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Young Children Selectively Seek and Offer Help When Solving Problems

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy

in

Psychology

by

Annette Lynne Cluver

Committee in charge:

Professor Leslie J. Carver
Professor Seana Coulson
Professor Sarah Creel
Professor Gail Heyman
Professor David Liu

2010

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University of California, San Diego

2010

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LIST OF ABBREVIATIONS

HC/HA: Experimenter portrayed as high in competency and social-availability

LC/LA: Experimenter portrayed as low in competency and social-availability

HC/LA: Experimenter portrayed as high in competency and low in social-availability

LC/HA: Experimenter portrayed as low in competency and high in social-availability

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ABSTRACT OF THE DISSERTATION

Young Children Selectively Seek and Offer Help When Solving Problems

by

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This dissertation investigated whether young children are sensitive to psychological cues in their social-learning partners when solving problems. Two groups of children age 20-24 and 32-36 months were presented with problem-solving situations involving toys and could interact with social learning partners who differed along the dimensions of competency and social availability. In Experiment 1, children age 20-24 months selectively sought help from a social learning partner who was high along both dimensions of competency and social availability. Experiment 2 demonstrated that by age three children not only selectively seek help from a competent and highly socially available partner, but also that some children (25%) now reliably offer help to a partner who lacks competency and social availability. Experiment 3 explored the relative impact of social availability and competency on young children's (20-24 months) selective help-seeking. Condition A served as an attempt to replicate experiment 1; in three additional

conditions, children's social learning partners now exhibited novel combinations of traits along dimensions of social availability and competency. In one condition, each experimenter had one positive and one negative trait; in two further conditions experimenters were equally high or low, respectively, along the dimension of social availability and differed only with respect to how competent they were at the task. Results replicated the findings from Experiment 1, as children preferred to seek help from a competent and socially available experimenter when she was pitted against someone lacking these traits. Children failed to show any selective help-seeking or -offering in the three remaining conditions when the contrast between experimenters was less salient. We failed to find any reliable evidence of spontaneous selective help-offering in Experiment 3. This suggests that around age 2, salient contrasts are required to elicit selective help-seeking in children.

These findings are the first to suggest that young children selectively engage with social learning partners when solving problems. We discuss possible underlying causes for these constraints on selective help-seeking and propose future studies to further track the developmental trajectory of selective help-seeking and -offering during young childhood.

Chapter 1: General Introduction

When faced with a challenging task (e.g., diagnosing a problem with one's car or cooking the perfect dish) the ability to turn to someone else for help and engage effectively in social learning is of critical importance. Often, social-learning partners differ in their experience with the task: one partner is more skilled and can instruct the other, less experienced partner, on how to solve it. You might know little about how to fix the problem on your car and might need to turn to your more mechanically inclined friend. On the other hand, your friend might turn to you, the avid cook, when she is trying to master a difficult recipe. That is, these kinds of social-learning situations involve someone who seeks help and someone who can offer help in solving the problem (Newman, 2000).

However, problem-solving situations do not always involve familiar people. In many cases one needs to quickly identify who can provide or who requires help. Adults and older children can successfully seek help because they are sensitive to other's psychological traits (Barnett, 1998; Feldman & Ruble, 1988).

Competency and social availability are two critical traits that impact both help-seeking and help-offering behaviors. A help-seeker must know not everyone is equally good at providing help. Imagine your computer had contracted a virus and you were faced with the task of having to safely remove it (without losing any of your important files). Asking an IT-specialist for advice is likely to yield more effective help than asking a florist; choosing the friendly specialist at the IT-helpdesk over the ill-tempered or aloof one will further enhance your chances of receiving the best advice. Not surprisingly, adults are more likely to seek help from an expert rather than a novice, and prefer a

friendly expert to one who is aloof/low in social availability (Barnett et al., 1998).

Similarly, a helper must identify when a partner needs and is receptive to help, in order for this assistance to be useful. Effective help-seeking and help-offering both require sensitivity to psychological cues in one's social learning partners. When do children begin to use these cues to collaborate effectively with others in problem-solving situations? The goal of this dissertation is to empirically investigate the development of this skill in young children.

Young Children's Help-Seeking in Problem-Solving Tasks

Young children certainly encounter a wide variety of problems that exceed their own capacities and in which they are likely to benefit from others' help, but do they tackle such situations in a similar manner as adults do? Researchers have addressed this question by identifying the individual components of effective help-seeking in problem-solving situations and have assessed when these abilities emerge throughout development (Nelson-Le Gall, 1981; Newman, 2000). A first step in becoming an effective help-seeker is an awareness of/sensitivity to when problem-solving situations exceed one's own capacities and demand another's assistance in order to be resolved. Both the difficulty of the task and one's own ability are important factors in determining this need for help. A second element of effective problem solving is knowing that others can facilitate the process of reaching one's goals and resolving a problem. A third element involves the development of effective help-seeking behaviors (both verbal and non-verbal) that will result in obtaining the help one needs. Finally, it is critically important to be sensitive to others' traits and know how differences along trait-

dimensions are related to the quality of help one might receive in response to one's request (see Newman, 2000 for a review).

The first 3 of these elements are acquired throughout infancy and toddlerhood (Carpenter et al., 1998; Mosier & Rogoff, 1994; Goubet, 2006). Toward the end of the first year of life, infants become more goal oriented and engage in what has been termed intentional communication (Carpenter et al., 1998). They begin to associate others with obtaining goals and increasingly recruit help when they are unable to reach a goal independently (Mosier & Rogoff, 1994; Goubet et al., 2006; Elsner, 2009;). Mosier and Rogoff (1994), for example, report that between the age of 6 and 13 months, infants increasingly turn to their mothers to use them as "tools" by initiating joint attention or employing gestures directed at a toy, in order to receive help in reaching a goal (such as obtaining or operating a toy) (Mosier and Rogoff, 1994). This kind of instrumental help-seeking in problem-solving situations further increases throughout the second and third year of life, as infants engage in more frequent and effective help-seeking behavior when they encounter difficulties in mastering a hard task (Benenson & Koulmazarian, 2008; Goubet et al., 2006; Honig & Wittmer, 1985; Newman, 2000; Thompson & Moore, 1999).

At age 2, children also show precursors to self-evaluative behavior and seem to have at least a rudimentary sense of when they can master a task independently and when a task exceeds their abilities (Geppert & Küster, 1983; Kagan, 1981; Stipek et al., 1992). They have become sensitive to the social value of their failures and successes, expressing pride in response to achievement and frustration, along with greater levels of help-seeking, when they are unable to reach a goal (Stipek et al., 1992). Toddlers also vary

their help-seeking based on task-demands, seeking help more frequently in problem-solving situations than when drawing or during free play (Benenson & Koulmazarian, 2008; DeCooke & Brownell, 1995). In sum, it is known that by their second birthday, toddlers have begun to develop several basic elements of effective help-seeking: they have a basic awareness of when they need help and have both the means and willingness to recruit this help from others.

What is not known is whether young children spontaneously make use of any cues that are associated with task-related psychological traits, such as competency and social availability, in problem-solving situations to select the best source of help.

There is evidence that toddlers begin to show first signs of selectivity in their help-seeking based on status and behavioral cues associated with their social learning partners. They direct bids more often toward unoccupied adults than to age-mates or adults preoccupied with other tasks (DeCooke and Brownell, 1995). Status and level of availability are certainly cues associated with quality of help, as status is often strongly associated with more psychological traits: adults are generally more competent than young children and potentially more willing to help (Jaswal & Neely, 2006; Taylor et al., 1991).

At what age however, do children become sensitive to the psychological cues themselves enabling them to be selective social learners? Precursors to this skill are present early on. Four- to 5-month olds are sensitive to cues of contingency in social interactions and prefer to interact with a social partner who has interacted contingently with them in the past compared to someone whose responses were non-contingent (Bigelow & Birch, 2000, see also Striano et al., 2006). One of the earliest social

interactive behaviors and an important component of social learning is gaze-following (Tomasello, 2001). Early in the second year of life infants show some selectivity when gaze-following. For example, when someone has given reliable cues about an event in the past and has responded with excitement when finding a toy in a box vs. when the box is empty, infants are more likely to follow that person's gaze in the future (Chow et al., 2008).

By 16 months, infants can differentiate between accurate and inaccurate labelers in a word-learning event (Koenig & Echols, 2003), and by age 2 they prefer sources who exhibit confidence to those who seem uncertain (Birch et al., 2009). Three-year olds prefer informants who have previously been accurate rather than inaccurate, and ones who appear knowledgeable rather than ignorant or distracted (Birch et al., 2008; Jaswal & Neely, 2006; Koenig & Harris, 2005; Nurmsoo & Robinson, 2009; Pasquini et al., 2007). By age 4, children continue to track reliability and in some cases will reverse their trust in a social-learning partner if she becomes unreliable (Scofield & Behrend, 2008). Finally, kindergartners are able to discriminate between the quality of sources of help based on a partner's psychological traits (Barnett et al., 1982; Nelson-Le Gall & Gumerman, 1984; Feldman & Ruble, 1988). They know that a helper's competency and global traits (e.g., prosocial behavior) relate to the quality of help provided and will refer to these traits as explanations for why they would choose a particular person as a source of help in a problem-solving situation (e.g., "Dad knows how it works.") (Nelson-Le Gall & Gumerman, 1984). When children are asked to choose a partner for a challenging task and are presented with potential helpers who differ along these trait dimensions, children can make inferences about these traits and know that someone who is skilled and socially

available is likely to provide better assistance compared to a non-skilled, aloof person (Feldman & Ruble, 1988). However, children younger than age 8 often fail to make unprompted inferences about other's traits in problem-solving situations in which older children and adults do (Kalish, 2002; Rholes & Ruble, 1984; Rotenberg, 1982, Ruble et al., 1988). Even when prompted, children at this age tend to use a different strategies than older children when reasoning about traits (Alvarez et al., 2001) and will make systematic mistakes, predicting that people will behave differently in the future than in the past, confusing effort with ability, or friendliness with competency (Barnett et al., 1982; Heyman et al., 2003; Kalish, 2002; Nicholls, 1978). This implies that is unlikely that toddlers view traits as stable, psychological constructs. However, given that they are frequently engaging in help-seeking and are influenced by a variety of behavioral cues, it is possible they have a basic sensitivity to salient psychological cues such as competency and social availability, especially when success depends on recruiting the best source of help and failing to do so comes at a cost.

Young Children's Help-Offering.

Successful transmission of information in social-learning situations depends not only on help-seeking but also on effective offering of help by the more knowledgeable partner. In order to be most helpful, the more knowledgeable partner must identify who needs help and how this help can be offered. Help-offering is one of a number of procosocial behaviors toddlers begin to exhibit in the second year of life together with sharing and comforting (Brownell et al., 2009; Vaish et al., 2009; Warneken & Tomasello, 2006). By age 2, they exhibit signs of "emotional helping", comforting

someone who is a victim of harm (Vaish et al., 2009) or sharing food with someone who communicates a desire (Brownell et al., 2009), as well as “instrumental helping”, e.g., picking up someone’s dropped object or providing gestural information about the location of a lost tool (Liszkowski et al., 2006; Warneken & Tomasello, 2006). A large body of evidence points to the fact that in contrast to other non-human primates, prosocial behavior in human children is phylogenetically unique (Silk, 2008; Tomasello, 2007). By their second year of life, human children are highly motivated to help a social partner, even if it is unlikely to result in a direct material gain for the helper (Tomasello, 2007). This kind of prosocial behavior is not observed in non-human primates (Silk, 2008; Tomasello, 2007).

When exhibiting such altruism toddlers clearly pay attention to behavioral and emotional cues exhibited by their partner in need of help. Based on verbal and gestural cues, they make inferences about a partner’s intention and show greater instances of helping when another communicates that her action was accidental (i.e., she failed to reach her goal) rather than intentional (i.e., she successfully reached her goal) (Warneken & Tomasello, 2006). They attend to affective cues and are more likely to respond prosocially to emotional distress than to neutral utterances (Eisenberg et al., 1988). Preschoolers are even better helpers. They openly recognize another’s need for help or sharing (e.g. “he’s hungry”) and can reason about their motivation for helping (Eisenberg-Berg & Neal, 1979). In problem-solving situations, they will readily assist an adult or a peer who is struggling with a difficult task, even when this peer does not solicit help (Geppert & Küster, 1983; Perlmutter et al., 1989). Once in Kindergarten, children have a basic and more explicit understanding of traits associated with being a good helper

(e.g., competency and willingness to help) (Barnett et al., 1982; Pearl, 1985). For example, when presented with stories in which characters face a problem situation, children can identify when someone else is in need of instrumental help and what kind of help is needed (Pearl, 1985). By this age, children become more selective in their helping based on context, and help more in difficult, real problem-solving situations than in imaginative play (Bar-Tal et al., 1982).

In sum, before the age of 2 young children behave prosocially and become increasingly attuned to cues indicating a need for help throughout development. They spontaneously help others in problem-solving situations. An empirical question is whether psychological cues associated with competency and social availability will influence the incidence and selectivity of spontaneous help-offering in a problem-solving context before age 2.

The Relative Importance of Competency and Social Availability

The first step in testing young children's sensitivity to these task-related psychological cues is to present them with a very salient contrast. For an adult the choice between a friendly expert versus an unfriendly novice would be clear and simple: they would choose the friendly expert. When offering help, an adult might be more likely to help someone who lacks competency, but seems friendly and socially available. Do young children display the same selectivity when the contrast is this salient?

If they do, the next step is assessing the relative importance of these psychological cues for selectivity. We have discussed competency and social availability as linked traits, but certainly these characteristics are relatively independent of each other (Feldman

& Ruble, 1988). A person can be quite competent, but not very likable, engaging or motivated to help, and vice versa (Barnett et al., 1998). Research on the emergence of person perception in children suggests that the understanding of competency and social availability develops along different trajectories. In general, findings suggest that young children understand and can reason about social information earlier than about competency (Barnett et al., 1982; Feldman & Ruble, 1988; Leonova & Dubois, 2002; Stipek & Tannatt, 1984).

Four- to 5- month old infants are already attuned to cues associated with social behavior (Bigelow & Birch, 2000). Eighteen-month old infants selectively imitate another person who is socially available and engaging rather than aloof, presumably because this kind of imitation is an infant's way of prolonging a social exchange (Nadel-Brulfert & Baudonniere, 1982; Nielsen, 2006). Research with older preschool- and elementary-school-aged children has investigated their preference for same-age game partners based on dispositional characteristics, such as target ability relevant to the task (good vs. poor physical coordination) and interpersonal behavior (prosocial vs. antisocial) (Droege & Stipek, 1993; Feldman & Ruble, 1988; Thompson et al., 1995). When using dispositional characteristics to choose partners among their peers for collaboration on either an academic task (a puzzle) or playtime, preschoolers can make correct inferences. They choose a peer they describe as smart for the academic task, and a peer they describe as nice for playtime (Droege & Stipek, 1993). In both cases, children focus on the appropriate trait-dimension and pay less attention to the dimension that is less relevant to the task-outcome. The fact that children are reasoning about their familiar peers and are

making concrete partner choices with the expectation of a future interaction may have facilitated children's ability to make strategic partner choices.

What happens in situations in which potential partners are unfamiliar? Feldman & Ruble (1988) presented groups of younger (5-6 year-old) and older (9-10 year old) children with videos of potential game partners who differed along trait-dimensions of social behavior (i.e., they were pro- or antisocial) and ability (e.g., they were coordinated or uncoordinated). Children were then presented with a variety of tasks (e.g., requiring coordination or sharing) and asked to choose one among these partners. For each of these tasks one of the characteristics was critical for maximizing gains (e.g., on one task it was advantageous to choose the antisocial partner who would not share winnings with the opposing team). Regardless of whether children expected to actually interact with the partner on this task in the future, 5-6 year old children overwhelmingly favored the prosocial game-partner, even when they acknowledged that this choice was strategically disadvantageous for maximizing their gains (i.e., keeping prizes), a phenomenon the authors term the "liking bias" (p.1344). Older children (age 9-11) on the other hand were more likely to choose the partner who would maximize their gains and therefore made more instrumentally correct choices, even if this required choosing a less likeable partner. Thus, younger children's choice of peers seems to be mainly influenced by the partner's affective properties, whereas older children weight the instrumental effectiveness of their partner's skills more heavily. Such an age-dependent "liking bias" has also been found in other work with children age 3-8, with 3-year olds exhibiting a strong liking bias, while older children (age 5-8) showed no such tendencies (Leonova & Dubois, 2002). Interestingly, in this study 5-year-olds were able to make strategically correct choices

based on intellectual ability and correctly ignoring the social dimension (i.e., indicating that a clever albeit naughty person would be a better choice for a tricky task than the nice but not clever person). This may be accounted for by the fact that in this case children did not expect any future interaction with a partner. It is possible that for preschoolers and kindergartners, the prospect of interacting with a yet unfamiliar partner highlights the importance of social characteristics.

Another critical aspect is that prior to the entry into formal schooling, children are not as motivated by achievement and fail to understand competitive success in the same way as older children (Ruble et al., 1976; Stipek et al., 1992). This in turn may lessen the importance of choosing a competent over a nice partner.

Other studies investigating young children's reasoning about intellectual competency and social traits have supported the hypothesis that children tend to grasp and are able to reason about social traits earlier than about intellectual competency (Heyman et al., 2003; Leonova & Dubois, 2002; Stipek & Tannatt, 1984). Some studies indicate that young children may also be more sensitive to cues of social traits than to cues of competency when both are expressed in a social learning partner (Feldman & Ruble, 1988; Leonova & Dubois, 2002). One possible explanation for these findings is that children were not familiar with their partners (Feldman & Ruble, 1988) and did not expect to interact with these children (Leonova & Dubois, 2002). In a similar study in which children were asked to choose a partner among their peers for either an academic task or playtime, kindergartners were able to correctly choose a peer they rated as smart for the academic task and a likable peer for playtime (Droege & Stipek, 1993). This

suggests that in concrete situations involving familiar partners, children are sensitive to cues of ability and social competence and can make instrumentally correct choices.

Cues associated with social availability in partners are certainly important to young children (e.g., Cleveland & Striano, 2007; Nielsen, 2006). Whereas children cannot engage in explicit reasoning about other's traits before the age of 3, they do encounter concrete situations in which they need help. It is possible that in such problem-solving situations they also weight cues associated with social availability and competency differently when making choices between social-learning partners. Whether younger children exhibit a liking bias as found in older children in concrete problem-solving situations remains an open question. If this were the case then we would expect them to prefer a partner they experience as friendly but incompetent over a partner who is less friendly but competent. That is, in this case differences in the dimension of social availability would be driving children's preference. However, young children may also be able to take into account competency in more concrete problem-solving situations, when the consequence of either obtaining or losing a reward is very tangible, even if this means interacting with someone who is less friendly. Though preschool-aged children have difficulty reasoning about competency and confound competency with likeability (Stipek & Tannatt, 1984), toddlers are already very motivated by salient outcomes in a problem-solving task (Bullock & Lütkenhaus, 1989; Kenward et al., 2009). Therefore, it is conceivable that toddlers may prefer a social learning partner they associate with an attaining a desirable outcome.

One way to empirically investigate this is to first establish at what age children are first sensitive to trait-related cues when the contrast is most salient. The second step is

to then establish the importance of these cues by presenting children with experimenters who portray novel combinations of traits and assess whether children's preferences are influenced more by one trait over the other.

Sensitivity to Trait-Cues: Do Young Children Generalize?

Given that children make systematic mistakes when asked to predict others future behavior based on trait-information (Kalish, 2002), it is possible that young children might be sensitive to trait information in only a narrow range of situations. Young children, for example, may only become sensitive to trait-cues when strong contrasts between traits of social learning partners highlight qualitative differences between potential helpers (Koenig & Harris, 2005). They may also only utilize this information in familiar situations, after seeing a helper be effective or ineffective in resolving a problem, rather than generalizing to a novel context, as an older child or adult learner will (Rholes & Ruble, 1984). Rholes and Ruble (1984) for example asked children to make predictions about a character's future behavior based on information about a character's competency and prosocial behavior. Children younger than age 8 did not generalize to novel situation, suggesting that they perception of traits as context dependent rather than constructs that are stable across situations.

One way to assess this is to expose children to problem-solving situations which children have experienced a social-learning partner tackle, and novel situations in which they have not yet interacted with the social-learning partner. If children generalize trait-information, then we would expect them to show similar preferences in both familiar and novel situations. However, if young children perceive traits as context specific, then we

would not expect them to exhibit the same preference. An ideal paradigm to assess children's ability to generalize their sensitivity to trait-cues from one situation to another is the elicited imitation paradigm, which has been widely used for the study of long-term memory development in infants (Bauer & Shore, 1987; Carver & Bauer, 1999).

Generally, infants observe demonstrations of how to operate on toys and then are tested on their ability to manipulate these toys again after a delay. At this time infants are also presented with novel objects and their ability to operate on familiar compared to novel toys serves as an index of declarative memory for the original demonstration.

In the present set of experiments we have adapted this paradigm for the purpose of assessing the nature of children's sensitivity to psychological cues. First, we added a second experimenter to the paradigm. Second, we varied how competent and socially available these two experimenters act when demonstrating actions on toys. Finally, the main objective of this set of experiments was to investigating children's preference for interacting with an experimenter, not assessing measures of declarative memory.

If children associate these cues with more general, situation independent behavior, we would expect children to exhibit similar preferences in both familiar and novel situations. If, on the other hand, children view these cues as specific and tied to a particular problem-situation, we would expect preferences to change direction or to dissipate in novel situations. Another advantage of this paradigm is that it sets up a dichotomy of presumably less challenging (i.e., familiar) and more challenging (i.e., novel) tasks. This allows for an assessment of the influence of task-demands on children's selective help-seeking and -offering behavior.

Previous work has indicated that children vary help-seeking as a function of task-demands (Benenson & Koulmazarian, 2008; DeCooke & Brownell, 1995). If children show similar sensitivity to task-demands in this set of projects, we would expect them to engage in a higher level of help-seeking on novel and more difficult tasks. With respect to help-offering, we hypothesize that children will be more likely to help another only after they know how the toy works, something that we expect to be the case more often on familiar trials.

Age-Related Differences

As we have highlighted above, children become increasingly skilled at interacting with others in social learning situations and navigating through problem-solving situations in a collaborative way. In particular, helping behavior becomes more pronounced and more spontaneous with age, as young children become more attuned to another's needs (Perlmutter et al., 1989). This suggests that children may become more sensitive to psychological cues and that interactions with social learning partners may become more selective. It is also possible, that with age, children become more able to generalize cue information to novel situations. Though in context, children have difficulty generalizing when asked to make explicit predictions (Kalish, 2000; Rholes and Ruble, 1988), it is possible that children can show some signs of generalizing when a task requires less of an explicit response and places less cognitive load on children. In order to assess these age-differences, we included two age groups in this study: 20-24 month olds and 32-36 month olds.

The goal of this dissertation

The goal of this dissertation was to investigate whether children exhibit sensitivity to cues related to traits of competency and social availability when interacting with social learning partners in problem-solving situations. In order to assess the development of this ability in young children we presented children with challenging problem-solving situations and provided them with the opportunity to solicit help from two social learning partners. In doing so, we have adopted a general methodology that has been used when studying young children's ability to distinguish between their social partners based on cues such as reliability, knowledge level or confidence (Birch et al., 2009; Jaswal & Malone, 2007) and combined it with the general structure of the elicited imitation paradigm (Carver & Bauer, 1999). By pitting against each other sources of help who are extremely distinct along trait-dimensions, we are highlighting trait-related differences and increasing the likelihood of eliciting a preference for a social learning partner in children. What is different about this set of experiments is that children are not required to choose between two experimenters, but rather are free to decide whether and in what manner to interact with their social learning partners.

We hypothesized that a) by their 2nd birthday, children will exhibit signs of selective preferences in their help-seeking and -offering behavior b) this selectivity will depend in part on task-demands and the trait-combinations in social-learning partners c) we will observe age-related changes in selective interactions with different social learning partners between the 2nd and 3rd year of life.

Chapter 2: General Methods

Are children sensitive to psychological cues when interacting with others in problem-solving situations? One way to address this question is to observe young children's behavior in a problem-solving situation in which they can seek help from two social learning partners who differ on trait dimensions of competency and social availability. Children's preference for seeking help from one social learning partner over the other would suggest that they are sensitive to the differences in their partners' traits. All 3 experiments discussed in this dissertation project utilized this approach, principally varying the degree of competency and social-availability expressed by the two social-learning partners.

Procedure

Each participant visited the lab with a parent, and was given an opportunity to engage in a series of problem-solving tasks that were designed to be conceptually but not physically challenging. Each task involved one of four novel toys that were constructed for the study (see Appendix, Figure 1). The toys can each be manipulated in order to retrieve an attractive toy.

