications of belief states such as thinking on the subsequent actions of other people by 4 to 5 years of age (Astington, Harris, & Olson, 1986; Wellman, Cross, & Watson, 2001; Wimmer & Perner, 1983). Such knowledge

would be beneficial in our tasks given that they require children to realize that if a character is thinking of carrying out a certain goal in a location other than where he or she is, then the focus of the character's mental attention will shift to this location. However, in our task this realization must occur to children spontaneously, as they are not asked explicitly about a character's mental state. As such, it differs significantly from most explorations of children's understanding of other's belief states and their relation to subsequent actions in which the test questions are posed more explicitly (e.g., "Where does Sally think . . ."; "Where will Sally look . . .") and generally answered well by 4 years of age. The competence largely demonstrated in our studies by only 5 years of age may be the result of this methodological difference. Further research will be needed to explore these possible parallel developments within these domains of narrative and children's understanding of the mind.

On a more specific level with respect to narrative development, our results appear consistent with findings from a limited, but growing, developmental literature on narrative ability and children's understanding of characters' actions and their relation to mental goal states. In two studies, 5-year-olds have been shown to be adept not only at narrating the actions of a character but also at spontaneously including the character's reasons for acting (Trabasso, Stein, Rodkin, Munger, & Baughn, 1992) and integrating both mention of the character and the thought content in their narrations (Pelletier & Astington, 2004). These two previous studies did include more demanding narrative production tasks, and so it is noteworthy that, in our arguably less demanding task, 5-year-olds were performing not only significantly better than 3-year-olds but at a level similar to that of adults, which appears not to be the case in these two other studies (although neither included a specific comparison with adult performance).

Beyond these previous studies, our study investigated a novel and hitherto unexplored aspect of children's understanding of the psychological vantage point of characters in a narrative, namely the ability to track a character's thoughts to a thought-about location separate from the character's actual physical location. This adept coordination of mental spaces in a narrative—mental spaces that can be spatially and temporally distinct—is a central (and indeed really quite amazing) feature of our adult narrative cognition. Our results demonstrate that the capacity to track the mental goal states of characters to different locations associated with those goals is emerging in 4-year-olds and reaches a level of performance in 5-year-olds similar to that demonstrated in adults.

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Appendix A

Scripts for Park, House, and Backyard Trials in Study 1

The following are the scripts for the park, house, and backyard trials with the two versions of the mental goal sentences (i.e., first or second). Given that the experimenter's actions and the control questions were identical in nature for each trial as detailed in the farm script in the text, they are not included.

Park: "This is the park by John's house. This is the playground. This is the garden beside the playground. Right now, John is in the garden. He wants to build a tree house." Mental goal first: "He is thinking of using the tree in the playground because the tree in the garden is too hard to climb." Mental goal second: "The tree in the garden is easy to climb, but he is thinking of using the tree in the playground." Target question: "Can you point to the tree?"

House: "This is John's house. This is the kitchen. This is the playroom beside the kitchen. Right now, John is in the kitchen. He wants to eat a snack." Mental goal first: "He is thinking of eating at the table in the playroom because the table in the kitchen is dirty." Mental goal second: "The table in the kitchen is clean, but he is thinking of eating at the table in the playroom." Target question: "Can you point to the table?"

Backyard: "This is John's backyard. This is the pool. This is the grass beside the pool. Right now, John is in the grass. He wants to ride a slide." Mental goal first: "He is thinking of riding the slide in the pool because the slide in the grass is broken." Mental goal second: "The slide in the grass is fun, but he is thinking of riding the slide in the pool." Target question: "Can you point to the slide?"

Appendix B

Scripts for Goal Sentences in Study 2

The wordings of the goal first/second sentences for the remaining three pairs of locations were as follows:

Park: "He goes and uses the tree in the playground because the tree in the garden is too hard to climb/The tree in the garden is easy to climb, but he goes and uses the tree in the playground."

House: "He goes and eats at the table in the playroom because the table in the kitchen is dirty/The table in the kitchen is clean, but he goes and eats at the table in the playroom."

Backyard: "He goes and rides the slide in the pool because the slide in the grass is broken/The slide in the grass is fun, but he goes and rides the slide in the pool."

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