Exposure Phase. The session began with an *exposure phase* in which two female experimenters attempted to demonstrate how to retrieve the toy from two of the four toys. In Experiment 1 and 2, one experimenter was assigned the role of appearing competent at the task and socially available (by acting friendly towards the child and making eye contact), and another experimenter was assigned the role of appearing both incompetent at the task and socially unavailable (by focusing on the toy and avoiding eye

contact).¹ In Experiment 3, the two experimenters in some conditions exhibited novel trait-combinations of competency and social-availability, e.g., appearing competent, but not socially available (see Chapter 5 for a more detailed description of experimenter characteristics). The first experimenter (either high or low in competency and availability, counterbalanced across participants) entered the room and modeled an action sequence using each toy, twice in succession, either successfully or unsuccessfully according to her role (see Appendix, Figure 2). The first experimenter then exited the room and the second experimenter entered and modeled slightly modified action-sequences that failed to attain the goal using the same toys. For each experimenter, the modeling of actions was guided by a scripted narration based on her role (see Appendix, Table 1).

Testing Phase. The exposure phase was followed by a *testing phase* in which the child was given an opportunity to interact with the same two toys, and also two novel toys, for the purpose of determining whether any spontaneous help seeking or help offering would be selectively directed to one of the two experimenters. The two experimenters were seated in the center of the testing room on either side of a video camera that faced the participant and his or her parent (see Appendix, Figure 4 for a schematic illustration of testing room set-up). The two familiar and the two novel toys were presented in an order that was counterbalanced across participants. The position of experimenters was also counterbalanced.

¹ Adult-ratings of experimenter demonstrations by individuals who were blind to our experimental hypotheses (N=11) revealed that experimenters appeared significantly different from each other in terms of competency ($t(11) = 13.69, p < .001$) and social-availability ($t(11) = 5.68, p < .001$).

On each trial, one toy was placed in front of the child by a third experimenter, who then left the room. The child was free to play with the toy, and to interact with the parent and the two experimenters. If the child exhibited a help-seeking behavior (e.g., verbalizing or offering a toy) that was directed towards one of the experimenters, the experimenter performed a demonstration on the toy that again was guided by a scripted narration based on her role (see Appendix, Table 1). The child's parent was instructed to respond with the phrase "I don't know how this works." in the event that the child directed help-seeking behavior towards her. Once the child had sought help at least twice, or after 3 minutes had passed, the toy was replaced with another toy and a new trial began.

Dependent Measures

Help-seeking and –offering. The target of a child's help-seeking and help-offering attempts could either be one of the two experimenters or the child's caregiver. To identify the preferred targets of spontaneous help-seeking behavior, 3 separate *help-seeking scores* were computed for each participant. These scores consisted of the number of times each of the 3 potential targets of spontaneous help-seeking and –offering behavior (the two experimenters and the parent) was the first to be approached for help on a trial. Because the testing phase consisted of four trials, the individual sum of the 3 help-seeking and help-offering scores associated with each child had a possible range from 0-4. In a given trial, it was possible for a child to first seek help from the parent, and then subsequently turn to one of the experimenters for help. Because our main interest was in children's preference for one experimenter over another, we also planned to test for children's target preference the first time they turned to an experimenter without

including the parent, in the case that the ANOVA across the 3 potential targets did not reveal any significant findings. In this case we assigned scores similarly to before and each experimenter received a score for a trial if she was the first experimenter the child had turned to during that trial. That is, if the child had first turned to the parent and then to experimenter HC/HA during a trial, experimenter received a score of HC/HA for this trial. We conducted a paired samples t-test on the two experimenter-target scores.

In addition to assessing children's overall preference for a target throughout the testing session, we focused on children's preferences during the *first* and *last* time the sought help. The assessment of target preference for the first trial was relevant for determining whether a given target preference was already established at the onset of testing and was not simply a result of learning during testing. The assessment of target preference during the last trial informed us about whether an initial preference was maintained, lost, or reversed over the course of the four trials.

We did not rule out that the continued exposure to the experimenters during the testing-session might have an effect on children's help-seeking or –offering behavior and might lead to a switching of target preference, especially in cases in which the initial choice proved ineffectual. For each child who showed help-seeking we compared target preferences during trial 1 and trial 4, with a particular interest in whether children were more or less likely to switch as a function of their initial target preference. We expected that children who initially preferred an experimenter who was less helpful would be more likely to switch compared to children who at first preferred an experimenter who provided better help.

We also looked at the overall type of switching across the four trials. Children had 3 opportunities to switch across the four trials. Because we were mainly interested in whether children switched whom they asked for help in a particular direction, we assessed whether children were more likely to switch towards one experimenter compared to another over the course of the four trials. We scored this switching behavior in binary form. Children received a score of 1 or 0 for each of the two directions of switching, 1 if a switch in this direction had occurred and 0 if no switch in this direction had occurred across the 4 trials. Children could show both directions of switching over the course of the 4 trials, in which case they received a score of 1 for both directions.

Action steps.² Action steps were actions that properly operated the toy and that eventually could lead to retrieval of the toy figure. There were three action steps that could be performed on each toy. Children's ability to operate the toys independently was measured in the number of action steps performed without assistance from the experimenters. Action steps were recorded before any experimenter demonstration during testing trials and served as an index of children's problem-solving skills (novel toys) and memory for the event (familiar toys) (see Appendix, Table 1, for a description of action steps).

Help-seeking/ –offering and familiarity. As previous studies had found that toddlers vary their help-seeking based on context (Benenson & Koulkazarian, 2008; DeCooke & Brownell, 1995) we were interested in testing whether the level of children's help-seeking depended on familiarity with the task. If children were indeed sensitive to

² In the deferred/elicited imitation literature these action steps are referred to as target actions. Here, we have decided to use the term action steps in order to distinguish this measure from measures of "target preference" when interacting with social partners.

the task-demands we would expect them to seek help more frequently in novel vs. familiar problem-solving contexts, and offer help more frequently on trials on which they are familiar with the functioning of the toy.

Help-seeking /-offering and success in operating toys. Finally, we looked at help-seeking as a function of children's success with the toys. We operationalized success as retrieval of the toy figure, as this constitute the goal of operating on the toys. We considered a trial a failure if children tried to operate on toys but were unable to retrieve the toy-figure. Specifically, for both novel and familiar trials we looked at how likely children were to seek help given failure or success in operating the toy independently.

Coding

For each project, two independent coders who were blind to the experimental hypotheses were trained on recordings of pilot data. Twenty-five percent of tapes were coded by both coders to determine a measure of intercoder-reliability. Cohen's κ is reported as a measure of agreement for each experiment.

Data Analysis

There were 3 possible targets of children's help-seeking and help-offering behavior. Our a priori hypotheses were that if children were sensitive to the psychological cues of competency and social availability, they should prefer to interact more with one experimenter than with the other and possibly with the parent. We conducted separate one-way repeated measures ANOVAs for help-seeking and -offering scores, followed by Bonferroni adjusted planned pair-wise comparisons between the 3 possible targets of help-seeking and -offering. In the case that the ANOVA did not reveal any significant

difference between the scores, we also conducted a t-test on children's preference the first time they sought help towards an experimenter.

Target preferences during the first and last time children sought help during the testing-session were assessed by comparing the number children who turned to one type of experimenter over the other using a Chi-square analysis.

Differences in the direction of switching were assessed using McNemar's test to account for repeated measures nature of the data. A significant p -value in this test indicates that children show a particular preference for switching in one direction over another.

We assessed children's ability to operate on toys by summing the number of action steps performed on novel versus familiar toys and compared these using paired samples t-tests.

Success on toys was determined by identifying trials on which children were able to reach the goal on a toy by retrieving the small toy figure. Chi-square tests were used to assess whether children were more likely to seek help vs. not seek help given a success or failure in operating the toys independently.

Chapter 3: Young children selectively seek help when solving problems in the second year of life.

Summary

Children ages 20 to 24 months ($N = 30$) were presented with a series of conceptually difficult problem-solving tasks and were given the opportunity to interact with adult experimenters who portrayed either a high level or a low level of both task-related competency and social availability. Participants selectively sought help from the experimenter who was competent and socially available, especially in tasks that were novel and challenging for children. Only one child showed evidence of selective help-offering. These findings are the first evidence that young children selectively seek out help in problem-solving contexts based on the psychological characteristics of others.

Introduction

This first experiment investigated whether young children distinguish between two social-learning partners who differ in competency and social availability. We chose to test children age 20-24 months based on pilot experiments indicating that this was the earliest age at which children reliably showed help-seeking behavior in the context of the experimental set-up. In this first version of the experiment, we pitted an experimenter who was high in both competency and social availability against another experimenter who was low along both of these trait dimensions. We deliberately chose to combine two positive and two negative traits in experimenters in order to highlight the contrast between their psychological characteristics as strongly as possible for children.

If children are sensitive to the cues displayed by the two experimenters they should prefer to seek help from an experimenter who is both competent and socially available and therefore provides high-quality help when children cannot operate the toys on their own. We also expected children to vary their help-seeking based on task demands and to therefore be more likely to seek help on a novel and difficult toy than on a toy that is familiar and does not represent a challenge. Finally, a more exploratory question of interest concerns the selectivity of prosocial behavior in a social learning context. Though by age 2, children are exhibiting an array of both emotional and instrumental prosocial behaviors (Brownell et al., 2009; Kaneko & Hamazaki, 1987; Vaish et al., 2009; Warneken & Tomasello, 2006), it is unclear whether children will spontaneously offer help to a social learning partner in a problem-solving situation and do so in a selective manner.

Method

Participants. Participants were 30 children age 20-24 months ($M = 22$ months, 15 days). The majority of children were of white (% 60) or of mixed ethnicity (% 37). Equal numbers of boys and girls participated in this study. All children had been born within 2 weeks of their due date and had no history of complications at birth or throughout development.

Procedure. The procedure was identical to that described in the general methods. Experimenters for this experiment were either high in both competency and social-availability (HC/HA) or low along both of these dimensions (LC/LA).

Coding. Cohen's Kappa (κ) as a measure of the agreement between the two coders was .82.

Dependent Measures and Data Analysis. Dependent measures and methods of data-analysis were identical to those described in the general methods section.

Results

Help-seeking scores. Twenty-nine of the 30 children sought out help on at least one occasion. Seventy-six percent of help-seeking attempts were directed toward one of the experimenters, with the remaining attempts directed toward a parent. Because the primary goal of the study was to determine children's preference for one experimenter versus the other, paired sample t-tests were used to compare the mean help-seeking scores of each of the two experimenters. Children preferred to seek help from the high competency/availability experimenter, $t(29) = 2.664$, $p < .05$ (see Table 2).

A 3 x 2 (target x gender) repeated measures ANOVA on the average help-seeking scores for all children revealed a main effect of the target of help-seeking behavior,

$F(2,28) = 8.09, p < .005$. There was no main effect of gender. Tests of the 3 a priori hypotheses were conducted using planned multiple comparisons with Bonferroni adjusted alpha levels of .016 per test (.05/3) and indicated that children turned significantly more often to experimenter HC/HA than to either experimenter LC/LA ($F(1,28) = 14.1, p < .005$) or their parent ($F(1,28) = 14.06, p < .005$). The difference between the help-seeking scores for experimenter LC/LA and the parent was not significant (see Table 3.1/Figure 3.1).

To examine whether children had established a preference for a particular target of selective help-seeking at the onset of testing, we also compared the number of children who turned to each experimenter the first time they sought help during the testing phase. Children showed a systematic preference for experimenter HC/HA the first time they sought help, $\chi^2(1, N = 29) = 4.8, p < 0.05$. The same analysis on children's preference on the last time they sought help revealed that as a group, children had maintained their preference, $\chi^2(1, N = 29) = 4.2, p < 0.05$ (see Figure 3.2).

Help-offering. Because only one child in this experiment offered help to an experimenter we did not conduct statistical analyses on these data. Nonetheless, the pattern of help-offering is interesting. The child offered help on both familiar trials, i.e., the child knew how to operate the sets of toys. In both instances the child offered help to the experimenter who was low in competency and social-availability (LC/LA). The child did not offer any help to the experimenter who was competent and high in social availability or to his parent.

Help-seeking and success on toys. Children showed greater help-seeking when they failed to operate the toy independently than when they were successful at doing so

themselves. Children sought help on 91% of fail-trials compared to 52% of “success-trials”. Chi-square analysis on the four possible outcomes (success/fail x novel/familiar), revealed that children were significantly more likely to seek help than to not seek help when they failed to operate the toy independently. This was the case for both novel ($\chi^2(1, N = 30) = 26.13, p < 0.001$) and familiar trials ($\chi^2(1, N = 26) = 22.15, p < 0.001$). This pattern was not found for trials on which children were successful in operating the toys on their own (see Table 3.2, Figure 3.3).

Help-seeking and familiarity. The difference between children’s help-seeking for novel ($M = 1.8, SD = .5$) vs. familiar toys ($M = 1.6, SD = .67$) was not significant (see Figure 3.4).

Switching Target of Help-seeking behavior.

Switching across all sessions. Twenty-two children switched their target of help-seeking at least once over the course of the four testing-session trials ($M = 1.77, SD = 1.08$). McNemar’s test revealed no significant difference in the overall direction of switching. Across all four trials, children were no more likely to switch towards experimenter HC/HA than towards experimenter LC/LA, $p = .1$.

Because this may have been due to the fact that most children had a preference for experimenter HC/HA at the onset of the testing session, we looked at children’s switch in target preference as a function of their initial preference. Sixteen out of 22 children who preferred experimenter HC/HA the first time they sought help had the same preference the last time they sought help to 6 children who switched to target LC/LA, a difference that was significant, $\chi^2(1, N = 22, 4.54, p < .05)$. Five out of the 7 children who preferred experimenter LC/LA on their first help-seeking attempt switched to experimenter HC/HA

on the last trial, compared to two children who maintained their preference. Chi-square analysis was not carried out on these data because the expected value for switching vs. non-switching was too low (i.e., lower than 5).

Action steps. Data-analysis of action steps revealed that children were more successful at operating on familiar ($M = 2.78$, $SD = 1.9$) compared to novel toys ($M = 1.52$, $SD = 1.22$), $t(29)=3.272$, $p < .05$) (see Figure 3.5).

Table 3.1

Experiment 1: Mean Help-seeking Scores for the 3 Potential Targets

Target	Help-seeking
HC/HA	1.97 (1.13)
LC/LA	0.77 (0.94)
Parent	0.83 (0.83)

Note. Targets are the high competency/availability experimenter (HC/HA), the low competency/availability experimenter (LC/LA), and the parent. Possible scores ranged from 0-4. Standard deviations are shown in parentheses.

Table 3.2

Experiment 1: Frequency of Children who Showed Help-seeking or Failed to Show Help-seeking Given Success or Failure on Familiar and Novel Trials.

	Help-Seeking	No Help-seeking	Total
Familiar Trials			
Success	4(.31)	9(.69)	13
Fail	25(.96)	1(.04)*	26
Novel Trials			
Success	0(.00)	0(.00)	0
Fail	29(.97)	1(.03)*	30

Note: Proportions are given in parentheses. Statistically significant differences between help-seeking v. no help-seeking are denoted by * $p < .001$.

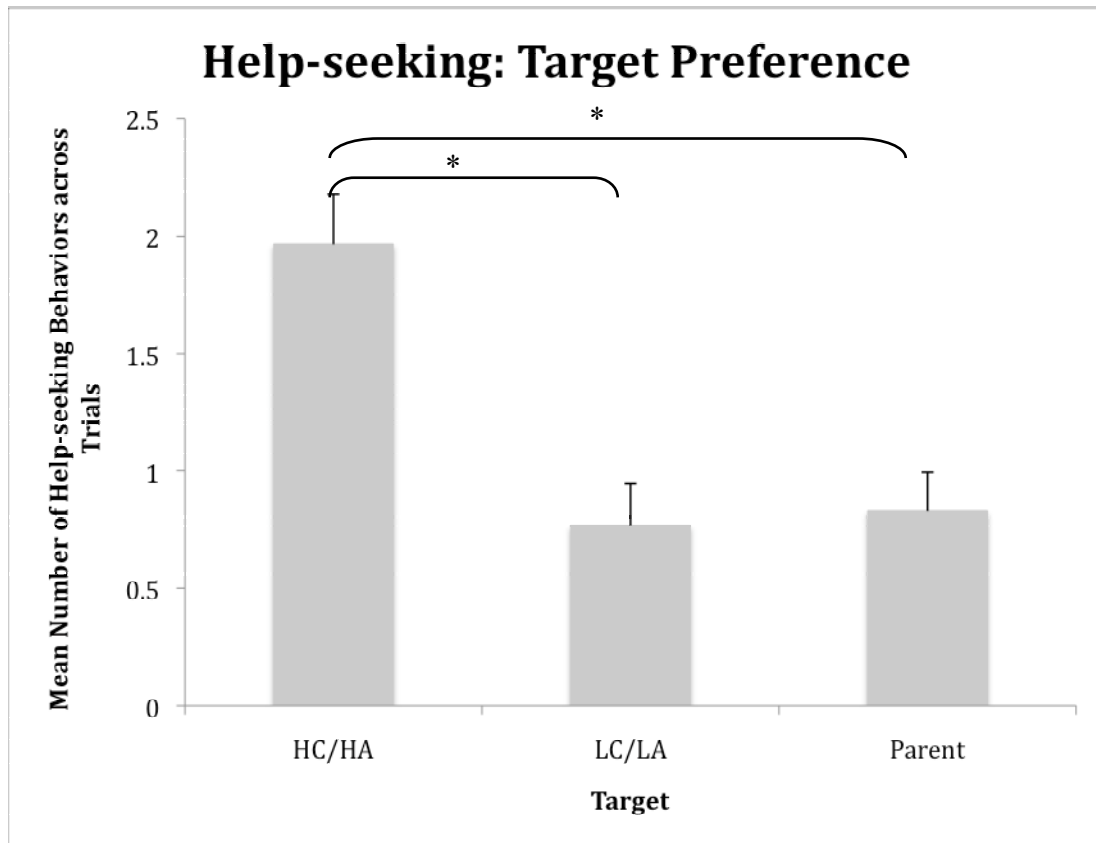


Figure 3.1. Experiment 1: Help-seeking scores as a function of target. Targets are the high competency/availability experimenter (HC/HA), the low competency/availability experimenter (LC/LA), and the parent. Possible scores ranged from 0-4. * $p < .005$.

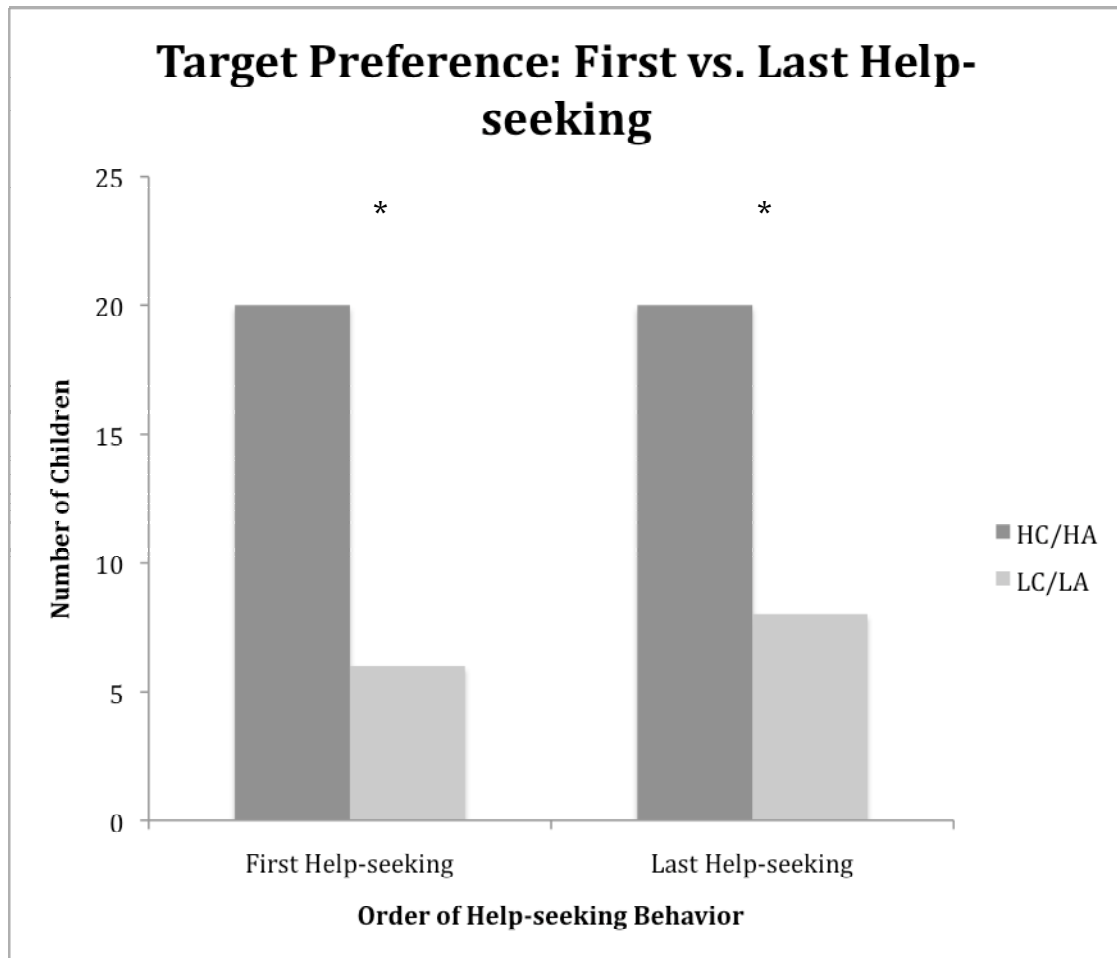


Figure 3.2. Experiment 1: Number of children who preferred to seek help from HC/HA compared to LC/LA the first and last time they sought help. * $p < .05$.

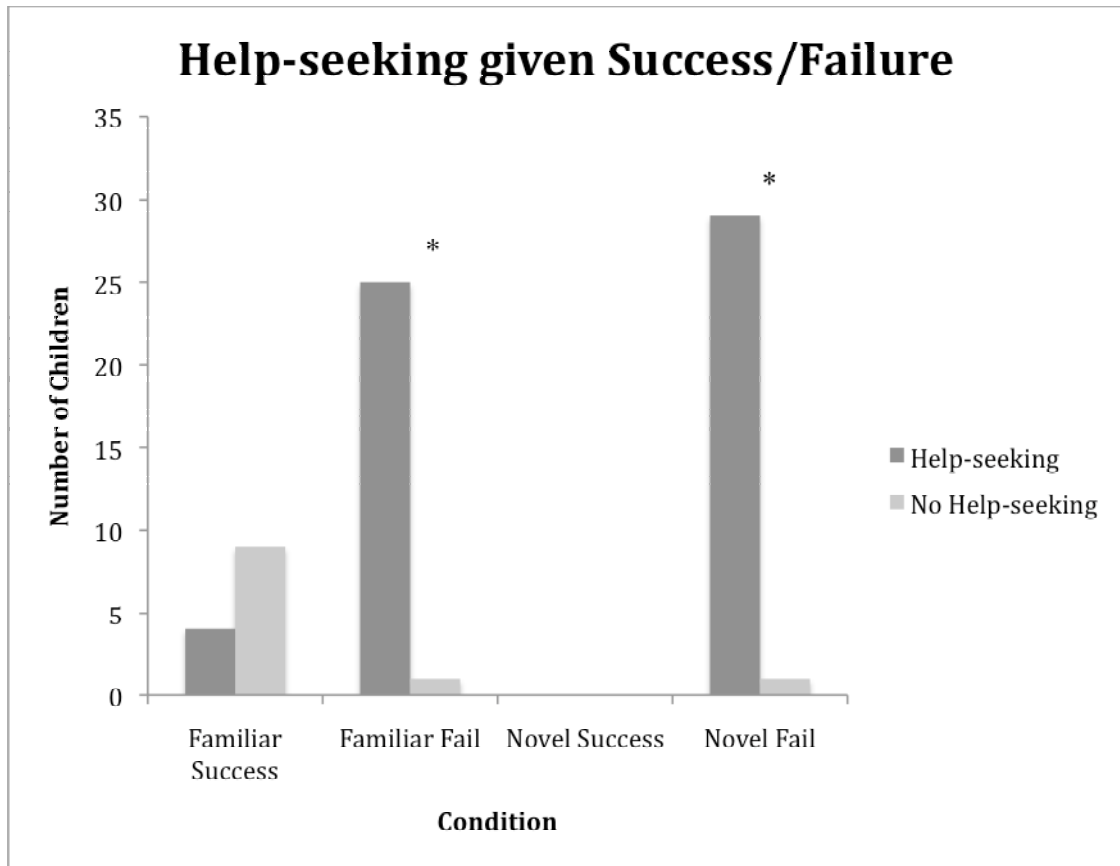


Figure 3.3. Experiment 1: Number of children who showed help-seeking vs. no help-seeking given success or failure on familiar and novel trials. * $p < .001$.

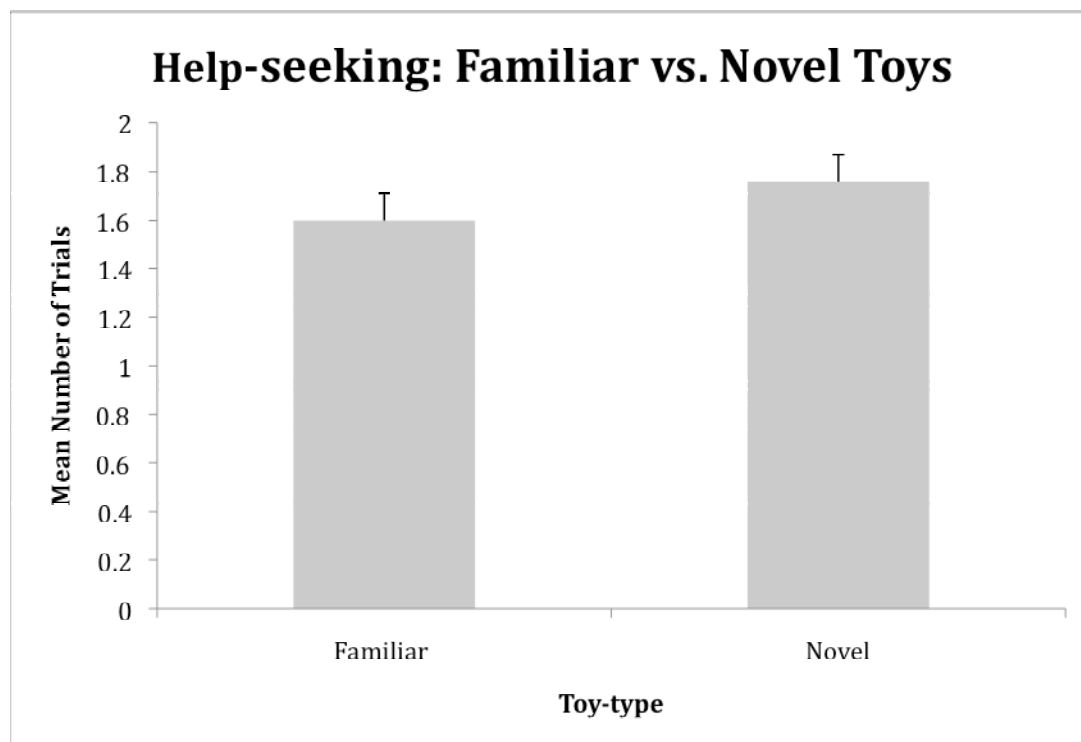


Figure 3.4. Experiment 1: Mean number of familiar vs. novel trials on which children sought help. Scores range from 0-2.

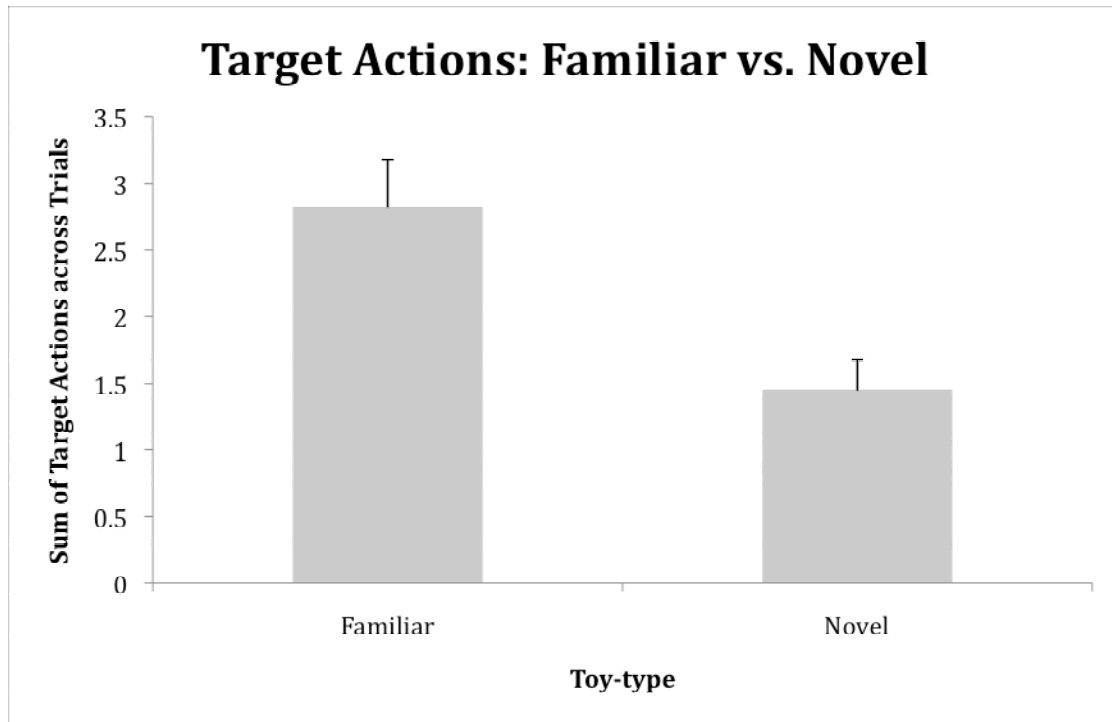


Figure 3.5. Experiment 1: Sum of action steps produced as a function of toy-type, averaged across all children. Scores range from 0-6.

Discussion

Results from Experiment 1 revealed that by age 2 children use psychological cues to distinguish between two social-learning partners when seeking help in problem-solving situations. After engaging with two social learning partners who differ along trait-dimensions of competency and social-availability, children developed a clear preference for seeking help from a partner who is portrayed as very competent and socially available over someone who lacks these qualities. Children display this preference at the onset of the testing session and end of the testing session, indicating that they establish this preference after a relatively brief period of engagement with the social-learning partners and maintain it throughout the course of the interaction.

Though the majority of children switch their target of help-seeking behavior at least once across the four trials, this kind of switching does not appear to follow a clear pattern that would indicate adaptive switching of help-seeking. However, children who preferred experimenter HC/HA the first time they sought help during the testing session were much more likely to maintain rather than to switch this preference. This pattern was not observed for children who preferred experimenter LC/LA at the onset of trial. Five out of 7 children in this group had switched their preference by the last trial. This suggests that at least to some extent, children are keeping track of the quality of help received in response to their help-seeking attempts and are more likely to “stick with” a social-learning partner if she is a useful source of help.

These results support our principal hypothesis. By age 2 children indeed appear to be sensitive to cues associated with psychological traits in their social-learning partners,

they seems to use and keep track of this information to determine which of two partners is the better source of help for a future problem-solving situation, at least in the short term.

Our findings are line with a number of studies indicating that 2-year-old children prefer social-learning partners who display confidence to those who are uncertain (Birch et al., 2010; Jaswal & Malone, 2007) and by age 3, children can use information about the past reliability of a social-learning partner when choosing who to trust in future learning events (Birch et al., 2008; Jaswal & Neely, 2006; Koenig & Harris, 2005; Nurmsoo & Robinson, 2009). Our findings suggest that even before their second birthday, children are sensitive to psychological cues associated with competency and social availability when selecting a social learning partner as a source of help.

Contrary to our expectation children did not seek help more frequently on novel compared to familiar trials. This is an interesting finding in light of children's greater success in operating familiar vs. novel toys, suggesting that children have encoded and recall the earlier event demonstration. One possibility is that at this age children do not rely on cues of familiarity when seeking help. Though children at this age will seek help less in non-demanding free-play situations compared to problem-solving situations (DeCooke & Brownell, 1995), it is unclear how children below the age of 2 adapt their help-seeking as a function of familiarity across different types of problem-solving situations. It is possible that the influence of familiarity on help-seeking becomes greater with age as children become more sensitive to the relationship between familiarity and task-demands. This ability might be linked to the emergence of rudimentary metamemory abilities during the preschool years, which are associated with a feeling of knowing ("I

know what I do and do not know”) and the use of mnemonic strategies to enhance declarative memory abilities (Cultice et al., 1983; DeLoache et al., 1985b; Lockl & Schneider, 2006).

Another possibility is that the familiar toys continued to represent a difficult task for children, in spite of the earlier demonstration. In support of this possibility, children did vary their degree of help-seeking in response to task-difficulty, a further sign of adaptive help-seeking. When children struggled with manipulating the toys and failed to operate them independently, they were much more likely to turn to one of the social learning partners for help than to not seek help. When they could successfully operate toys on their own they were much less likely to seek help from a social learning partner. Finally, and perhaps most interestingly, when they were struggling with toys, the majority of children preferred to seek help from experimenter HC/HA, whereas the four children who turned to a social learning partner after success with a toy did so equally often towards HC/HA ($n=2$) and LC/LA ($n=2$). These results are consistent with reports of toddlers exhibiting an increasing ability to monitor their own performance on a task, to know whether they are achieving a desired outcome and whether they are doing so correctly (Bullock & Lütkenhaus, 1988; DeLoache et al., 1985a; Stipek et al., 1993).

One question is why four children turned to these partners at all after successful retrieval of the toy. A closer examination of these instances revealed that in two of these cases, children had reached an alternative means to retrieve the toy (e.g., they turned the “fish” toy upside down in order for the fish to fall out, rather than use the magnet to retrieve it). It is possible that children knew that they had not completed the steps in the correct manner and wanted to learn how to do it correctly. There is some evidence that 2-

year-old children are aware of normative rules of games, i.e., that there is a right and a wrong way to play a game (Rakoczy et al., 2008). It is possible that children who turned to a partner after a successful, albeit alternatively executed, retrieval of the toy were trying to gather more information about the normatively correct way to play the game. Another possibility is that children initiated interaction with the experimenter (e.g., by handing her the toy) as part of the imitative game which consists of turn-taking and role-sharing and that children enjoy playing around this age (Nadel-Brulfert et al., 1982; Nadel et al., 1999; Ross & Lollis, 1987). Once children had operated on the toy once, they may have expected the other partner to take her turn.

This allows for several conclusions. First, children's general success with familiar toys indicates that they benefited from the demonstrations and learned how to operate the toys. Second, children's varied help-seeking as a function of familiarity implies that they are sensitive to the task demands and respond to challenges in reaching a goal adaptively by soliciting help from a social learning partner. Third, children seem to be sensitive to the fact that they need the most help on challenging toys and that a competent and friendly partner is likely to provide superior help compared to someone who lacks these skills.

Returning to the 4 critical steps of effective help-seeking (Nelson-Le Gall, 1981), our findings confirm that by age 2 children a) understand that others can assist them in reaching a goal, b) monitor a situation for task-difficulty in order to know when help is needed c) respond with adaptive and effectual help-seeking behaviors and d) are sensitive to which social learning partner can provide the best help when it is needed.

These findings are in line with previous work indicating that children vary their level of help-seeking according to situational factors, seeking help more often in problem-

solving situations than during free play, and that show some selectivity for a potential helper based on status, preferring to seek help from an adult rather than a peer (DeCooke & Brownell, 1995, Geppert & Küster, 1983). However, this is the first study to report this kind of selectivity based on the psychological cues of two novel and relatively unfamiliar social learning partners. Certainly, this does not necessarily mean that children have an explicit understanding of their social learning partners' traits or how these traits relate to the likelihood of resolving a challenging problem. On the contrary, research indicating the difficulties that older children have with respect to understanding and reasoning about traits (e.g., Heyman et al., 2003; Kalish, 2002; Stipek & Tannatt, 1984) suggests that by age 2 this sensitivity is still quite rudimentary and likely to be a first stepping-stone in the development of trait-perception. However, children's selectivity does indicate that they have developed (perhaps at an implicit level) a sensitivity to these trait cues, that they know when they are particularly far from reaching an intended goal on their own and that they have perhaps associated one experimenter with advancing them to this goal most successfully.

These findings give rise to several further questions. The first general question concerns the developmental trajectory of this kind of trait-related selectivity towards social-learning partners in problem-solving situations. Now that we know that 2-year-olds display selective help-seeking, it is an empirical question whether older children will show similar or perhaps even greater levels of selectivity when seeking help from a social-learning partner. Interestingly, one 23-month old child in the present experiment showed selective help-offering towards the experimenter who was low in competency and social availability on two trials. While it is important to emphasize that this is an

anecdotal account of selective helping in a single child, it is nonetheless an interesting pattern of behavior. First, he offered help on trials involving familiar toys for which he had seen a demonstration and which he therefore knew how to operate. Second, this child directed his behavior towards a person exhibiting two negative traits, which to our knowledge has not been previously reported in children this young. Third, and most importantly, this help-offering was selective, that is, this child exclusively and repeatedly offered help to the person who lacked competency and therefore was in need of help. Notably, help-offering occurred despite the fact that the experimenter never explicitly requested help, only indicating that she lacked knowledge as to the functioning of the toy. No attempts at help-offering were observed towards experimenter HC/HA or the parent.

It is quite possible that this child is atypical in terms of his general prosocial tendencies and selective help-seeking behavior. Similarly, the systematic pattern of selective help-offering may simply have occurred by chance. Another possibility, however, is, that this child is perhaps precocious and is displaying a behavior that typically emerges in children in the third year of life. Supporting evidence for this stems from developmental studies in the domain of prosocial behavior (Brownell et al., 2009; Vaish et al., 2009; Warneken et al., 2006). Prosocial behavior, such as sharing and comforting, is believed to emerge during the second year of life, and become increasingly pronounced and selective (e.g., Brownell et al., 2009; Kaneko & Hamazaki, 1987; Rheingold, 1982). Though we did not find any evidence of help-offering in other children at this age, it is likely that the overall increase in prosocial behavior will give rise to more instances of help-offering.

The second major question concerns the individual influence of the two trait dimensions on children's selective help-seeking. We deliberately investigated children's response to very salient trait combinations, in order to test whether children at this age exhibited any selectivity in the most extreme of contrasts that would clearly bias an adult learner or something like that. Now that we have established that children distinguish these two, it is possible that: a) social-learning partners need to be distinct along both trait-dimensions in order for children to show any preference or b) one trait-dimension is more important to children and drives the preference. Some evidence suggests that beginning around age 4 children are sensitive to both competency and social availability, but that they seem to exhibit a bias for factors of social availability (Stipek & Tannatt, 1984). When selecting potential partners for a task, children this age prefer someone who is friendly but incompetent over a skilled but unfriendly partner (e.g., Feldman & Ruble, 1988; Thompson et al., 1995). It is an open question whether children show a similar bias by age two.

The next experiments address these questions. The goal of Experiment 2 is to investigate the developmental trajectory of selective help-seeking and help-offering in 3-year-old children (see Chapter 4 & 5). Experiment 3 assesses the individual impact of the two trait-dimensions (see Chapter 6).

Chapter 4: 3-year-old children selectively seek and offer help.

Summary

Children ages 32 to 36 months ($N = 30$) were presented with a series of conceptually difficult problem-solving tasks and were given the opportunity to interact with adult experimenters who portrayed either a high level or a low level of both task-related competency and social availability. Participants selectively sought help from the experimenter who was competent and socially available, and selectively offered help to the experimenter who was neither competent nor socially available. These findings are the first evidence that young children both selectively seek out and offer help in problem-solving contexts based on the psychological characteristics of others.

Introduction

In experiment 1 we established that by age 2, children can use psychological cues to distinguish between social learning partners and are selective in their help-seeking. One child was also selective in offering help. The aims of the present experiment were two-fold and sought to further explore the aspects of selective interactions with social learning partners in problem-solving situations.

First, we wanted to test for age related differences in selective help-seeking in problem-solving tasks. Our main question here was whether older children would exhibit the same or perhaps an even stronger selectivity for the experimenter who was both high in competency and social availability. In contrast to younger children who sought help equally often on novel and familiar trials, older children are better at monitoring their task-related abilities and may have a better awareness of when they need help and when they can complete a task independently (Bullock & Lütkenhaus, 1988; Geppert & Küster, 1983). Therefore, we were also interested in assessing whether older children would seek help more frequently in novel vs. familiar trials.

Second, we were interested in further exploring the possibility of spontaneous selective helping in children in the third year of life. The spontaneous offering of help, along with other prosocial behaviors such as cooperation and sharing, emerges in children between the second and third year of life (e.g., Brownell et al., 2009; Rheingold, 1982; Warneken & Tomasello, 2006; Yarrow et al., 1976). There is some evidence that children selectively choose their targets of helping at an early age (Kaneko & Hamazaki, 1987; Warneken & Tomasello, 2006). Observations of children living in an orphanage suggest that in their spontaneous interactions, 2-year olds act more prosocially towards

their peers than towards adults, and direct more helping towards younger than towards older peers (Kaneko & Hamazaki, 1987). In an experimental context, toddlers have been to be more likely to act prosocially towards an adult who expresses her desire, has become the victim of injury or who has carried out an action accidentally (e.g., dropping) more than if she indicates that the act was intentional (e.g., throwing) (Brownell et al., 2009; Vaish et al., 2009; Warneken & Tomasello, 2006).

By age 3 children show more spontaneous prosocial behavior, in particular helping (Yarrow et al., 1976). As social-learning situations involving problems solving tasks require both seeking and offering help, we wondered whether 32-36-month old children would exhibit greater helping and would do so selectively. Because the experimental design of the present research involves a contrast between an individual who is high on both competency and social availability and one who is low on each of these dimensions, any such selectivity could be expected to take one of two forms. One possibility is that children would selectively offer help to individuals who appear to lack competency and therefore need the help. Alternatively, children might selectively offer help to individuals who are more socially available, because they are seen as more desirable partners for interaction.

The present experiment was designed to examine the influence of psychological cues on 32-36month old children when interacting with others in a problem-solving context. We expected 32-36-month-olds to show both selective help-seeking and offering. We hoped to gain insight into how these older children respond to the psychological characteristics of others and how they approach problem-solving tasks.

Method

Participants. Participants were thirty children ages 32 to 36 months ($M = 34$ months, female $N = 15$). The sample was primarily white (73%) or of mixed ethnicity (20%). All children had been born within 2 weeks of their due date and had no history of complications at birth or throughout development.

Procedure. The procedure was identical to that described in the general methods section.

Dependent measures. Dependent measures in Experiment 2 were identical to those of Experiment 1, with one exception: In addition to computing separate *help-seeking* scores for each target we also computed 3 separate *help-offering scores* for each participant in an analogous manner, based on the first target to be spontaneously offered help on a trial. On a given trial it was possible for a child to contribute to the help-seeking score of a potential target, the help-offering score of a potential target, to both, or to neither.

Coding. Cohen's κ was .92.

Data-analysis: Children did not show any help-offering attempts towards parents. We therefore compared the mean number of help-offering attempts directed towards one experimenter over the other across trials using a paired samples t-test. All other measures were identical to those described in the data-analysis section of Experiment 1.

Results

Help-seeking scores. Twenty-seven of the 30 children sought out help on at least one occasion. Seventy-seven percent of help-seeking attempts were directed toward one

of the experimenters, with the remaining attempts directed toward a parent. A one-way repeated measures ANOVA on the average help-seeking scores for all children revealed a main effect of the target of help-seeking behavior, $F(2,28) = 9.53, p = .001$. Tests of the 3 a priori hypotheses were conducted using planned multiple comparisons with Bonferroni adjusted alpha levels of .016 per test (.05/3) and indicated that children turned significantly more often to experimenter HC/HA than to either experimenter LC/LA ($F(1,28) = 14.1, p < .001$) or their parent ($F(1,28) = 14.06, p < .05$). The difference between the help-seeking scores for experimenter LC/LA and the parent was not significant (see Table 4.1/Figure 4.1).

To examine whether children had established a preference for a particular target of selective help-seeking at the onset of testing, we also compared the number of children who turned to each experimenter during the first trial of the testing phase. Children showed a systematic preference for the high competency/availability experimenter the first time they sought help, $\chi^2(1, N = 27) = 14.286, p < 0.001$. An analysis of children's preference on the last time they sought help revealed that they continued to have the same preference $\chi^2(1, N = 21) = 8.05, p = 0.005$ (see Figure 4.3).

Help-offering. Nine of the 30 children directed at least one offer of help toward the low competency/availability experimenter, but none did toward the low competency/availability experimenter (see Table 4.1). Averaged across all children offered help most to LC/LA, $F(1,29) = 9.04, p = .005$. Bonferroni adjusted pair-wise comparisons revealed that this difference was significant with respect to both HC/HA ($F(1,29) = 9.4, p = .005$) and the parent ($F(1,29) = 9.4, p = .005$). These results suggest

that young children selectively offer help to individuals who appear to lack competency. No child offered help to his or her parent (see Table 4.1/Figure 4.2).

Help-seeking and success on toys. Children showed greater help-seeking when they failed to operate the toy independently than when they were successful at doing so themselves. Children sought help on 77% of fail-trials compared to 27% of “success-trials”. Chi-square analysis on the four possible outcomes (success/fail x novel/familiar), revealed that children were significantly more likely to seek help than to not seek help when they failed to operate the toy independently. This was the case for both novel ($\chi^2(1, N = 25) = 11.56, p = 0.001$) and familiar trials ($\chi^2(1, N = 19) = 4.26, p < 0.05$). On familiar trials on which they were successful, children showed the opposite pattern, not seeking help more frequently than seeking help ($\chi^2(1, N = 21) = 3.57, p < 0.05$). This pattern was not found on novel trials on which children were successful (see Table 4).

Switching Target of Help-seeking behavior.

Switching across all sessions. Fourteen children switched their target of help-seeking at least once over the course of the four testing-session trials ($M=.57, SD=.68$). McNemar’s test revealed no significant difference in the overall direction of switching. Across all four trials, children were no more likely to switch towards experimenter HC/HA than towards experimenter LC/LA, $p = 1$.

Because this may have been due to the fact that most children had a preference for experimenter HC/HA at the onset of the testing session, we looked at children’s switch in target preference as a function of their initial preference. Four of the 24 children who preferred experimenter HC/HA the first time they sought help sought help only once and are therefore not included in this analysis. Sixteen out of the remaining 20 children who

preferred experimenter HC/HA at the onset of testing had the same preference the last time they sought help compared to 4 children who switched to target LC/LA, a difference that was significant, $\chi^2(1, N = 20), 7.2, p < .01$.

Out of the 3 children who preferred experimenter LC/LA on their first help-seeking attempt, two children only sought help once across the four trials and therefore do not yield any data on switching. The remaining child switched to experimenter HC/HA the last time she sought help.

Help-seeking and familiarity. Children sought help more often when they were presented with novel ($M = 1.467, SD = .73$) rather than familiar toys ($M = .83, SD = .74$), a difference that reached significance according to a paired samples t-test, $t(29) = 3.739, p = .001$.

Combined help-seeking and help-offering. On five occasions involving four different participants, a child sought help from the high competency/availability experimenter, and subsequently offered help to the low competency/availability experimenter on the same trial. No parents were involved in any instances of combined help-seeking and help-offering on a single trial.

Action steps. Data-analysis of action steps revealed that children were more successful at operating on familiar ($M = 4.23, SD = 2.13$) compared to novel toys ($M = 2.9, SD = 2.17$), $t(29) = 3.64, p = .001$ (see Figure 4.5).

Table 4.1.

Experiment 2: Mean help-seeking scores and help-offering scores for the 3 potential targets: the high competency/availability experimenter (HC/HA), the low competency/availability experimenter (LC/LA), and the parent.

Target	Help-seeking	Help-offering
HC/HA	1.4 (0.64)	0.0 (0.00)
LC/LA	0.3 (0.10)	0.6 (1.07)
Parent	0.5 (0.37)	0.0 (0.00)

Note: Possible scores ranged from 0-4. Standard deviations are shown in parentheses.

Table 4.2

Experiment 2: Number of children who showed help-seeking vs. no help-seeking given success or failure on familiar and novel trials.

	Help-Seeking	No Help-seeking	Total
Familiar Trials			
Success	5(.24)	16(.76)*	21
Fail	14(.74)	5(.26)*	19
Novel Trials			
Success	7(.50)	7(.50)	14
Fail	21(.84)	4(.16)**	25

Note. Proportions are given in parentheses. Statistically significant differences between help-seeking v. no help-seeking are denoted by * $p < .05$, ** $p = .001$.

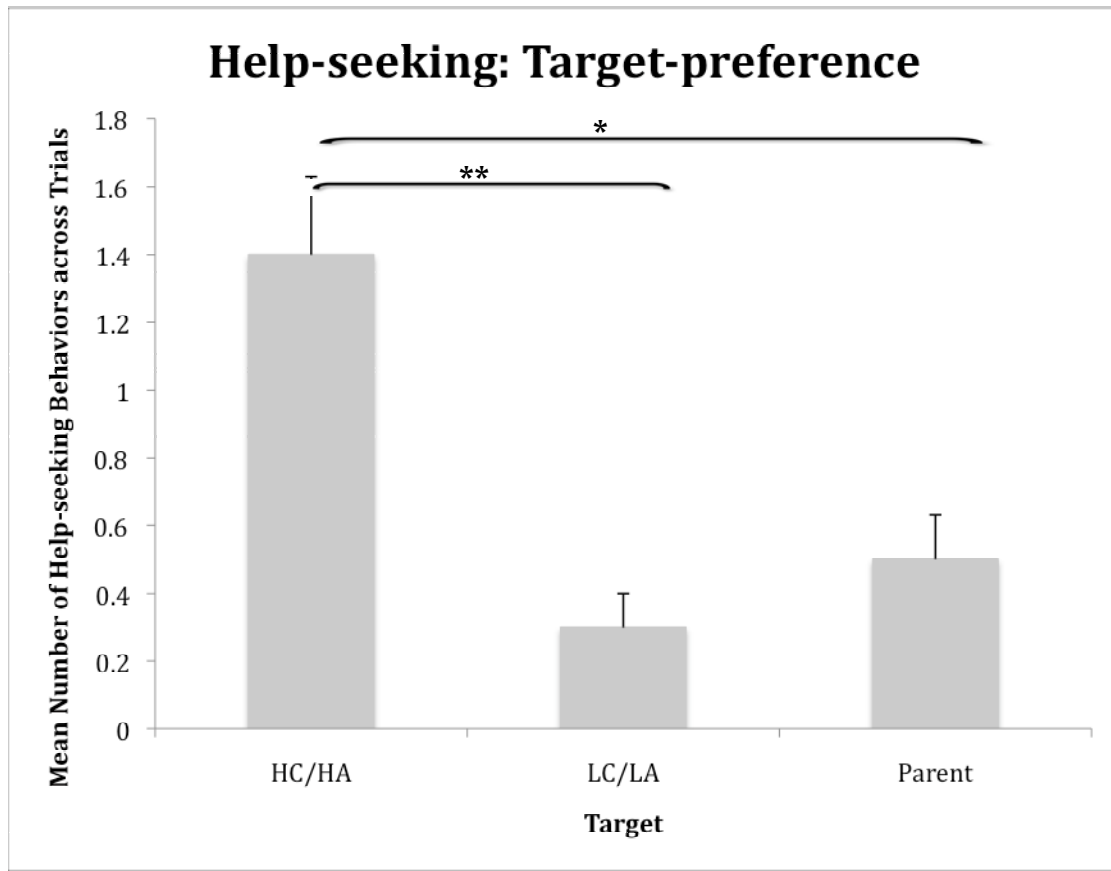


Figure 4.1. Experiment 2: Help-seeking Scores as a Function of Target. Targets are the high competency/availability experimenter (HC/HA), the low competency/availability experimenter (LC/LA), and the parent. Possible scores ranged from 0-4. * $p < .05$, ** $p < .001$.

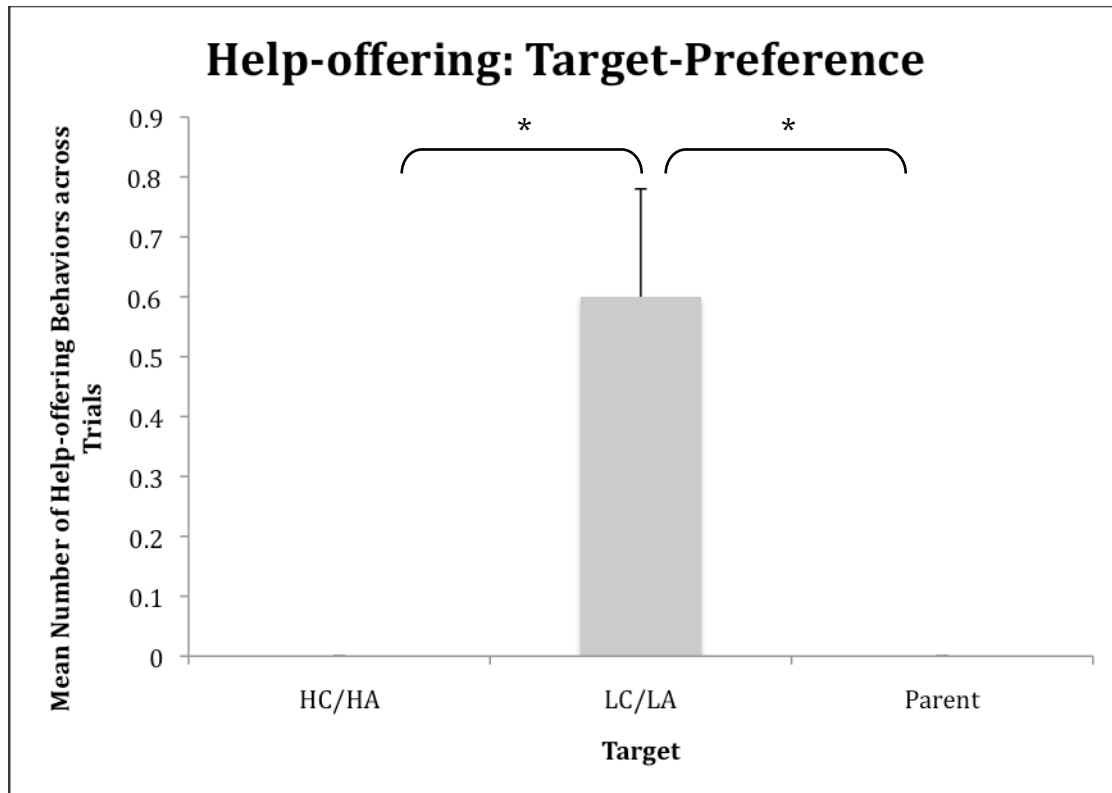


Figure 4.2. Experiment 2: Help-offering scores as a function of target.

Targets are the high competency/availability experimenter (HC/HA), the low competency/availability experimenter (LC/LA), and the parent. Possible scores ranged from 0-4. * $p = .005$.

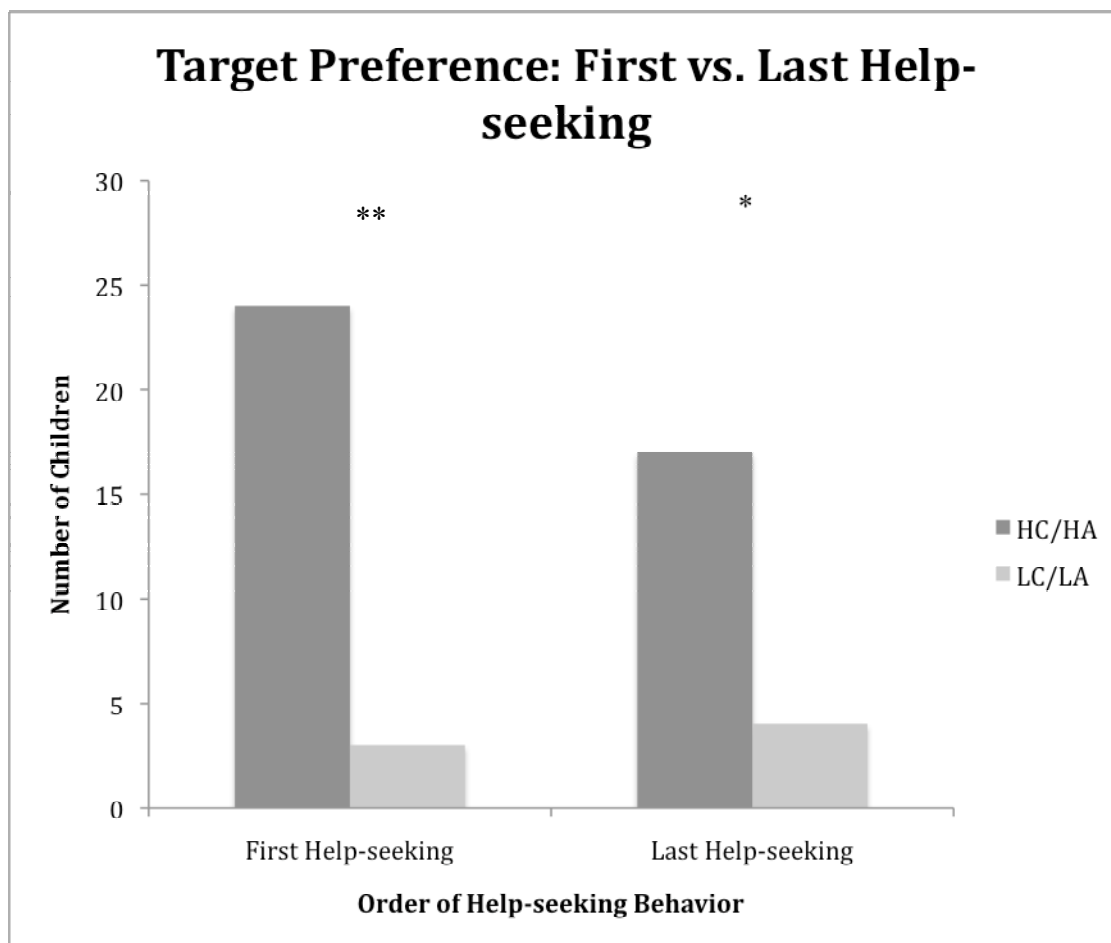


Figure 4.3. Experiment 2: Number of children who preferred to seek help from HC/HA compared to LC/LA on the first and last trial. * $p = .005$, ** $p < .001$.

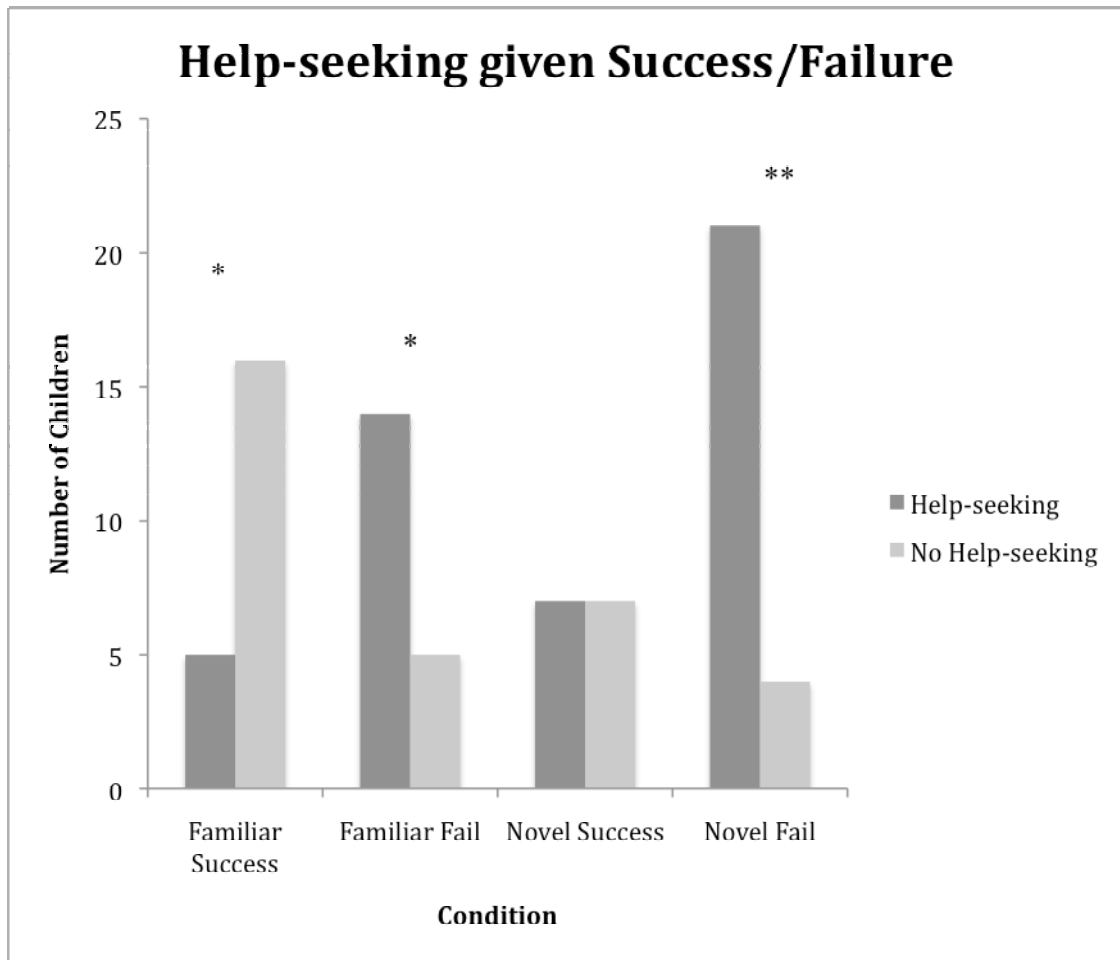


Figure 4.4. Experiment 2: Number of children who showed help-seeking or no help-seeking given success or failure on familiar and novel trials. * $p < .05$, ** $p < .001$.

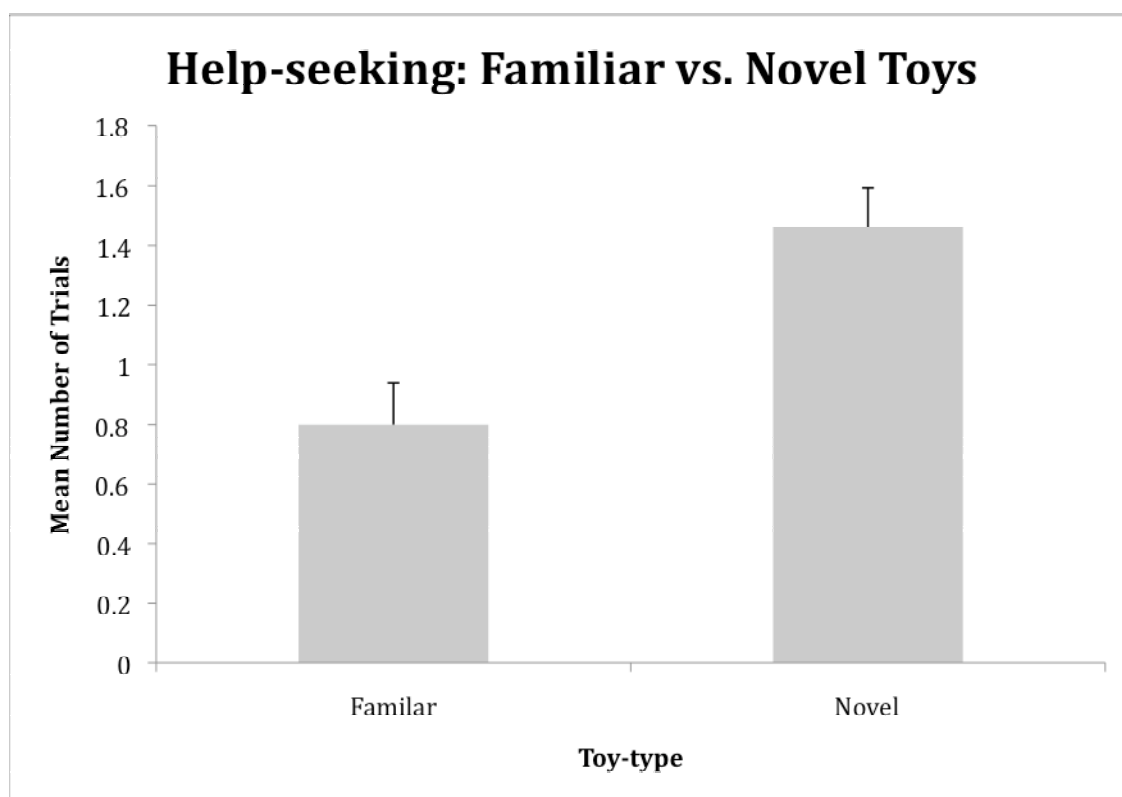


Figure 4.5. Experiment 2: Mean number of familiar vs. novel trials on which children sought help. Scores range from 0-2.

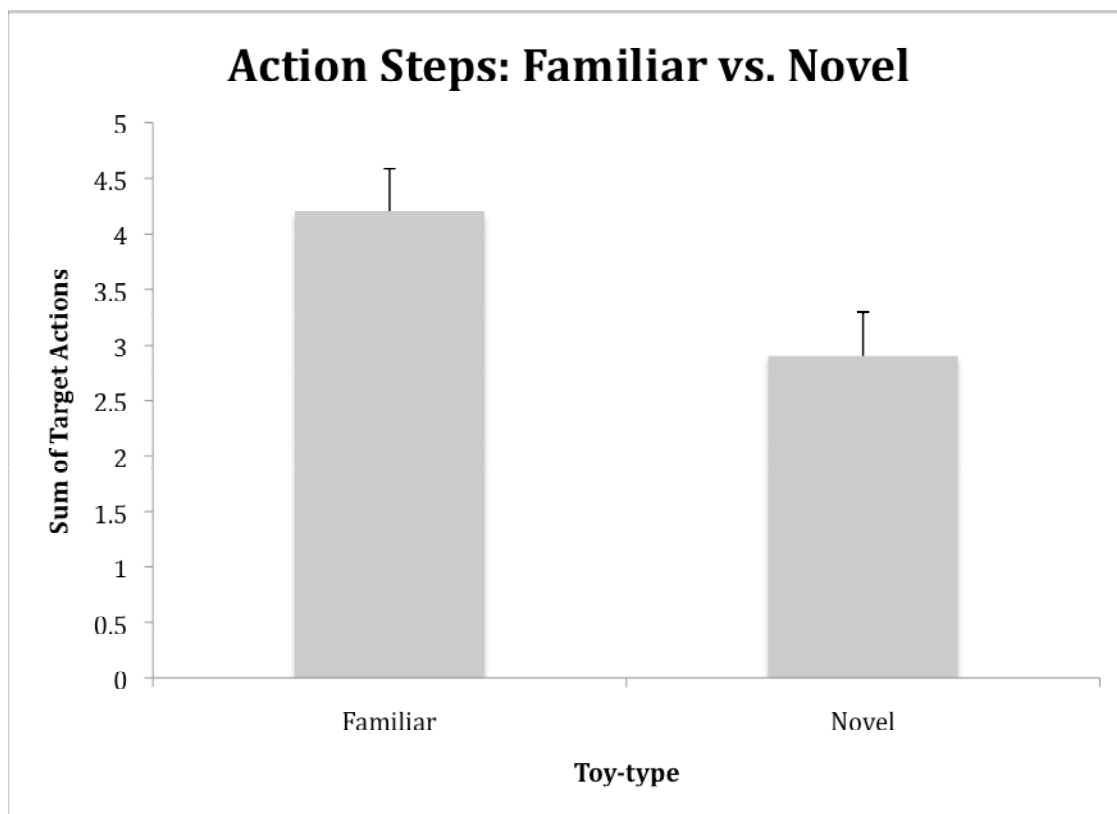


Figure 4.6. Experiment 2: Sum of action steps produced as a function of toy-type, averaged across all children. Scores range from 0-6.

Discussion

The results suggest that by age 3, children selectively seek and offer help on problem-solving tasks. Ninety percent of participants sought help on at least one trial, and in doing so they showed a strong preference for the experimenter who was portrayed as high in competency and social availability. Children already exhibit this preference at the onset on the experiment and tend to maintain it throughout the testing session. This parallels our findings of selective help-seeking from Experiment 1. Additionally, 30 % of the participants spontaneously offered help on one or more trials, and the offers followed a consistent pattern: they were made only after the child had discovered how to solve the problem, and they were always directed toward experimenter who was portrayed as low in competency and social availability. In Experiment 1 we had seen only one 23-month-old child exhibit this pattern of selective helping.

The finding of spontaneous offers of help by age 3 contributes to growing evidence that young children have substantial prosocial tendencies (Brownell et al., 2009; Warneken et al., 2006). For example, children as young as 12 months will point to an object a person is searching for (Lizkowski et al., 2006) and by 18 months, children will hand objects to individuals who have difficulty reaching them (Warneken et al., 2006). When someone's treasured object (e.g., a balloon) is intentionally destroyed, children 18 months of age and older will comfort and express concern towards this person, even if she expresses no emotional distress (Vaish et al., 2009). Two-year olds have been observed to selectively offer help to their younger than to their older peers or to adults (Kaneko & Hamazaki, 1987). Four-year-old children have been observed to spontaneously offer help to a peer who is struggling on a computer-task, even if this help

is not requested, indicating that at a somewhat older age than children in the present study, children are aware of a partner's lack of competency and will readily assist (Perlmutter et al., 1989). The present study is the first to show that by age 3, children will spontaneously offer help to individuals who demonstrate a lack of competency.

The familiarity of the task also appears to play a role in determining when children turn to others for help and when they offer help. On the trials in which children were presented with toys that they had seen demonstrated previously, they were less likely to seek help than on trials that involved novel toys, which presumably posed a greater challenge. Children were more successful in operating toys they had seen previously and were less likely to seek help if they were able to operate the toys on their own. Though children were overall more likely to seek help when presented with novel toys, this can be explained by the fact that children had more difficulty in successfully operating these toys on their own. As with the familiar toys, children were more likely to seek help when they were struggling in manipulating the toy rather than when they could figure it out on their own. In fact, overall, children were most likely to seek help when presented with a novel toy they could not operate on their own. One reason why children sought more help when failing with novel compared to familiar toys could be that children's interest for figuring out novel toys was greater than for familiar toys, for which they had already seen a successful demonstration. This could explain children's greater motivation in soliciting help from the experimenters for the novel toys.

Overall, this indicates that children at this age adapt their level of help-seeking based on the difficulty of the problem-situation. This finding is consistent with evidence that by 18 months of age, children are particularly likely to seek help in situations that are

challenging for them (Geppert & Küster, 1983; DeCooke & Brownell, 1995). The present findings also suggest that by age 3, children have some ability to generalize what they have learned about an individual's psychological characteristics across situations, and that they are able to identify and selectively seek help when solving novel problems.

The finding that young children preferred to seek help from the competent and socially available experimenter leaves the question of the relative importance of cues to competency and social availability unanswered. Previous research suggests a developmental shift in emphasis on these cues in help-seeking contexts, with 5- and 6-year-olds emphasizing social availability to a greater extent, and older children and adults showing the reverse pattern (Feldman and Ruble, 1988; Thompson et al., 1995). This suggests that for participants in the present study, social availability cues may have been more salient than the competency cues in guiding help-seeking behavior.

Children age 3 and younger were selective in their use of trait-related psychological cues when seeking help, and many also began to make selective and spontaneous offers of help. Furthermore, participants took the familiarity of the task into account both when both seeking help and offering help. These findings suggest that 3-year-old children are capable of interacting distinctly with others in problem-solving contexts based on differences in psychological cues.

Chapter 5: Age-related changes in children's selective choice of social learning partners in problem-solving situations.

Summary

One of the aims of this set of experiments was to assess age-related changes in young children's selective interactions with social learning partners in problem-solving situations between the second and third year of life. Here, we directly compare the two age-groups included in Experiment 1 and 2, 20-24 month olds and 32-36 month olds, with each other on measures of help-seeking and success in operating toys.

In general, younger children were less successful at operating on toys and sought help more frequently compared to children in the older age-group. In contrast to younger children, older children also selectively sought help more frequently in novel toy trials compared to familiar toy-trials. Younger children did not show this selectivity as a function of familiarity with the toy. Importantly, we found no age-related differences in the degree of selectivity children displayed when seeking help from social learning partners. Analyses also revealed an age-group x gender interaction. Girls sought help more frequently than boys in the older but not the younger age-group. There was no effect of gender or age-group by gender interaction on the measure of success on toys. Analyses were not run on measures of help-offering, as only one child in the younger group showed evidence of this behavior. We discuss the bases of age-related differences in help-seeking and -offering the context of the development of prosocial behavior and trait-perception.

Introduction

In this section we focus on age-related changes in children's preference for social-learning partners in problem-solving situations. So far, we have established that by age 2, young children are sensitive to psychological cues and are selective help-seekers, a finding that was replicated with children age 32-36 months. One of the primary age-related differences that we have established is that in contrast to children in the younger age-group, older children are beginning to show selectivity when offering help.

However, this does not mean that there are no age-related differences in children's sensitivity to psychological cues and their preference for a given social learning partner when seeking help. Given that children in both age-groups are selective help-seekers, it is possible that children by age 3 children are more selective and show a greater preference for a given partner compared to their younger counterparts. This might index an increase in children's sensitivity to psychological cues and an improved ability to use this information to effectively seek help.

With age, children are also more likely to succeed in problem-solving situations (DeLoache et al., 1985). Previous findings indicate that with age and experience in manipulating objects, children's problem-solving skills increase, resulting in improved ability to manipulate the toys without help (Geppert & Küster, 1983). Similarly, studies on young children's behavior in problem-solving situations indicates that as children become more self-sufficient with age, their spontaneous help-seeking in problem-solving situations decreases (e.g., Benenson & Koulmazarian, 2008; Geppert & Küster, 1983).

Finally, some studies on young children's help-seeking in problem-solving situations have reported an effect of gender on help-seeking that emerges around 3 years

of age (Benenson & Koulkazarian, 2008; Thompson, 1999). In these studies, girls sought help more readily than boys, even though they were equally successful in handling the task (e.g., assembling a puzzle) (Thompson, 1999).

Here, we address questions of age-related and gender-related differences in children's interactions with social learning partners when solving problems. To meet this end, we combined the data-sets from Experiment 1 and 2 and tested for possible effects of age and gender on our primary dependent measures, selective help-seeking and success in operating the toys. Our predictions are that compared to younger children older children a) will show greater selectivity in their help-seeking, b) will be more successful at manipulating toys and thus seek help less frequently and c) among older but not younger children, girls will be more likely to seek help compared to boys.

Methods

Participants. We conducted these analyses on the combined data of children from experiment 1 (age 20-24 months) and 2 (age 32-36 months) ($N = 60$; $F = 30$).

Data-analysis. We ran several repeated measures ANOVAs on measures of children's help-seeking and success on operating the toys, followed by Bonferroni adjusted planned pair-wise comparisons between the 3 possible targets of help-seeking and -offering.

Help-seeking. We ran a $3 \times 2 \times 2$ (Target x Age-group x Gender) repeated measures ANOVA on children's preference for a given target when seeking help.

Help-seeking and familiarity. We ran a 2 x 2 (toy-type x age-group) repeated measures ANOVA on children's help-seeking as a function of toy-type, to assess whether children varied their help-seeking based on familiarity with the toys.

Action steps. We ran a 2 x 2 x 2 (toy-type x age-group x gender) repeated measures ANOVA on the number of action steps produced with toys.

Results

Help-seeking. There was a main effect of target, $F(2,112) = 19.65, p < .001$. Planned pair-wise comparisons revealed that all children sought help significantly more often from experimenter HC/HA compared to both experimenter LC/LA ($F(1,59) = 32.09, p < .001$) and the parent ($F(1,59) = 23.02, p < .001$). There was a main effect of age, $F(1,56) = 23.84, p < .001$. Two-year-old children sought help significantly more often ($M = 1.19, SD = .79$) compared to 3-year-old children ($M = .72, SD = .46$). There was no interaction-effect between target-preference and age. Children in both age-groups showed an equally strong preference for experimenter HC/HA over the other two targets of help-seeking behavior. The main effect of gender approached significance, $F(1,58) = 3.54, p < .065$, in the expected direction, with girls ($M = 1.04, SD = .5$) showing slightly more help-seeking behaviors compared to boys ($M = .87, SD = .68$). There was a significant age by gender interaction, $F(1,58) = 3.94, p < .05$. Whereas girls in the older age-group showed more help-seeking than boys, this effect of gender was not found in younger age-group.

Help-seeking and familiarity. We found a main effect of toy-type, $F(1,58) = 14.796, p < .001$. Collapsed across age-groups, children showed more help-seeking with

novel ($M = 1.62$, $SD = .64$) compared to familiar ($M = 1.2$, $SD = .82$) toys. There was a main effect of age, $F(1,58) = 16.237$, $p < .001$. Collapsed across toy-type, younger children sought help more frequently than older children. There was an interaction-effect between toy-type and age-group, $F(1,58) = 5.327$, $p < .05$. Older, but not younger, children sought help more on novel toy trials compared to familiar toy trials. No effect of toy-type was found for younger children.

Action steps. We found a main effect of toy-type, $F(1,56) = 25.91$, $p < .001$. Collapsed across age, children produced more action steps with familiar (3.52 , $SD = 2.15$) compared to novel ($M = 2.18$, $SD = 1.9$) toys. There was a main effect of age, $F(1,56) = 11.2$, $p < .001$. Collapsed across toy-type, older children produced more action steps ($M = 3.57$, $SD = 2.24$) compared to younger children ($M = 2.19$, $SD = 2.17$). An analysis of a toy-type x age interaction revealed no significant effect. We found no main effect of gender and no interaction effects involving gender.

Discussion

A comparison of help-seeking and target action behaviors between 20-24-month-olds and 32-36-month-olds revealed several interesting age-related differences in how children interact with others in social learning situations. First, young children sought help more frequently than older children. This is in line with other work that has looked at young children's spontaneous help-seeking and has reported a decrease in the amount of help-seeking throughout the preschool years (Benenson & Koulmazarian, 2008; Farris, 1994). There are two possible explanations for this finding. One is that younger children are simply more likely to seek help in problem-solving situations. However, this seems unlikely, given previous findings that suggest that with age, children become more effective self-regulated help-seekers (Newman, 2000). The second, more plausible account is that the task at hand was more difficult for younger than for older children. In support of this explanation, older children produced more action steps compared to younger children and were significantly more successful at operating both novel and familiar toys. This suggests that by age 2, children know when they need help and will solicit assistance in order to overcome task-difficulty, a sign of self-regulated adaptive help-seeking.

Interestingly, we found an interaction effect between age and gender on the frequency of help-seeking. Among the group of 32-36 month old children girls sought help more frequently compared to boys. We also found evidence of a gender effect on help-seeking behavior. Overall, girls were more likely to solicit help than boys. This is in line with previous research that suggest that by age 3, girls will engage in more collaborative interactions with others in social learning situations and are more likely to

elicit helping in their social learning partners (Benenson & Koulmazarian, 2008; Thompson, 1999; Thompson & Moore, 2000). Interestingly, we found no evidence of a gender effect in the measure of children's success in operating the toys. Boys and girls were equally likely to fail or be successful in operating the toy, suggesting that the greater level of help-seeking in girls was not simply due to a gender effect on task-difficulty (Thompson, 1999). Rather, our results are consistent with previous findings indicating that by around age 3, girls show more affiliative behavior and are more socially oriented in problem-solving situations, seeking help more readily than boys, who exhibit more object oriented behaviors (Benenson & Koulmazarian, 2008; Thompson, 1999; Thompson & Moore, 2000).

Finally, we failed to find an interaction effect between target and age-group on children's help-seeking behavior. This indicates that contrary to our hypothesis, children in the older age-group did not display a greater preference for experimenter HC/HA compared to children in the younger age-group. Overall, the pattern of selectivity in help-seeking was the same across both age-groups. This suggests that before their second birthday children are sensitive to psychological cues associated with their social-learning partners and will show preferences for these partners in a similar manner as older children do when they require help. However, this does not exclude the possibility that age-related differences in children's sensitivity to psychological cues do exist. In experiments 1 and 2 we presented children with the most extreme contrasts between experimenters along trait-dimensions of competency and social-availability, and as younger children already exhibited a strong preference for experimenter HC/HA, it is possible that our lack of a significant interaction effect was due to ceiling effects. One

way to investigate perhaps more subtle differences in children's sensitivity to and preference for psychological cues is to present them with social learning partners who exhibit novel combinations of traits along these trait-dimensions that give rise to a less salient contrast. The aim of experiment 3 (see Chapter 6) is to take a first step in this direction and investigate the relative influence of competency and social-availability on 20-24-month-olds' interactions with social-learning partners who exhibit novel combinations of competency and social-availability.

Chapter 6: A friend who knows what to do: both competency and social-availability drive selective help-seeking in the second year of life.

Summary

Here, we explored the relative impact of social availability and competency on young children's (20-24 months) selective help-seeking and -offering. Condition A served as an attempt to replicate experiment 1; in 3 additional conditions (B-D), children's social learning partners exhibited novel combinations of traits along dimensions of social availability and competency. In condition B, each experimenter had one positive and one negative trait; in two further conditions experimenters were equally high or low, respectively, along the dimension of social availability and differed only with respect to how competent they were at the task. Results replicated the findings from Experiment 1, as children preferred to seek help from the competent and socially available experimenter when she was pitted against someone lacking these traits. Children failed to show any selective help-seeking in the 3 remaining conditions when the contrast between experimenters was less salient. Across all conditions, we failed to find any reliable evidence of spontaneous selective help-offering.

Introduction

Experiment 1 established that by age 2 young children selectively seek help from a social learning partner who is both high in competency and social availability when she is paired with someone who is portrayed as low along these trait-dimensions. Thus, children are sensitive to trait-related differences between their social learning partners when psychological cues associated with traits signal a salient contrast between the partners' and the quality of help they are likely to provide. What is unclear based on these data is what specifically is driving children's preference for one partner over another. It is possible that for young children the selection of a partner depends more strongly on cues associated with social availability, cues associated with competency or a combination of these two types of cues. The present experiment was designed to address this question by pitting experimenters with novel trait-combinations against each other.

First, we wondered whether 20-24 month old children would also exhibit a "liking bias". This tendency to favor information associated with social availability over information associated with competency when choosing among unfamiliar partners has been reported in children age 3-6 (Feldman & Ruble, 1988; Leonova & Dubois, 2002; Thompson et al., 1995). Given that infants pay attention to a wide range of social cues and prefer to interact with a partner who behaves in a socially engaging manner (Bigelow & Birch, 2006; Nielsen et al., 2006), it seems plausible that toddlers might already exhibit a liking bias when selecting a partner for help in a problem-solving situation. One way to test this is to pit one experimenter who is competent but not very available (HC/LA) against another who is very available but incompetent (LC/HA). Finding that children

preferred the experimenter LC/HA over HC/LA would suggest that by age 2 children already show a liking bias.

Another possibility in this situation is that children might favor experimenter HC/LA, thereby choosing the partner who can provide a solution to the problem, albeit in a less socially engaging manner. This kind of “competency bias” would indicate that children’s target preference in a problem-solving situation depends more strongly on a partner’s competency than on social availability. In previous studies, only older children (age 9-11) but not younger children (5-6) showed this tendency to make instrumental partner choices that promised to maximize their gains (e.g. winning prizes) (Feldman & Ruble, 1988; though see Leonova & Dubois for an alternative finding). This finding seems somewhat less likely, given that in the course of development children understand and can reason about social traits before ability (Heyman et al., 2003; Stipek & Tannatt, 1984). However, by toddlerhood, children are also extremely outcome oriented (Kenward et al., 2009) in problem-solving tasks and might therefore exhibit a selective preference for a social-learning partner who can successfully bring about a desired goal (i.e., retrieval of the toy).

A third possibility is that children no longer exhibit a preference for one experimenter over another. This would indicate that by age 2 children are sensitive to cues of both competency and social availability and weight them equally heavily when selecting a partner. This would suggest that children show a preference for a social learning partner only when cues regarding the quality of this source of help are unambiguous.

We included two additional conditions in this experiment, in which we held the level of social availability constant while varying the level of competency among experimenters. Thus, in condition C, both experimenters are highly socially available, but only one is also competent (HC/HA) while the other is low along this trait dimension (LC/HA). In condition D, both experimenters are low along the dimension of social availability, but one is also low in competency (LC/LA), while the other knows how to operate the toys (HC/LA).

Our reasoning for including these conditions was as follows. Given that social cues matter to young children when interacting with a social learning partner, we wondered whether we could set up a situation in which children would selectively seek help based on cues of competency alone. Our main question motivating the design of condition C was therefore: “Given that both partners are socially available, do children care about competency?”. Evidence indicating that by age 2, children are very outcome oriented in problem-solving tasks suggests that they may treat competency in a partner as a relevant psychological cue. Two- to 3-year-old children also are sensitive to the efficiency and normative correctness of the means of reaching a goal and care about whether something is done in a “right” or “wrong” way (Warneken et al., 2006; Williamson et al., 2008).

While little is known about how young children respond to differences in other’s competency in manipulating objects, there is evidence about children’s sensitivity to cues associated with the quality of a source of information. Beginning around age 2, young children will selectively trust information from a reliable over an unreliable source, even when both sources are equally socially available (Birch et al., 2010; Birch et al., 2008;

Jaswal & Neely, 2006; Koenig & Harris, 2005; Nurmsoo & Robinson, 2009). There is also a large body of work indicating that infants are already sensitive to the intentionality of an act and selectively imitate intentional rather than accidental acts (Meltzoff, 1995; Nielsen, 2009).

If children indeed are sensitive to cues of competency and are influenced by these cues we might nonetheless see differences in situations in which both experimenters are socially available vs. situations in which they are not very socially available. One possibility is that children will be more sensitive to cues of competency in the first of the two conditions, in which both experimenters are socially available. Given that young children care about social cues, they are likely to approach experimenters more frequently when they are both social, which may facilitate the detection of any selectivity. If children show a preference, we predict that this preference would be for a socially available and competent experimenter. However, there is also a chance that when both social learning partners are socially available children show a greater interest in interacting with the partner who is incompetent. One very interesting finding would be if 20-24 month olds now showed greater levels of selective help-seeking towards the competent and help-offering towards the incompetent social learning partner, akin to our findings with children in the older age-group.

What if children showed no target preference? This could have one of three explanations: either cues of competency have no influence on young children's interactions with others; what matters are cues of social-availability alone. A less extreme account might explain the lack of target preference with relative differences in the salience of differences in competency and social-availability. Young children may indeed

be sensitive to cues of competency, but given that both partners are socially available, these differences might not be strong enough to drive selective interactions in a problem-solving situation. Finally, it may mean that young children are equally sensitive to differences on both trait-dimensions of competency and social availability, but that strong contrasts along both dimensions are necessary to highlight these differences and elicit a target preference in children.

To our knowledge, there have been no studies in which young children have been presented with two social learning partners who are both low in social-availability, our predictions for the outcomes of this condition are therefore speculative. It is possible that in this condition, children will fail to interact with the experimenters altogether, given that neither are particularly engaging. While this is possible findings from experiment 1 and 2 indicate that while children show a preference for the socially available experimenter, they do not completely avoid the experimenter who is low in social-availability; in experiment 2 some children even selectively approached this experimenter in order to offer help.

Assume that children do approach the experimenters when both are low in social availability, can we expect them to show a target preference in this condition? If yes, we would expect them to prefer the experimenter who was high in competency. Indeed, if the dimension of social availability is much more salient to children than the dimension of competency, children may be more sensitive to a high level of competency when it appears as the single positive cue among otherwise negative cues. It is possible then that in this condition children will turn to the experimenter who exhibits at least one useful characteristic.

Even if children approach the experimenters, it is possible that in this condition children will fail to show a target preference. Indeed, if we found a lack of preference in both condition C and D, this would offer the strongest support for the hypothesis that in problem-solving situations competency alone does not influence 20-24-month olds' interactions with their social learning partners, regardless of how socially available they are.

We investigated the relative importance of competency and social availability by adding 3 novel conditions to our previous design. In each of these 3 new conditions, we presented children with novel combinations of experimenters and measured their tendency to seek and offer help. We expect findings to a) replicate results from Experiment 1 and b) further inform us of the influence of competency and social-availability on young children's partner selection in problem-solving situations.

Method

Participants. Participants were 80 children age 20-24 months ($M = 21.9$ months). Children were white (%66), Hispanic (%7) or of mixed ethnicity (%27). Equal numbers of boys and girls participated in this study. All children had been born within 2 weeks of their due date and had no history of complications at birth or throughout development.

Procedure. The procedure of this study was identical to the procedure described in the general methods, with the exception of the introduction of two novel types of experimenters. Whereas study 1a and b had featured experimenters who expressed traits either high or low on both trait-dimensions of competency and social availability, two novel types of experimenters were introduced in this study who expressed one positive

and one negative trait along dimensions of competency and social availability. This resulted in two new trait combinations, such that there was an experimenter type who was high in competency but low in social availability (HC/LA) and one who was low in competency but high in social availability (LC/HA). Children were randomly assigned to one of four conditions (N=20 per condition). In each condition we presented children with a different combination of experimenters: condition A had the same combination of experimenters as Experiment 1 and 2 and was designed to serve as a replication of Experiment 1. In conditions B through D, novel types of experimenters were introduced and pitted against each other. In condition B, experimenter HC/LA was pitted against experimenter LC/HA, in condition C experimenter HC/HA and was pitted against experimenter LC/HA and in condition D experimenter HC/LA was pitted against experimenter LC/LA

Coding. Cohen's Kappa was .81.

Results

Results for each of the four conditions are reported separately below.

Condition A: High Competency/High Social Availability vs. Low Competency/Low Social Availability.

Help-seeking scores. All children (N=20) sought help on at least one occasion. Sixty-four percent of help-seeking attempts were directed towards one of the experimenters, 36% were directed at the parent. A one-way repeated measures ANOVA on the average help-seeking scores for all children revealed a main effect of the target of help-seeking behavior, $F(2,18) = 4.39, p < .05$. Tests of the 3 a priori hypotheses were

conducted using planned multiple comparisons with Bonferroni adjusted alpha levels of .016 per test (.05/3) and indicated that children turned significantly more often to experimenter HC/HA than to experimenter LC/LA ($F(1,19) = 14.1, p < .05$). The difference between help-seeking scores of experimenter HC/HA and parent ($F(1,19) = 1.37, p = .76$) or between LC/LA and the parent ($F(1,19) = 1.15, p = .85$) were not significant (see Table 6.1/Figure 6.1).

An analysis of children's preference for seeking help from a particular target the first time they sought help revealed that they selectively turned to the highly competent and socially available experimenter over the experimenter who was low along these dimensions, $\chi^2(1, N = 19) = 4.26, p < 0.05$. This preference was maintained until the last time they sought help, $\chi^2(1, N = 17) = 7.12, p < 0.01$ (see Figure 6.2).

Help-offering. Only one child out of 20 showed an attempt to offer help during a single trial of the testing-session. This help-seeking attempt was directed towards the experimenter who was low in competency and social availability. Due to the low incidence, help-offering scores are not reported in Table 6.1.

Help-seeking and success on toys.

Children sought help on 64% of “fail-trials” compared to 54% of “success-trials”. Chi-square analysis on the four possible outcomes (success/fail x novel/familiar), revealed that children were significantly more likely to seek help than to not seek help when they failed to operate a novel toy independently ($\chi^2(1, N = 16) = 12.25, p < 0.001$). This pattern was not found for trials on which children were successful in operating the toys on their own ($\chi^2(1, N = 15) = .6, p = .44$) (see Table 6.2/Figure 6.3).

Help-seeking and familiarity. Children sought help more often when they were presented with novel ($M = 1.5$, $SD = .51$) rather than familiar toys ($M = 1.1$, $SD = .78$), a difference that reached significance according to a paired samples t-test, $t(19) = 2.349$, $p < .05$. (see Figure 6.4).

Switching Target of Help-seeking behavior.

Switching across all sessions. Eleven out of 20 children switched their target of help-seeking at least once across the four trials ($M = 1.36$, $SD = .5$). McNemar's test revealed no significant difference in the overall direction of switching. Across all four trials, children were no more likely to switch towards experimenter HC/HA than towards experimenter LC/LA, $p = .33$.

Because this may have been due to the fact that most children had a preference for experimenter HC/HA at the onset of the testing session, we looked at children's switch in target preference as a function of their initial preference. Two of the 14 children who preferred experimenter HC/HA the first time they sought help sought help only once and are therefore not included in this analysis. Nine out of the remaining 12 children (75%) who preferred experimenter HC/HA on their first instance of help-seeking had the same preference the last time they sought help compared to 3 children who switched to target LC/LA, a difference that only approached significance, $\chi^2(1, N = 12)$, 3.0, $p = 0.08$.

Out of the 4 children who preferred experimenter LC/LA on their first help-seeking attempt all children (100%) switched to experimenter HC/HA by the last time they sought help. Chi-square analyses were not run on these data due to the low expected value for switching and non-switching.

Action steps. Data-analysis of action steps revealed that the difference between the number of action steps children produced on familiar ($M = 3.15$, $SD = 1.69$) compared to novel toys ($M = 2.2$, $SD = 1.99$) only approached significance, $t(19) = 1.94$, $p = .067$ (see Figure 6.5).

Table 6.1

Experiment 3, Condition A: Mean help-seeking scores for the 3 potential targets for children in Condition A: the high competency/availability experimenter (HC/HA), the low competency/availability experimenter (LC/LA), and the parent.

<u>Target</u>	<u>Help-seeking</u>
HC/HA	1.30 (1.03)
LC/LA	0.45 (0.69)
Parent	0.80 (1.19)

Note. Possible scores ranged from 0-4. Standard deviations are shown in parentheses.

Table 6.2

Experiment 3, Condition A: Number of children who showed help-seeking vs. no help-seeking given success or failure on familiar and novel trials.

	<u>Help-Seeking</u>	<u>No Help-seeking</u>	<u>Total</u>
Familiar Trials			
Success	4(.40)	5(.60)	10
Fail	9(.60)	6(.40)	15
Novel Trials			
Success	2(.71)	5(.29)	7
Fail	15(.94)	1(.06)*	16

Note: Proportions are given in parentheses. In each case, the number of children who sought or did not seek help were compared. * $p=.001$.

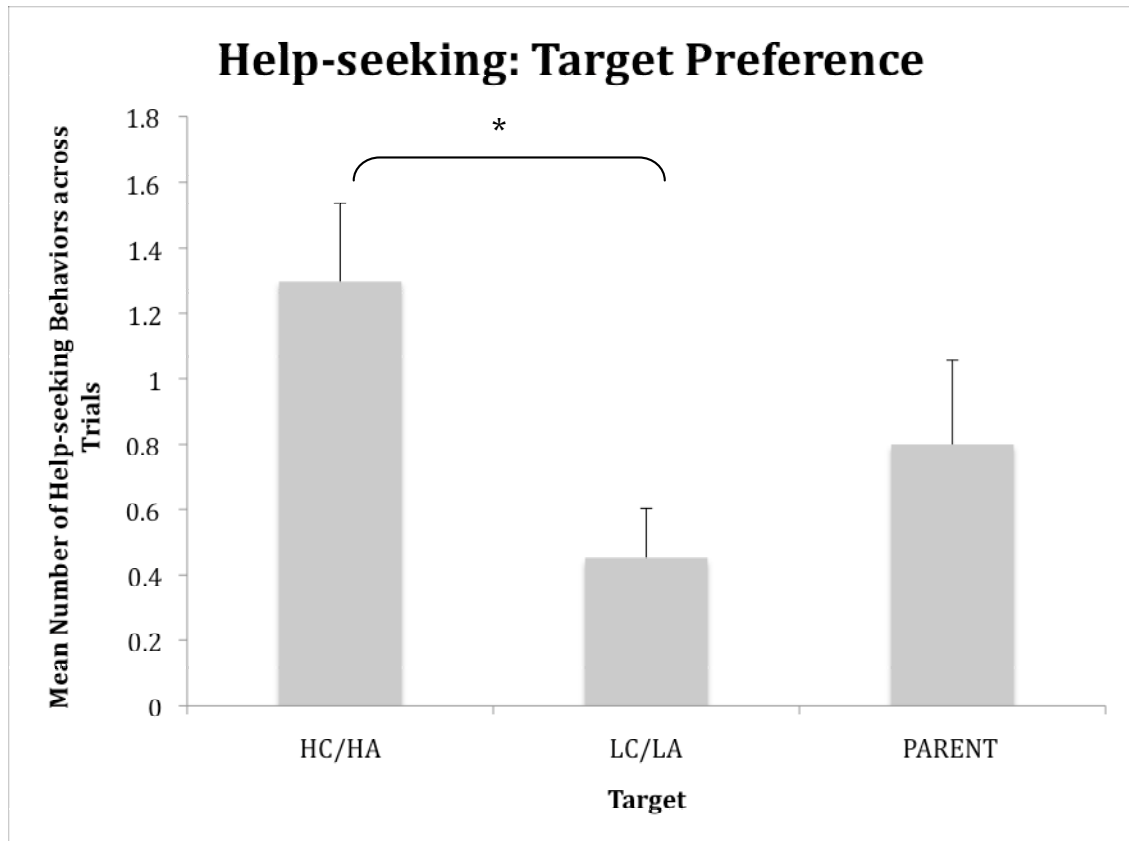


Figure 6.1. Experiment 3, Condition A: Mean help-seeking Scores as a Function of Target. Targets are the high competency/availability experimenter (HC/HA), the low competency/availability experimenter (LC/LA), and the parent. Possible scores ranged from 0-4. * $p < .05$.

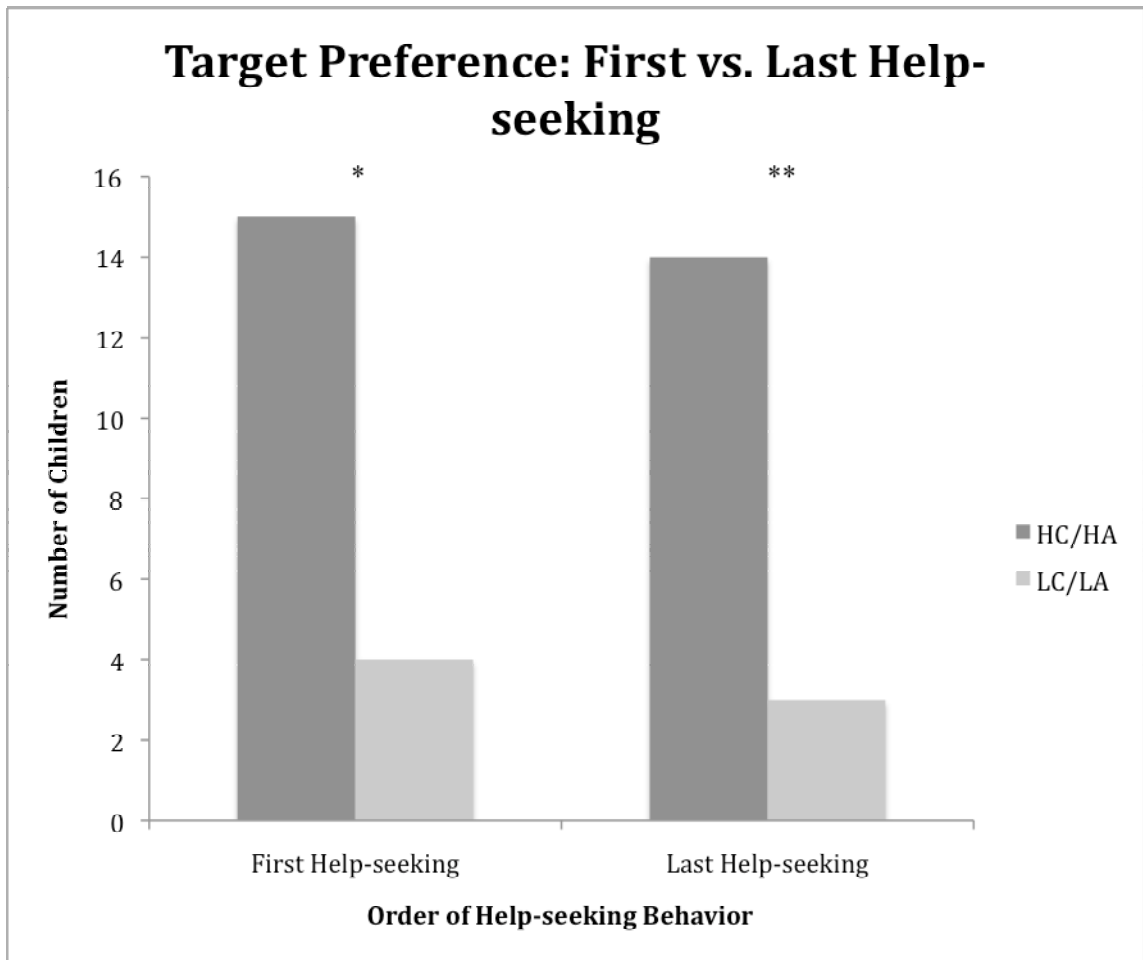


Figure 6.2. Experiment 3, Condition A: Number of children who preferred to seek help from HC/HA compared to LC/LA the first and last time they sought help. * $p < .05$, ** $p < .01$.

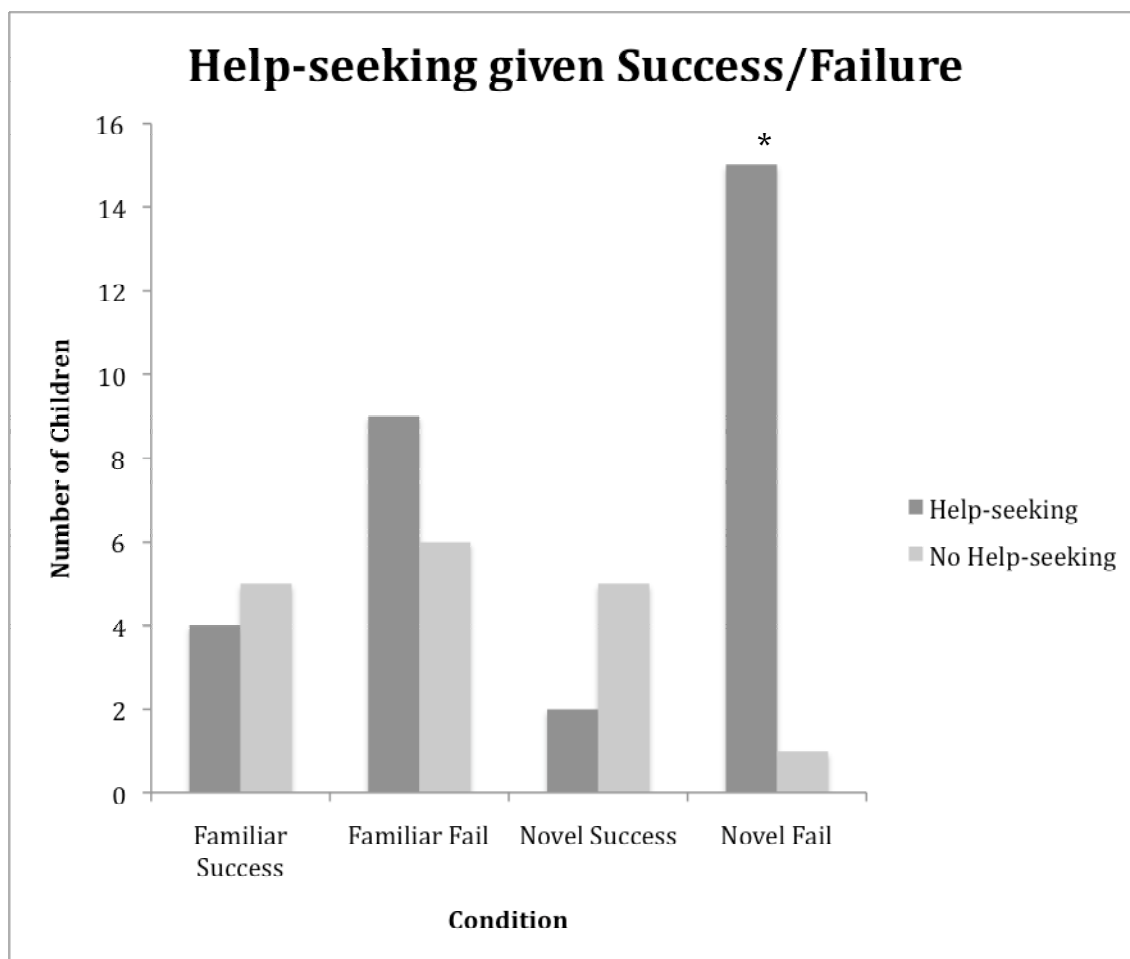


Figure 6.3. Experiment 3, Condition A: Number of children who showed help-seeking or no help-seeking given success or failure on familiar and novel trials. $*p = .001$.

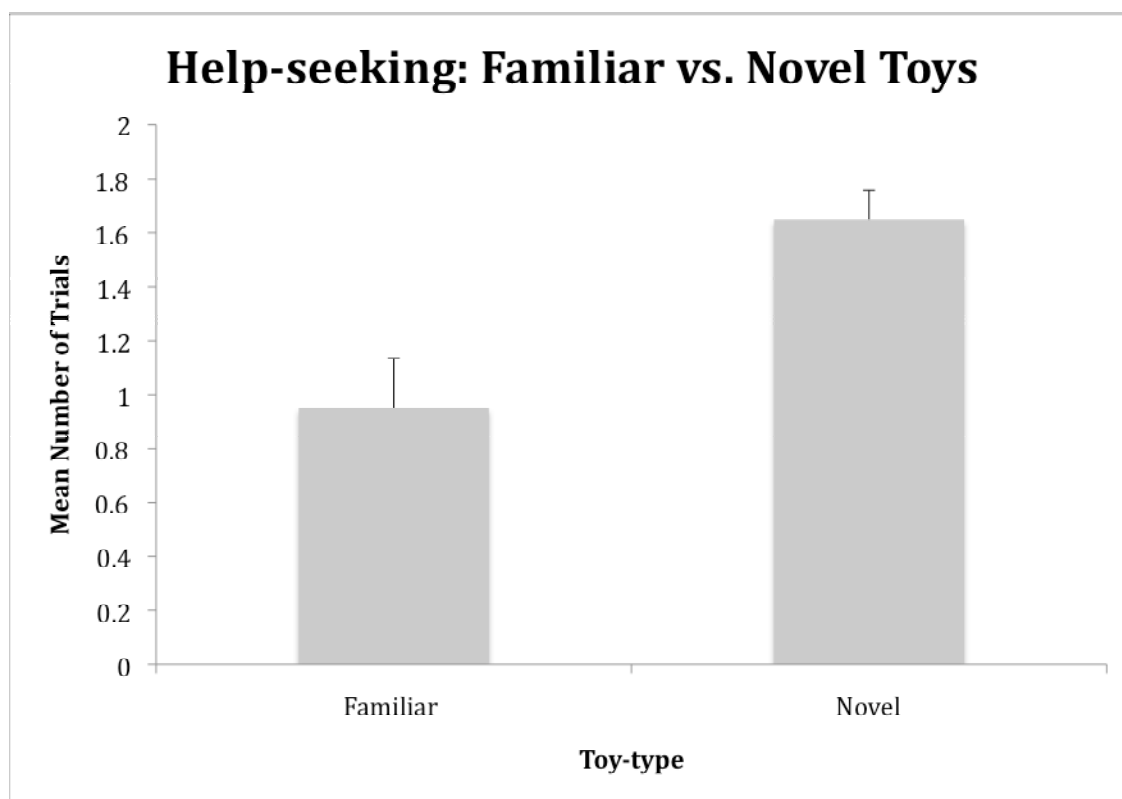


Figure 6.4. Experiment 3, Condition A: Mean number of familiar vs. novel trials on which children sought help. Scores range from 0-2.

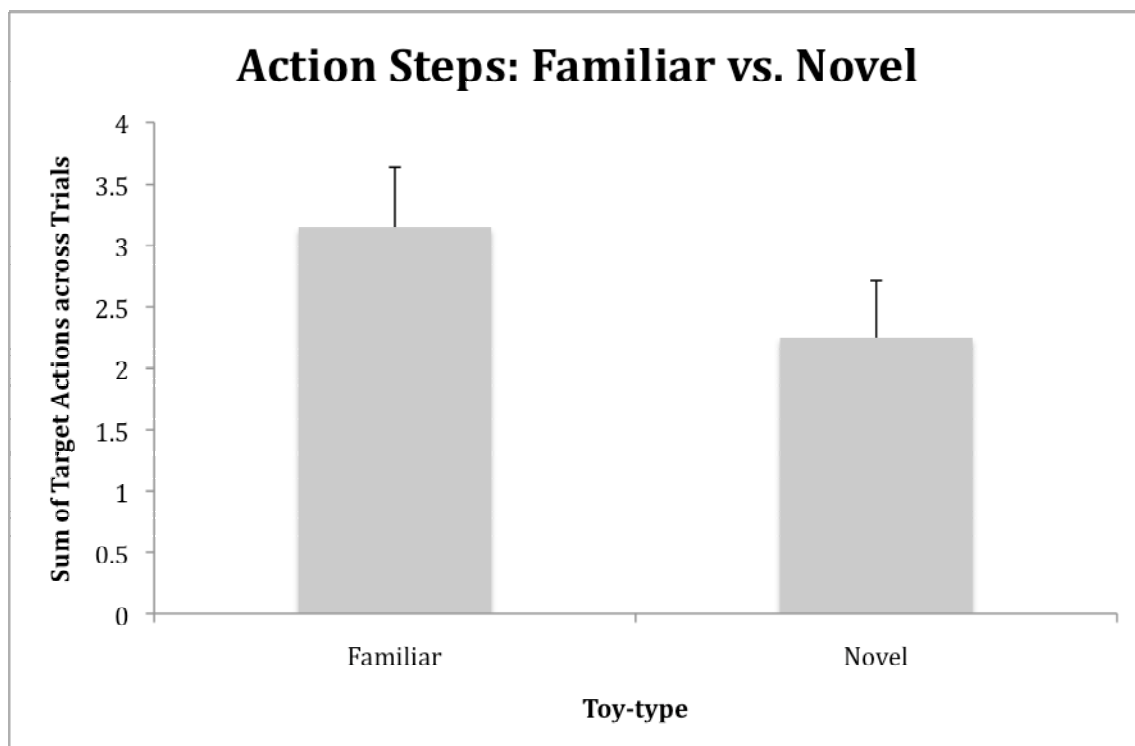


Figure 6.5. Experiment 3, Condition A: Sum of action steps produced as a function of toy-type, averaged across all children. Scores range from 0-6.

Condition B: High Competency/Low Social Availability vs. Low Competency/High Social Availability.

Help-seeking scores. All children ($N = 20$) sought help on at least one occasion. Sixty-three percent of help-seeking attempts were directed towards one of the experimenters, 37% were directed at the parent. A one-way repeated measures ANOVA on the average help-seeking scores for all children revealed no significant main effect of the target of help-seeking behavior (see Table 6.3/Figure 6.6).

Because the ANOVA revealed no main effect of target, we compared help-seeking towards experimenters looking only at the first time that children turned to an experimenter across the trials using a paired-samples t -tests. One child sought help exclusively from her mother and is therefore not included in this analysis. We found no evidence that the 19 remaining children preferred to seek help from experimenter LC/HA ($M = 1.42$, $SD = 1.35$) over HC/LA ($M = 1.31$, $SD = 1.34$).

Chi-square analysis of children's first help-seeking during revealed that in contrast to children in condition A, children in condition B failed to show a preference for one experimenter over the other the first time they sought help. An analysis of the children's last help-seeking attempt also did not reveal a significant difference in the number of children who preferred experimenter HC/LA over LC/HA (see Figure 6.9).

Help-offering. No child showed any evidence of help-offering on any of the trials.

Help-seeking and familiarity. Children sought help just as frequently when they were presented with novel ($M = 1.6$, $SD = .59$) as with familiar toys ($M = 1.6$, $SD = .59$). (see Figure 6.9).

Help-seeking and success on toys. Children sought help on 84% compared to 61% of success trials. Chi-square analysis on the four possible outcomes (success/fail x novel/familiar) revealed that children were significantly more likely to seek help than to not seek help when they failed to operate a toy independently on both novel ($\chi^2(1, N = 20) = 16.2$, $p < 0.001$) and familiar trials ($\chi^2(1, N = 19) = 11.84$, $p = 0.001$). Children were also more likely to not seek help than to seek help on familiar trials on which they were successful ($\chi^2(1, N = 8) = 4.5$, $p < 0.05$). This difference was not observed on novel success trials (see Table 6.3/Figure 6.8).

Switching Target of Help-seeking behavior.

Switching across all sessions. Thirteen out of 20 children switched their target of help-seeking at least once across the four trials ($M = 1.15$, $SD = .37$). McNemar's test revealed no significant difference in the overall direction of switching. Across all four trials, children were no more likely to switch towards experimenter HC/LA than towards experimenter LC/HA, $p = .44$.

We looked at children's tendency to switch target preference as a function of their initial preference. One of the 12 children who preferred experimenter HC/LA the first time they sought help sought help only once and is therefore not included in this analysis. Seven out of the remaining 11 children (64%) who preferred experimenter HC/LA on their first instance of help-seeking had the same preference the last time they sought help

compared to 4 children (36%) who switched to target LC/HA, a difference that did not reach significance.

Out of the 7 children who preferred experimenter LC/HA on their first help-seeking attempt only one child switched to experimenter HC/LA on the last time they sought help, whereas 6 children again sought help from experimenter LC/HA. Chi-square analyses were not run on these data due to the low expected value for switching and non-switching.

Action steps. Data-analysis of action steps revealed that the difference between children were more successful at operating on familiar ($M = 2.7$, $SD = 1.78$) compared to novel toys ($M = 1.9$, $SD = 1.8$) only approached significance, $t(19) = 1.8$, $p = .08$ (see Figure 6.10).

Table 6.3

Experiment 3, Condition B: Mean help-seeking scores for the three potential targets for children in Condition B: the high competency/low availability experimenter (HC/LA), the low competency/high availability experimenter (LC/HA), and the parent.

<u>Target</u>	<u>Help-seeking</u>
HC/LA	0.90 (1.17)
LC/HA	1.05 (1.23)
Parent	1.15 (1.31)

Note: Possible scores ranged from 0-4. Standard deviations are shown in parentheses.

Table 6.4

Experiment 3, Condition B: Frequency of children who showed help-seeking vs. no help-seeking given success or failure on familiar and novel trials.

	Help-Seeking	No Help-seeking	Total
Familiar Trials			
Success	1(.12)	7(.88)*	8
Fail	17(.89)	2(.11)**	19
Novel Trials			
Success	2(.50)	2(.50)	4
Fail	19(.95)	1(.05)**	20

Note. Proportions are given in parentheses. Statistically significant differences between help-seeking v. no help-seeking are denoted by * $p < .05$, ** $p < .001$.

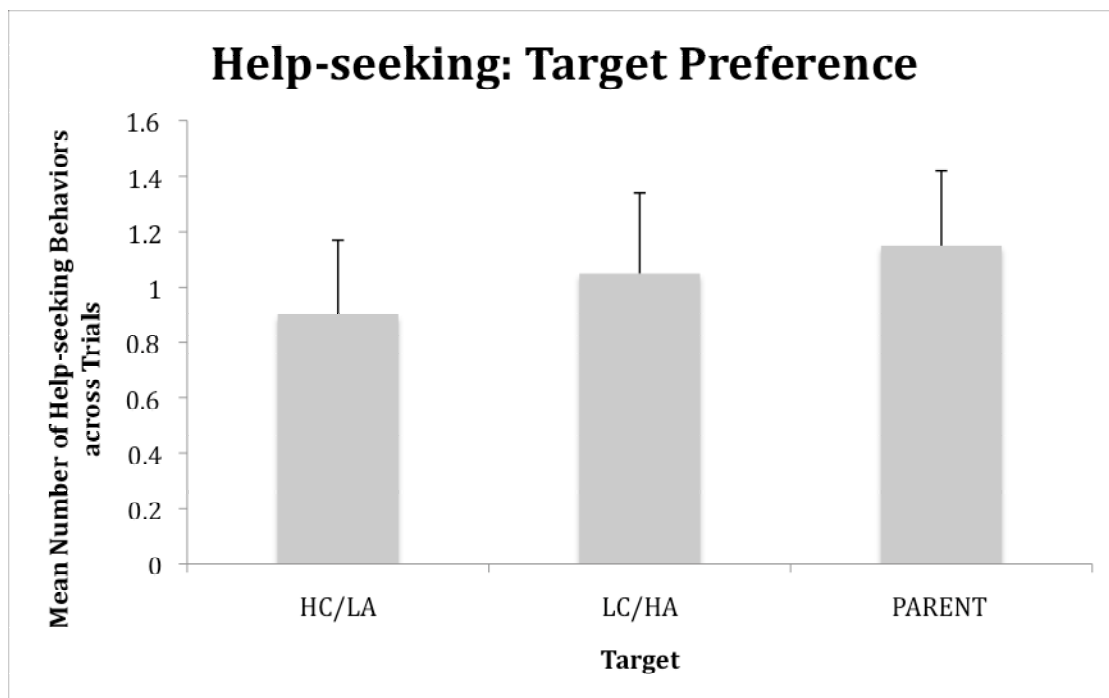


Figure 6.6. Experiment 3, Condition B: Mean help-seeking Scores as a Function of Target. Targets are the high competency/low availability experimenter (HC/LA), the low competency/high availability experimenter (LC/HA), and the parent. Possible scores ranged from 0-4.

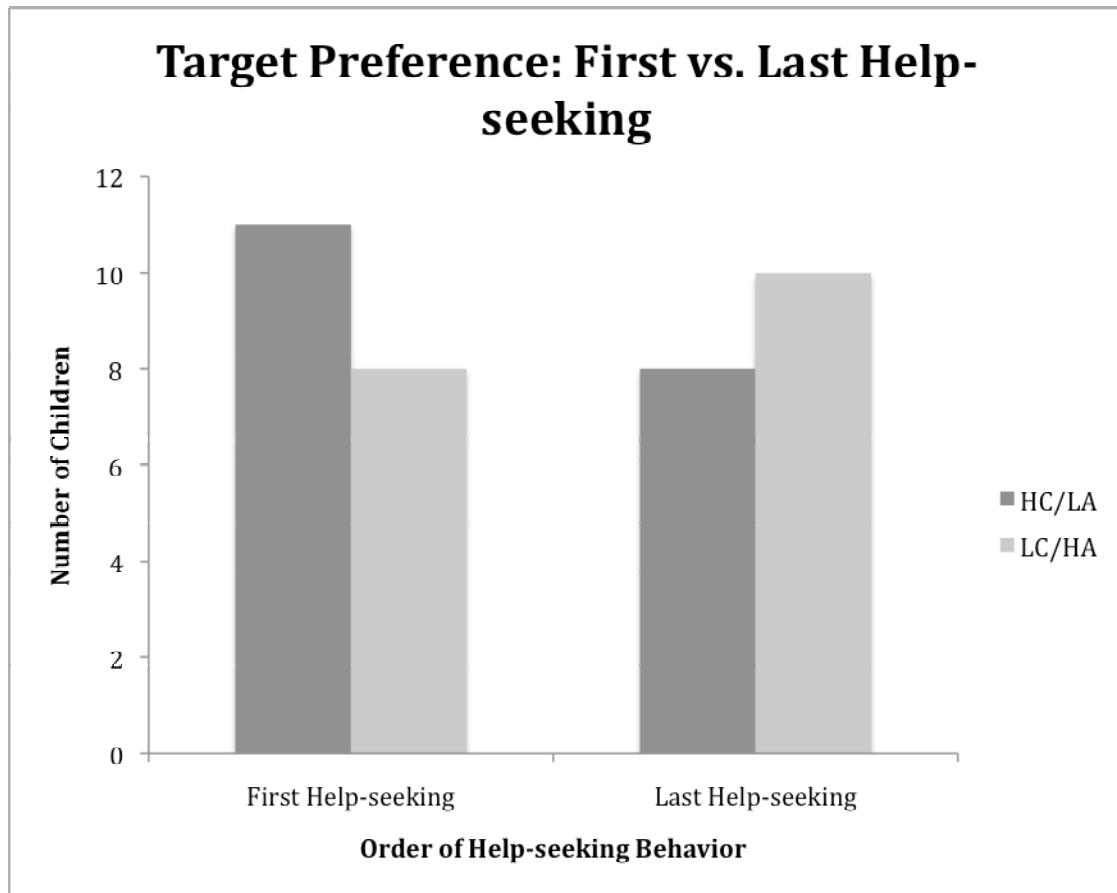


Figure 6.7. Experiment 3, Condition B: Number of children who preferred to seek help from experimenter HC/LA compared to LC/HA the first and last time they sought help.

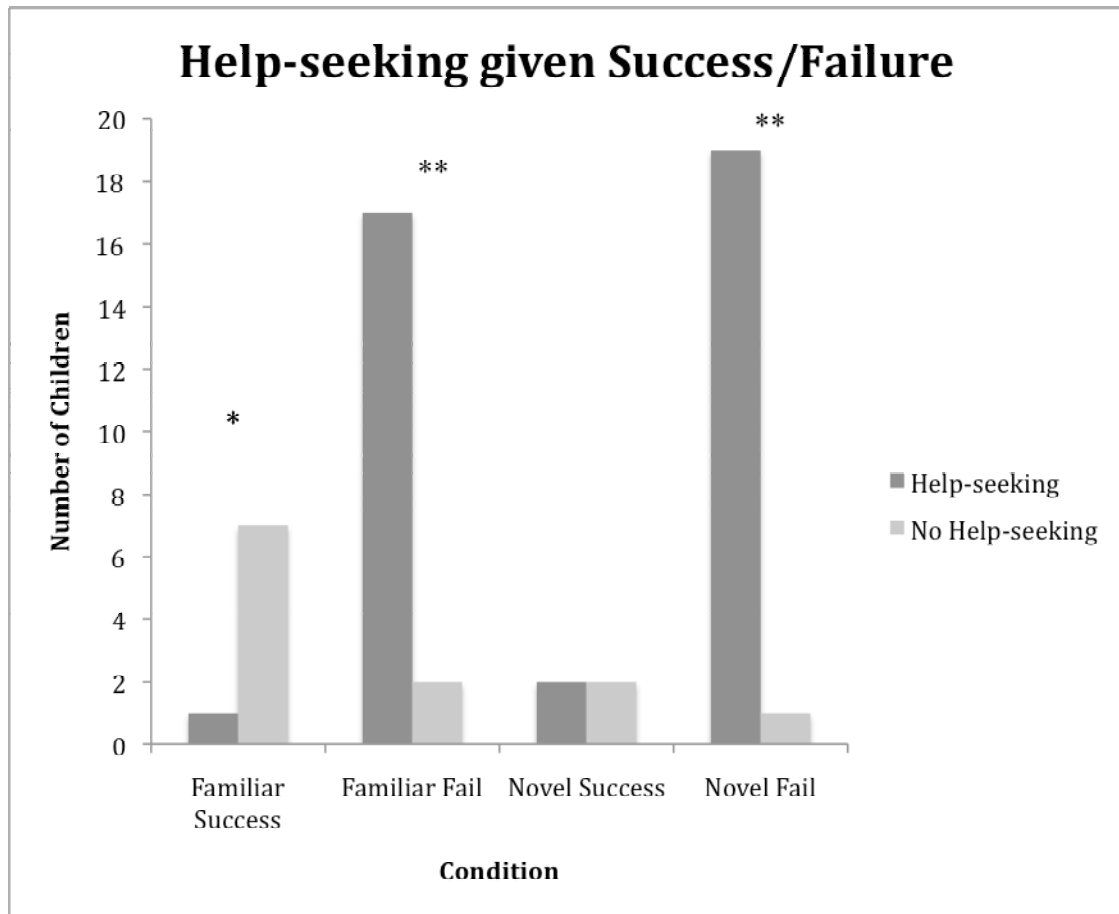


Figure 6.8. Experiment 3, Condition B: Number of children who showed help-seeking vs. no help-seeking given success or failure on familiar and novel trials. $*p < .05$, $**p < .001$.

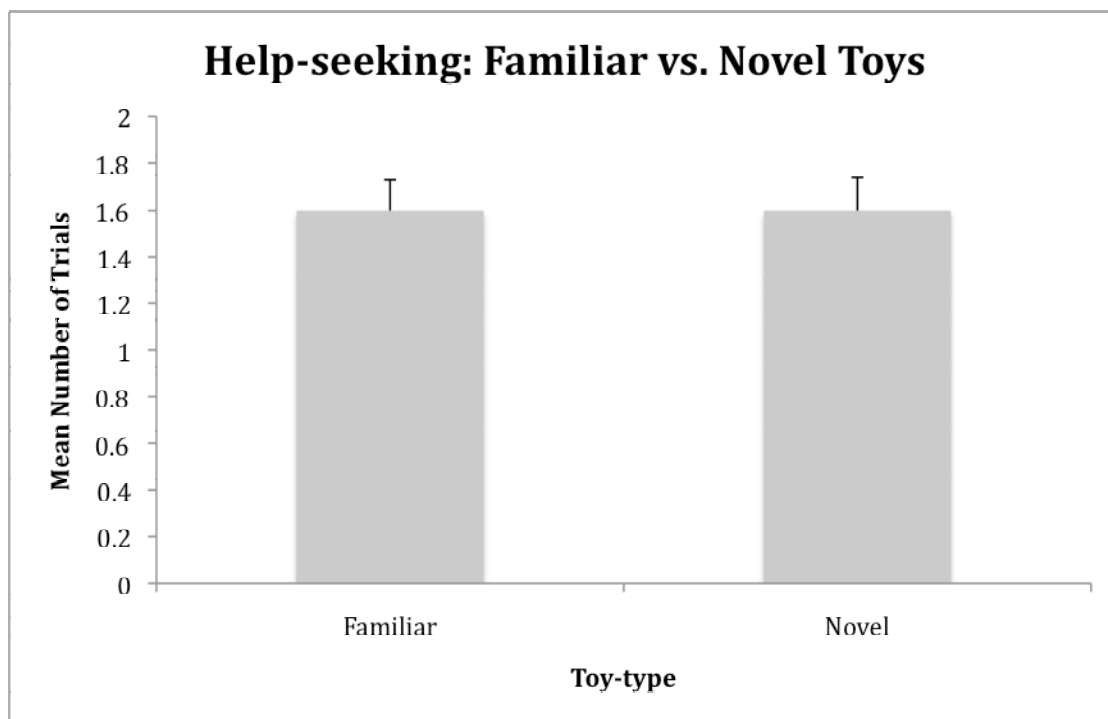


Figure 6.9. Experiment 3, Condition B: Mean number of familiar vs. novel trials on which children sought help. Scores range from 0-2.

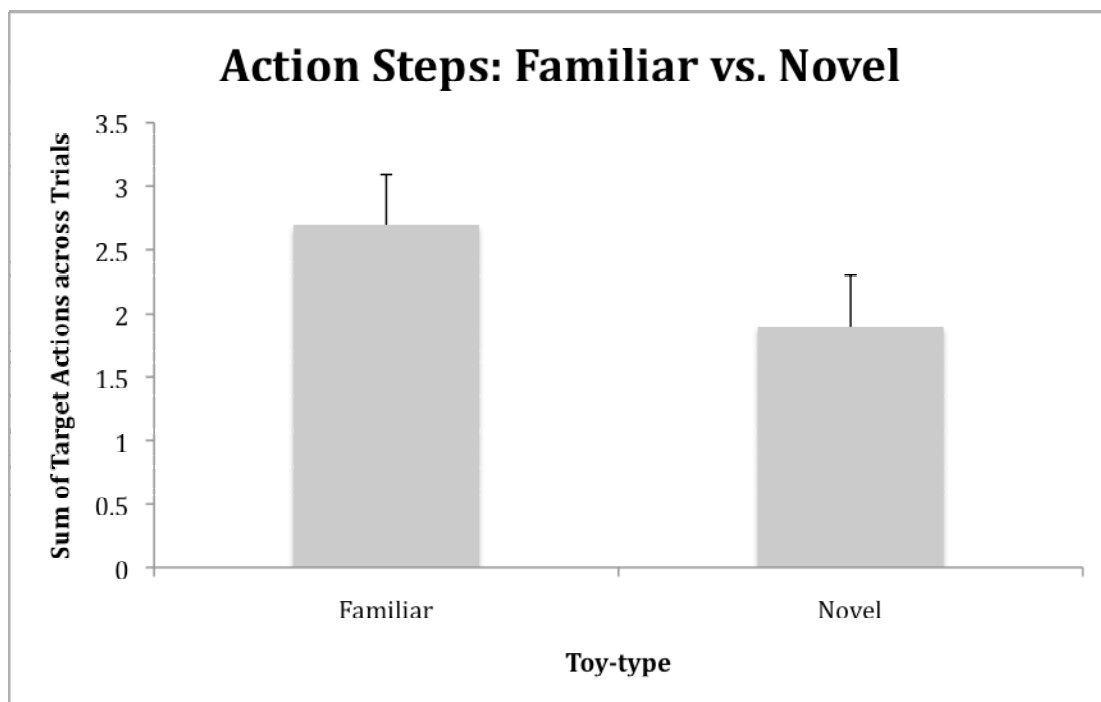


Figure 6.10. Experiment 3, Condition B: Sum of action steps produced as a function of toy-type, averaged across all children. Scores range from 0-6.

Condition C: High Competency/High Social Availability vs. Low Competency/High Social Availability.

Help-seeking scores. All children ($N=20$) sought help on at least one occasion. Sixty-five percent of help-seeking attempts were directed towards one of the experimenters, 35% were directed at the parent. A one-way repeated measures ANOVA on the help-seeking scores revealed no significant effect of the target of help-seeking behavior (see Figure 6.11).

Because the ANOVA revealed no main effect of target, we compared help-seeking towards experimenters looking only at the first time that children turned to an experimenter across the trials using a paired-samples t-tests. We found no evidence for a preference to seek help from experimenter HC/HA ($M = 1.15$, $SD = 1.09$) over experimenter LC/LA ($M = .85$, $SD = .88$).

Chi-square analysis of children's help-seeking during the first trial revealed that in contrast to children in condition A, these children failed to show a preference for one experimenter over the other at the onset of the testing session, $\chi^2(1, N = 17) = .06$, $p = .8$. Children's preference for experimenter HC/HA over experimenter LC/HA during the last trial of the testing session approached significance $\chi^2(1, N = 12) = 3$, $p = .08$. (see Figure 6.12).

Help-offering. Two children (Female $n=1$, Male $n=1$) showed evidence of help-offering on at least one of the trials. All instances of help-offering were directed towards the experimenter who was low in competency but high in social availability. Both children offered help on one familiar toy trial. One of these children additionally offered help on a novel trial, after having sought help from the experimenter who was high in

competency and high in social availability. Due to the low incidence the means for help-offering are not reported in Table 6.5.

Help-seeking and success on toys.

Children sought help on 65% of fail trials compared to 33% of success trials. Chi-square analysis on the four possible outcomes (success/fail x novel/familiar) revealed that children were significantly more likely to seek help than to not seek help when they failed to operate a toy independently on both novel ($\chi^2(1, N = 19) = 6.37, p < 0.05$) and familiar trials ($\chi^2(1, N = 16) = 6.25, p < 0.05$). This difference was not observed on success trials (see Table 6.6/Figure 6.13).

Help-seeking and familiarity. We found no difference in the frequency of children's help-seeking on novel ($M = 1.3, SD = .73$) versus familiar toys ($M = 1.0, SD = .73$) (see Figure 6.14).

Switching Target of Help-seeking behavior.

Switching across all sessions. Eight out of 20 children switched their target of help-seeking at least once across the four trials ($M = 1.75, SD = .7$). McNemar's test revealed no significant difference in the overall direction of switching. Across all four trials, children were no more likely to switch towards experimenter HC/HA than towards experimenter LC/HA, $p = .25$.

We looked at children's tendency to switch their target preference as a function of their initial preference. Two of the 8 children who preferred experimenter HC/HA the first time they sought help sought help only once and are therefore not included in this analysis. All six remaining children (100%) who preferred experimenter HC/HA on their first instance of help-seeking had the same preference the last time they sought help.

Out of the 9 children who preferred experimenter LC/HA on their first help-seeking attempt 3 children showed only one help-seeking behavior and are not included in the analysis. Out of the 6 remaining children, 4 switched to experimenter HC/HA on the last time they sought help, whereas 2 children again sought help from experimenter LC/HA. Chi-square analyses were not run on these data due to the low expected value for switching and non-switching.

Action steps. Data-analysis of action steps revealed that children were more successful at operating on familiar ($M = 3.3$, $SD = 2.15$) compared to novel toys ($M = 2.15$, $SD = 1.5$), $t(19) = 2.19$, $p < .05$ (see Figure 6.15).

Table 6.5

Experiment 3, Condition C: Mean help-seeking scores for the 3 potential targets for children in Condition C: the high competency/high availability experimenter (HC/HA), the low competency/high availability experimenter (LC/HA), and the parent.

<u>Target</u>	<u>Help-seeking</u>
HC/HA	0.80(1.05)
LC/HA	0.60(0.68)
Parent	0.85(1.04)

Note. Possible scores ranged from 0-4. Standard deviations are shown in parentheses.

Table 6.6

Experiment 3, Condition C: Frequency of children who showed help-seeking vs. no help-seeking given success or failure on familiar and novel trials.

	Help-Seeking	No Help-seeking	Total
Familiar Trials			
Success	5(.45)	6(.55)	11
Fail	13(.81)	3(.19)*	16
Novel Trials			
Success	1(.25)	3(.75)	4
Fail	15(.79)	4(.21)*	19

Note: Proportions are given in parentheses. Statistically significant differences between help-seeking v. no help-seeking are denoted, $*p < .05$

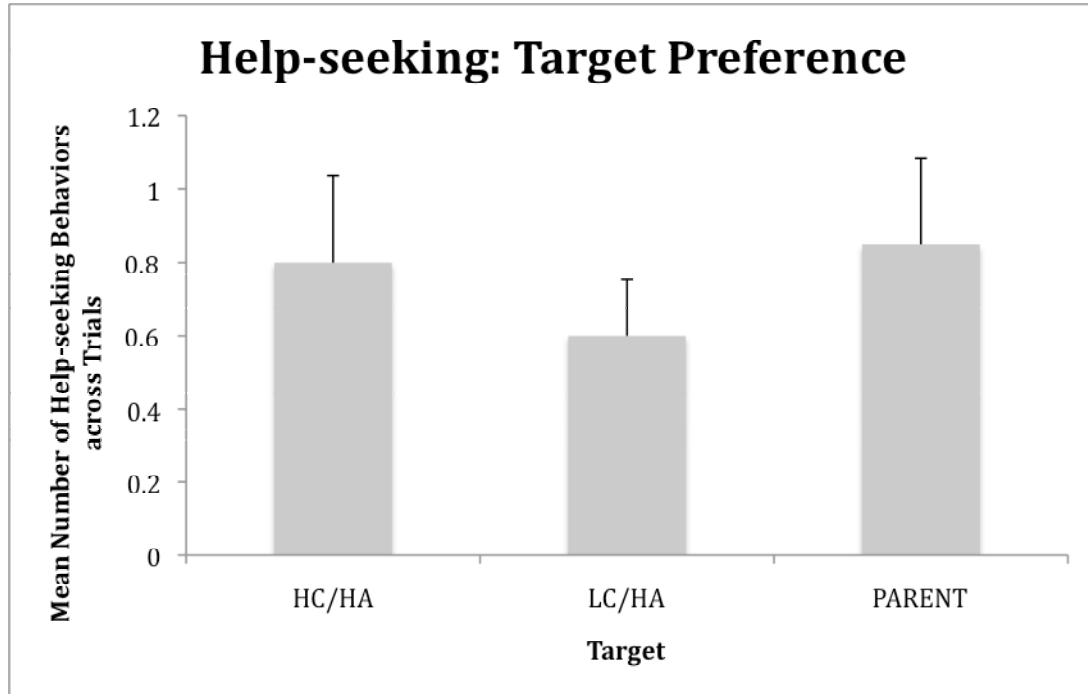


Figure 6.11. Experiment 3, Condition C: Mean help-seeking Scores as a Function of Target for Condition C. Targets are the high competency/low availability experimenter (HC/HA), the low competency/high availability experimenter (LC/HA), and the parent. Possible scores ranged from 0-4.



Figure 6.12. Experiment 3, Condition C: Number of children who preferred to seek help from experimenter HC/LA compared to LC/HA the first and last time they sought help.

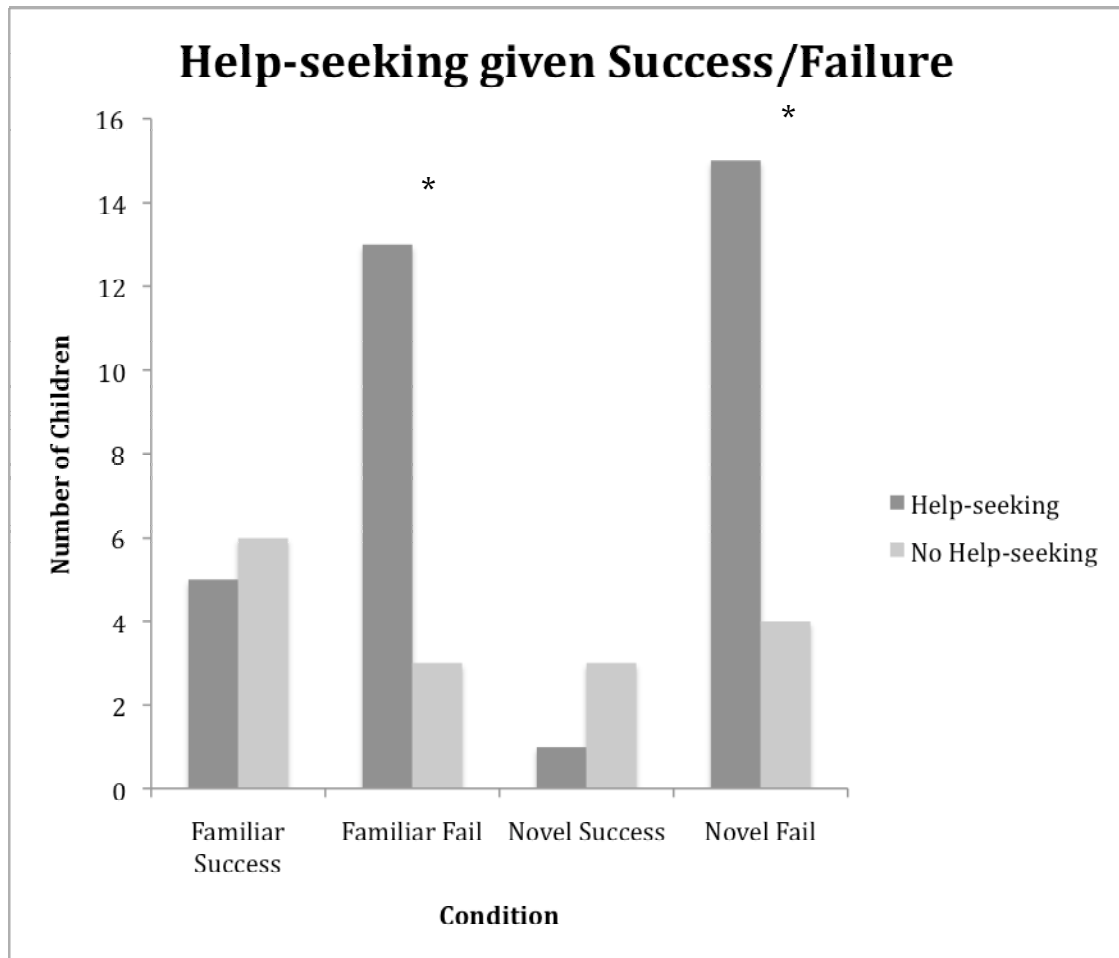


Figure 6.13. Experiment 3, Condition C: Number of children who showed help-seeking vs. no help-seeking given success or failure on familiar and novel trials. $*p < .05$.

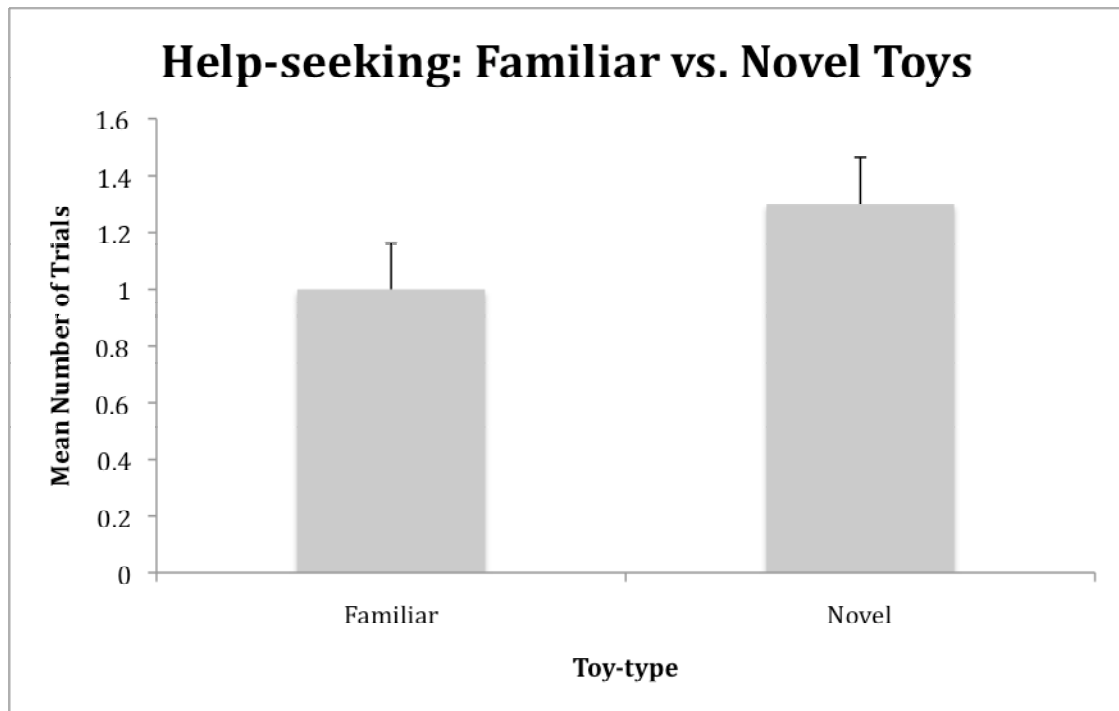


Figure 6.14. Experiment 3, Condition C: Mean number of familiar vs. novel trials on which children sought help. Scores range from 0-2.

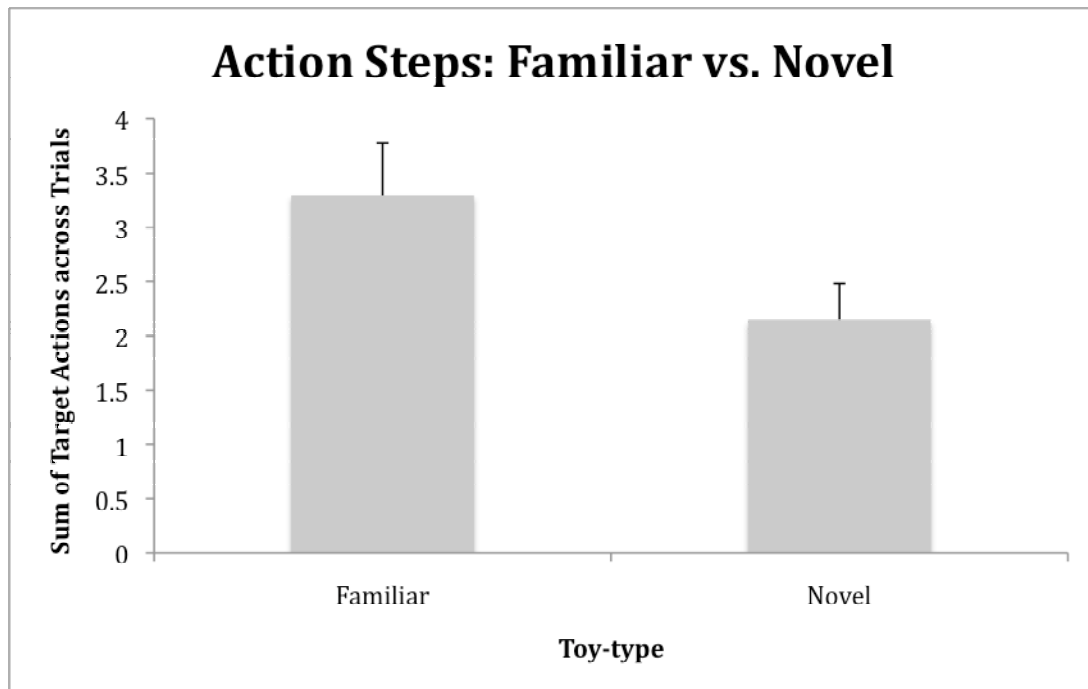


Figure 6.15. Experiment 3, Condition C: Sum of action steps produced as a function of toy-type, averaged across all children. Scores range from 0-6.

Condition D: High Competency/Low Social Availability vs. Low Competency/Low Social Availability.

Help-seeking scores: Almost all children ($N=19$) sought help on at least one occasion. 58% of help-seeking attempts were directed towards one of the experimenters, 42% were directed at the parent. A one-way repeated measures ANOVA on children's target preference revealed no main effect of target. Children did not prefer to seek help from the parent compared to either of the experimenters (see Table 6.7/ Figure 6.16). Because the ANOVA revealed no main effect of target, we compared help-seeking towards experimenters looking only at the first time that children turned to an experimenter across trials using a paired-samples t-test. We found no preference to seek help more frequently from experimenter HC/LA ($M = .85$, $SD = .88$) versus experimenter LC/LA ($M = 1.2$, $SD = 1.15$).

Chi-square analysis of children's help-seeking during the first time they sought help revealed that in contrast to children in condition A, these children did not show a preference for one experimenter over the other the first time they sought help. Children also did not show a significant preference for one experimenter over the other during the last time they sought help (see Figure 6.17).

Help-offering. No child showed any evidence of help-offering on any of the trials.

Help-seeking and success on toys. Children sought help on 73% of fail trials compared to 35% of success trials. Chi-square analysis on the four possible outcomes (success/fail x novel/familiar) revealed that children were significantly more likely to seek help than to not seek help when they failed to operate a toy independently on both

novel ($\chi^2(1, N = 20) = 7.2, p < 0.01$) and familiar trials ($\chi^2(1, N = 17) = 9.94, p < 0.005$).

This difference was not observed on success trials (see Table 6.8).

Help-seeking and familiarity. We found no evidence for differences in help-seeking between novel ($M = 1.3, SD = .73$) and familiar toys ($M = 1.2, SD = .77$) (see Figure 6.19).

Switching Target of Help-seeking behavior.

Switching across all sessions. Eight out of 20 children switched their target of help-seeking at least once across the four trials ($M = 1.6, SD = 0.7$). McNemar's test revealed no significant difference in the overall direction of switching. Across all four trials, children were no more likely to switch towards experimenter HC/LA than towards experimenter LC/LA, $p = .15$.

We looked at children's switch in target preference as a function of their initial preference. Two of the 9 children who preferred experimenter HC/LA the first time they sought help sought help only once and are therefore not included in this analysis. Four of the remaining seven children (57%) who preferred experimenter HC/LA on their first instance of help-seeking had the same preference the last time they sought help.

Out of the 7 children who preferred experimenter LC/LA on their first help-seeking attempt one child showed only one help-seeking behavior and is not included in the analysis. Out of the 6 remaining children, 2 (33%) switched to experimenter HC/LA on the last time they sought help, whereas 4 children again sought help from experimenter LC/LA. Chi-square analyses were not run on these data due to the low expected value for switching and non-switching.

Action steps. Data-analysis of action steps revealed no difference in the number of action steps children performed on familiar ($M = 2.65$, $SD = .48$) compared to novel toys ($M = 2.15$, $SD = 1.5$) (see Figure 6.20).

Table 6.7

Experiment 3, Condition D: Mean help-seeking scores for the 3 potential targets for children in Condition D: the high competency/low availability experimenter (HC/LA), the low competency/low availability experimenter (LC/LA), and the parent.

<u>Target</u>	<u>Help-seeking</u>
HC/LA	.6(0.75)
LC/LA	.9(1.07)
Parent	1.1(1.29)

Note. Possible scores ranged from 0-4. Standard deviations are shown in parentheses.

Table 6.8

Experiment 3, Condition D: Frequency of children who showed help-seeking vs. no help-seeking given success or failure on familiar and novel trials.

	Help-Seeking	No Help-seeking	Total
Familiar Trials			
Success	2(.71)	5(.29)	7
Fail	15(.88)	2(.12)**	17
Novel Trials			
Success	1(.50)	6(.50)	1
Fail	16(.80)	4(.20)*	20

Note: Proportions are given in parentheses. In each case, differences between help-seeking vs. not help-seeking are given, * $p < .01$, ** $p < .005$.

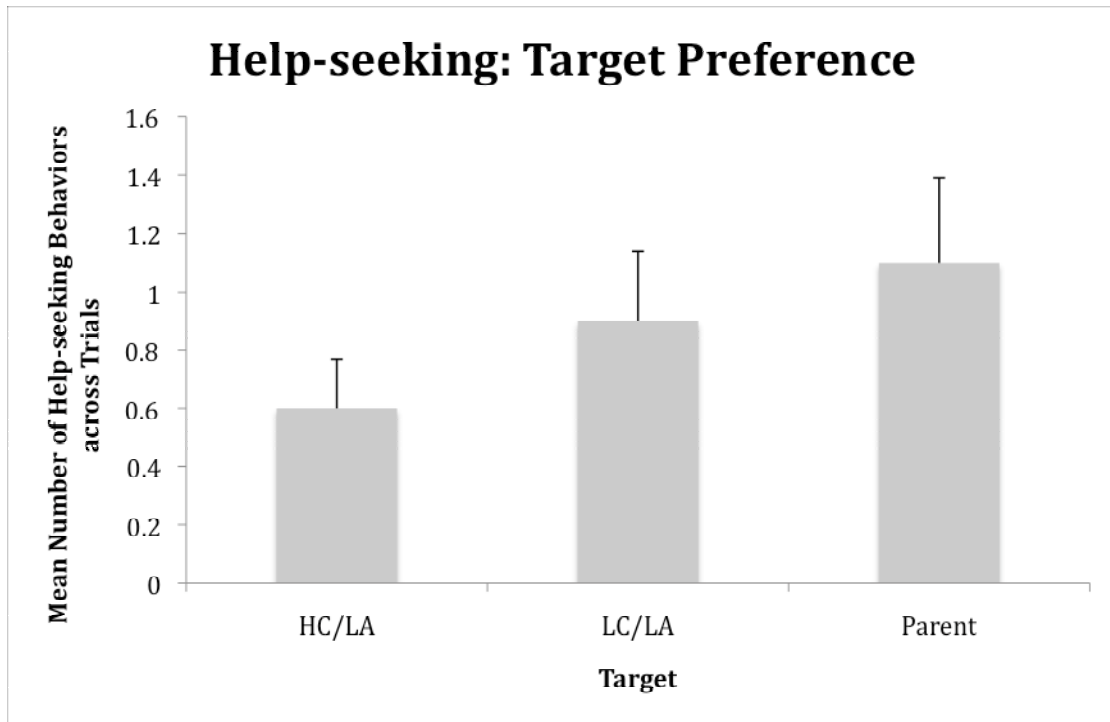


Figure 6.16. Experiment 3, Condition D: Mean help-seeking Scores as a Function of Target. Targets are the high competency/low availability experimenter (HC/LA), the low competency/low availability experimenter (LC/LA), and the parent. Possible scores ranged from 0-4.

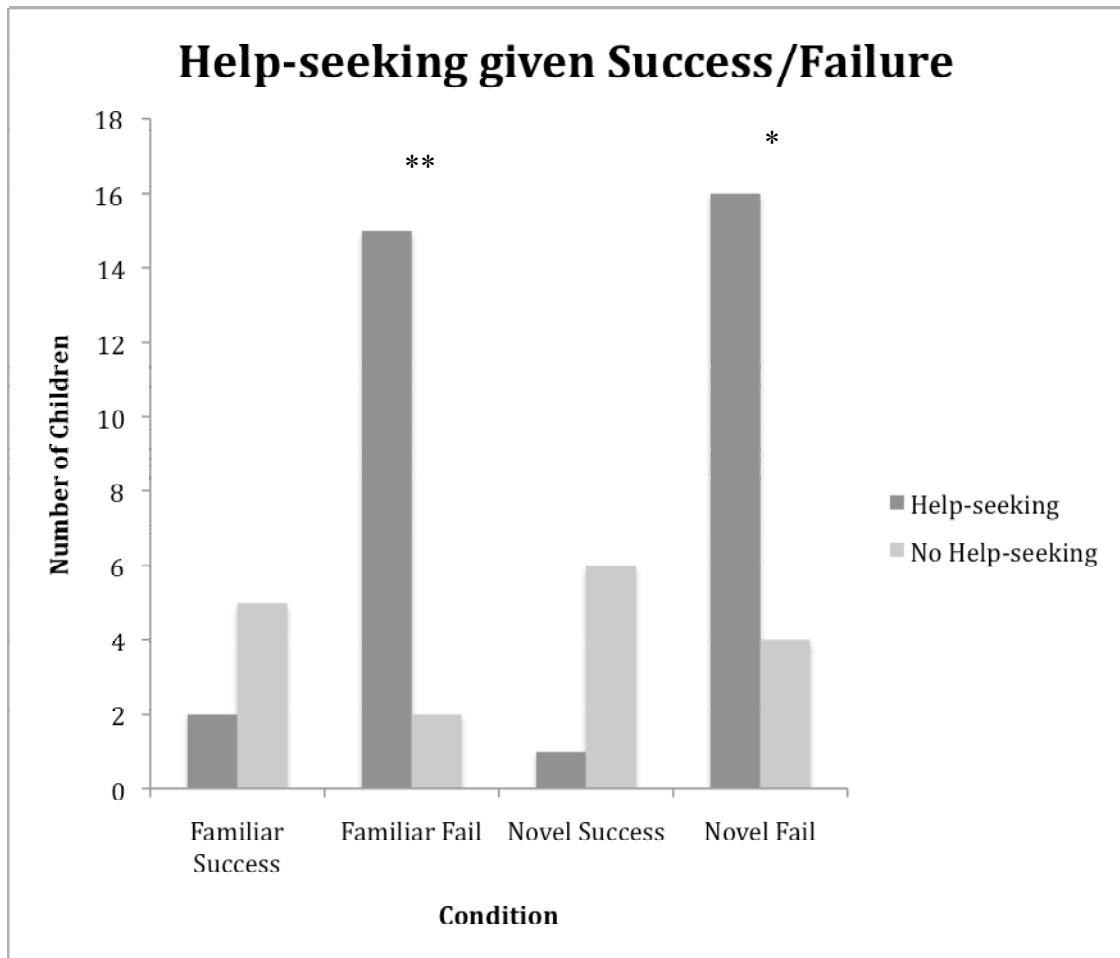


Figure 6.17. Experiment 3, Condition D: Number of children who showed help-seeking vs. no help-seeking given success or failure on familiar and novel trials. $*p < .01$, $**p < .005$.

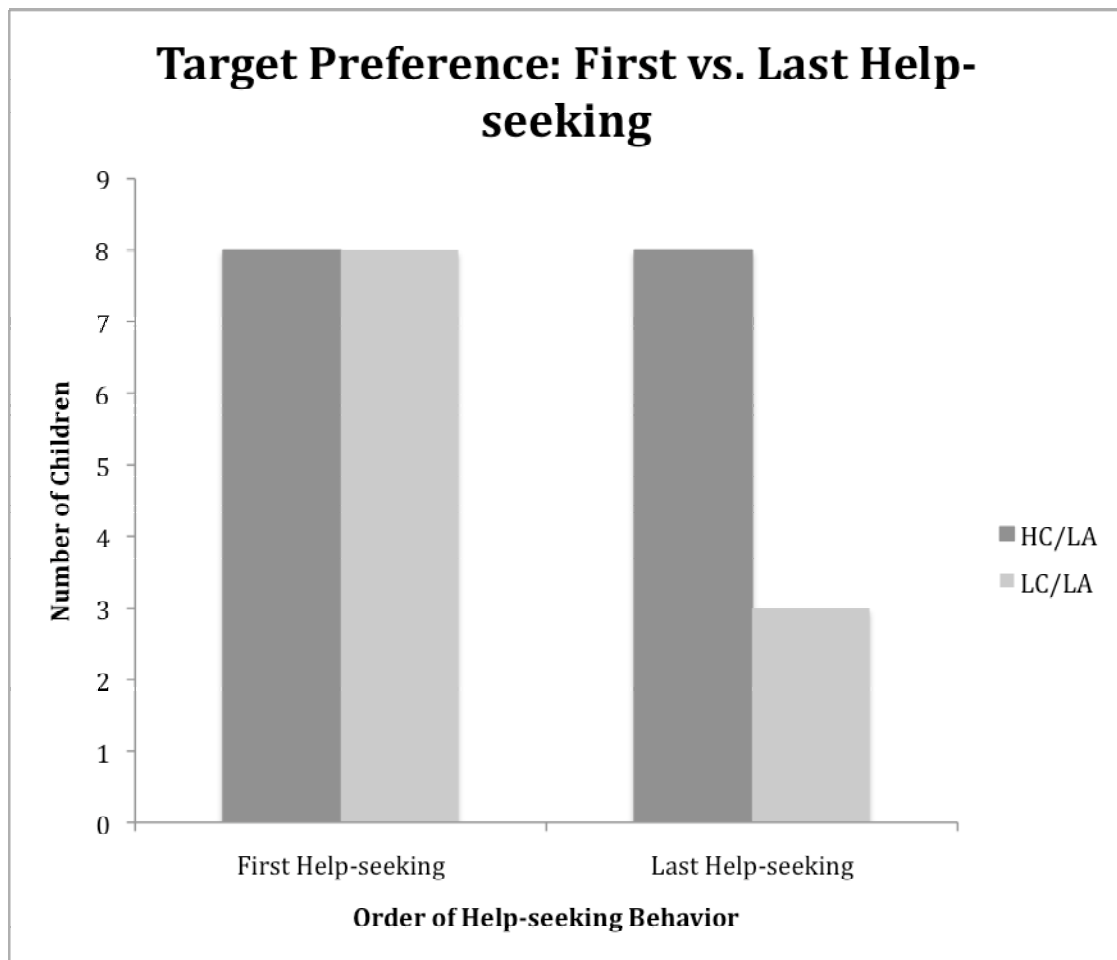


Figure 6.18. Experiment 3, Condition D: Number of children who preferred to seek help from experimenter HC/LA compared to LC/LA the first and last time they sought help.

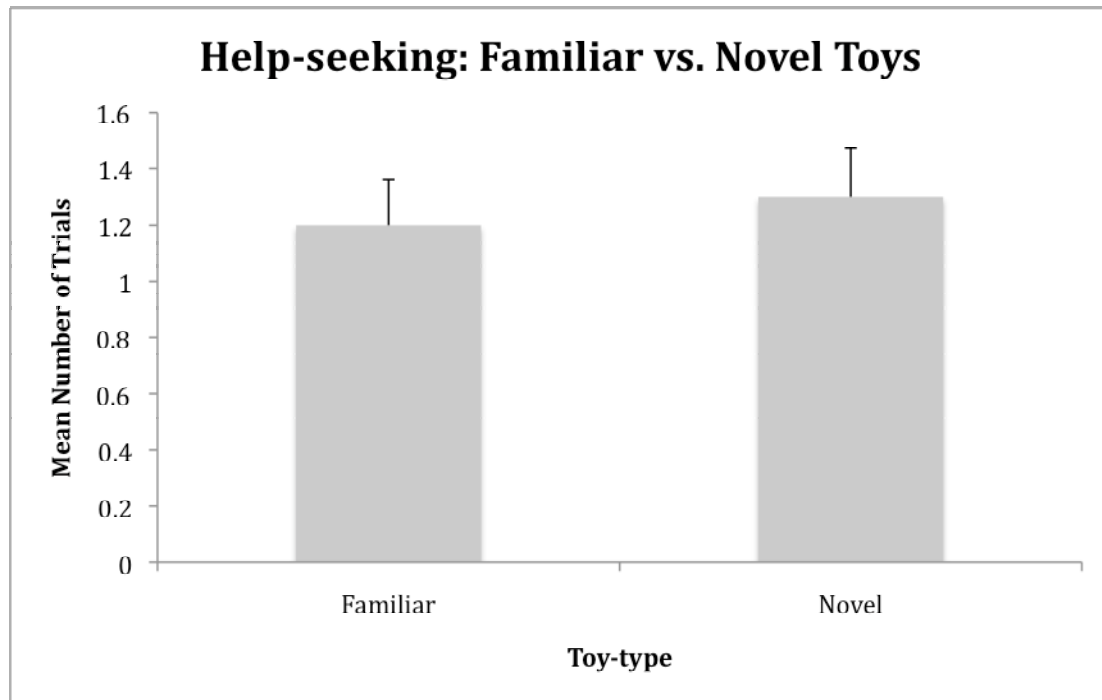


Figure 6.19. Experiment 3, Condition D: Mean number of familiar vs. novel trials on which children sought help. Scores range from 0-2.

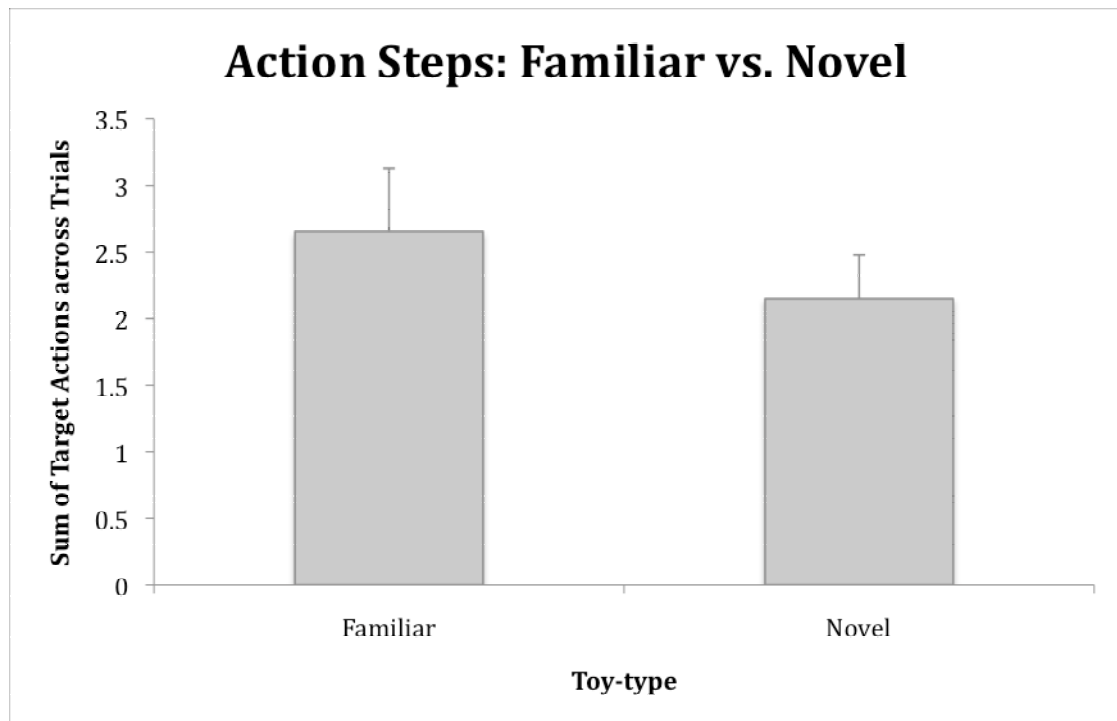


Figure 6.20. Experiment 3, Condition D: Sum of action steps produced as a function of toy-type, averaged across all children. Scores range from 0-6.

Comparison Across Conditions A-D:

As we were mainly concerned with patterns of help-seeking and children's ability to manipulate the toys, we ran univariate and repeated measures ANOVAs with condition as a between subjects factor to assess any differences in children's behavior as a function of condition. Our main focus here was on overall help-seeking, production of action steps and likelihood of switching across trials.

Help-seeking. We conducted a 3 x 4 (Target x Condition) repeated measures ANOVA looking at the number of times children sought help the experimenters. We found no main effect of target on help-seeking behavior. When averaged across the two experimenter targets, children did not show greater levels of help-seeking in one condition than another (see Figure 6.21). A one-way ANOVA on children's preference for their parent also revealed no significant difference between groups (see Table 6.9).

Action Steps. We conducted a 2 x 4 (Toy-type x Condition) repeated measures ANOVA. We found a main effect of toy-type, $F(1,76) = 11.39, p = .001$. Across groups, children were more likely to perform action steps on familiar ($M = 2.95, SD = 1.98$) versus novel toys ($M = 2.1, SD = 1.66$). We found no main effect of condition. Averaged across toy-type, children were no more likely to produce action steps on toys in one condition than another (see Table 6.10). There was no interaction effect of toy-type by condition.

Switching. We calculated the mean total of switching children showed across trials (min. = 0, max. = 3) and conducted a one-way ANOVA. Condition had no effect on children's likelihood to switch across trials (see Table 6.11).

Table 6.9

Number of help-seeking attempts directed at the two experimenters (mean score) or the parent as a function of condition.

	<u>Experimenters</u>	<u>Parent</u>
Condition		
A	1.03 (0.97)	0.80 (1.19)
B	1.35 (1.25)	1.15 (1.30)
C	1.00 (1.01)	0.85 (1.04)
D	1.03 (0.98)	1.10 (1.29)

Note. Scores for experimenters are averaged across the two experimenter targets.

Standard deviations are given in parentheses. Scores range from 0-4.

Table 6.10

Action Steps produced on Familiar and Novel Toys as Function of Condition.

	Familiar	Novel
Condition		
A	3.15 (1.69)	2.20(1.99)
B	2.70 (1.78)	1.90 (1.30)
C	3.30 (2.15)	2.15 (1.49) *
D	2.65 (2.15)	2.15 (1.46)

Note. Standard deviations are given in parentheses. Scores range from 0-6.

* $p < .05$.

Table 6.11

Sum of Switching Behaviors across Trials as a Function of Condition.

<u>Switching</u>	
Condition	
A	.75 (0.79)
B	.75 (0.64)
C	.80 (0.98)
D	.75 (0.95)

Note. Standard deviations are given in parentheses. Scores range from 0-3.

Discussion

Experiment 3 investigated 20-24-month-old children's response to social-learning partners who exhibit novel trait-combinations of competency and social availability. We begin by a discussion of our principle dependent measure, children's target preference when seeking help before covering measures of children's success with toys and selective help-seeking as a function of familiarity and task-demands.

In Condition A of this experiment children were presented with a highly competent and socially available experimenter pitted against an incompetent and socially less available experimenter and served as a replication of Experiment 1. We replicated results from Experiment 1 and found that by age 2, children discriminate between sources of help in a problem-solving situation and prefer to seek help from someone who is high along the dimensions of competency and social availability compared to someone who is low along these dimensions. We failed to replicate the finding that children also prefer to seek help from experimenter HC/HA compared to their parent. One explanation for this is that the number of participants in this condition was lower ($N=20$) than in Experiment 1 ($N=30$) decreasing the power to find an effect.

Contrary to our expectation children exhibited no target preference in the other 3 conditions. Condition B was designed as a first step to tease apart the relative influence of competency and social-availability on children's selective interaction with a social learning partner. Experimenters were now high on one trait-dimension and low on another. Based on earlier findings regarding the importance of social availability to infants and toddlers when interacting with social learning partners, we had anticipated that children might prefer to seek help from the incompetent but socially available partner

over the competent, but less socially available partner, a behavior that would be akin to the “liking bias” found in older children (Feldman & Ruble, 1988; Thompson et al., 1995). Our findings do not support this hypothesis. Children showed no preference for either experimenter, seeking help equally often from the two experimenters and their parents throughout the trials.

In condition C and D, we presented children with two experimenters who were equally high or low along the dimension of social availability, but differed in their degree of competency. Here, we wanted to investigate whether in a very concrete problem-solving situation, children would select a social learning partner based on cues of competency alone. Given that both partners were social, would children selectively use competency to choose between partners? Conversely, given that neither of them were socially available, we wondered whether children would choose a partner who at least had one positive quality.

As in condition B, children showed no preference for either social learning partner in either condition C or D. This suggests that competency alone does not elicit selective help-seeking behavior in children in second year of life. As discussed at the outset of Experiment 3, there are several possibilities to account for our findings. First, cues of competency could have no influence on young children’s interactions with others; what matters may be cues of social-availability alone. However, this account seems unlikely given that children in condition B exhibited no preference for the experimenter who was socially available, but incompetent.

A less extreme account suggests that young children are indeed sensitive to cues of competency, to the extent that pairing high social-availability with low competency or

vice versa creates sufficient ambiguity regarding the quality of the source of help. In other words, children are no longer able to identify the best source of help when social learning partners are high on one dimension, but low on the other.

Finally, our findings may indicate that young children are equally sensitive to differences on both trait-dimensions of competency and social availability, but that strong contrasts along *both* dimensions are necessary to highlight these differences and elicit a target preference in children.

To identify the most plausible of these alternative accounts we need to know how young children respond to the final two possible combinations of experimenters, i.e., when social learning partners are equally competent but differ along the dimension of competency. We are currently collecting data from these two remaining conditions: In condition E, both experimenters are competent, but only one is socially available (i.e., we are pairing HC/HA with HC/LA). In condition F, both experimenters are incompetent, but only one experimenter is socially available (i.e., we are pairing HC/HA with HC/LA).

What if children now showed a target preference? In the context of our other findings from condition A-D, this would suggest that while children are sensitive to contrasts along the dimension of competency, they perceive contrasts along the dimension of social-availability as more salient. In other words, a clear contrast along the dimension of social-availability may be sufficient to drive children's preference, as long as there is no competing contrast along the dimension of competency to create ambiguity, as may have been the case in condition B.

It is also possible that children fail to show a preference in these two conditions paralleling our current findings in conditions B-C. This result would indicate that

children younger than age 2 require very salient and unambiguous contrasts along both trait-dimensions of competency and social-availability before exhibiting selective help-seeking.

Contrary to our expectation, we found no difference in how often children turned to the social-learning partners in Condition D compared to the other conditions, a finding that is somewhat surprising given the importance of social-engagement for young children's interactions (Nielsen, 2009).

Interestingly, 3 children in Experiment 3 exhibited selective help-offering. One child offered help to experimenter LC/LA in condition A and two children offered help to experimenter LC/HA in condition C. These results are in line with our findings from Experiment 1 and 2 and indicate that when young children offer help, they consistently turn to someone who lacks competency. Though too few children showed help-seeking to allow for statistical analyses, the pattern of findings nonetheless suggests that even before their second birthday some children are sensitive to cues signaling a need for help and will respond prosocially. These findings consistent with other work that has suggested from an early age young children engage in selective helping and comforting based on affective or behavioral cues (Brownell et al., 2009; Eisenberg et al., 1988; Warneken et al., 2006). Our results cannot not speak to the influence of social availability on help-offering, mainly due to the low incidence of help-offering. Affective cues are known to influence children's emotional and instrumental prosocial actions (Eisenberg et al., 1988). Many of these studies have looked at the influence of negative affect, such as sadness or distress, on eliciting behaviors such as comforting or sharing (see Eisenberg & Fabes, 2006). Less is known about the effect of social availability on prosocial behavior.

Observations in experimental settings and during free playtime indicate that older preschoolers (age 3 and 4) are more likely to act prosocially towards a friend than to an acquaintance and to reciprocate towards someone who has behaved prosocially towards them (Costin & Jones, 1992; Fujisawa et al., 2008). It is possible that older children will exhibit a more differentiated pattern of helping when they are presented with the novel types and combinations of experimenters introduced in Experiment 3. By age 3, children might vary their help-offering towards an incompetent partner depending on how high or low she is in social availability. It might be expected that children prefer to help someone who is high in social availability and therefore openly communicates (by making eye-contact and initiating joint attention) a need for help. Another possibility is that children may interpret the low level of social availability as sadness about not knowing how to operate the toy. One child in experiment 3, showed emotional helping towards experimenter LC/LA in condition A (i.e., she offered the experimenter her stuffed animal, presumably to comfort her). On another occasion, a girl showed other comforting behaviors (i.e., hugging and kissing on the cheek) towards both experimenters who were low in social availability (condition C). While these are anecdotal accounts of emotional helping, it suggests that some children are interpreting the lack of social engagement as negative affect and are responding with empathy and prosocial acts.

One way to explore the influence of social availability on help-offering behavior is to conduct the full version of Experiment 3 (i.e., conditions A-F) with children age 32-36 months. Children's response in condition F, when both experimenters lack competency but vary in their level of social availability, would be particularly informative regarding the role of social availability on help-offering.

We replicated results from Experiment 1 and 2 suggesting children in this experiment were sensitive to their own need for help. In all conditions children were more likely to seek help than to not seek help when failing to operate on a toy. This parallels our findings from Experiment 1 and 2 and is consistent with previous studies on the relationship of task-demands and help-seeking (Geppert & Küster, 1983).

The pattern of children's success with toys in conditions A-D was as follows: children in conditions A and B exhibited a trend to perform more action steps with familiar versus novel toys. Based on our findings from Experiment 1, we expected the difference between the number of action steps as a function of toy-type to reach significance, in particular in condition A. The lack of a significant finding might be due to our use of a smaller sample size in Experiment 3 compared to experiment 1 which may have reduced our power to detect a significant difference. Children in condition C produced significantly more action steps with familiar compared to novel toys. We found no effect of toy-type on the number of action steps in condition D. It is unclear why we failed to find an effect in condition D. If children are mainly influenced by social availability, one possibility is that in this condition in which both experimenters are portrayed as being low in social availability, children are reluctant to seek help and more likely to try to figure out toys independently. However, a comparison of help-seeking behaviors and action steps across conditions does not support this hypothesis. There was no difference in how frequently children in this condition turned to experimenters for help or how successful they were in operating the toys compared to children in the other conditions. One possibility is that because neither experimenters were socially available children as a group may have engaged less paid less attention during the exposure session

and therefore may not have encoded the original event information as well as other children. Evidence suggests that social cues are critical for young children when learning about objects and events (Cleveland & Striano, 2007; Nielsen, 2006). One way to address this question in the future is to collect measures of joint attention, gaze duration and willingness to interact with the experimenters during the exposure session.

Only children in condition A showed selective help-seeking as a function of toy-type. These children sought help more frequently with novel versus familiar toys. This finding was surprising, given that we had found no differences in help-seeking as a function of toy familiarity in Experiment 1. In fact, children in this condition showed the opposite pattern from children in Experiment 1. Differences in action sequences did not quite reach significance, but children did show selective help-seeking based on toy familiarity. Whereas measures of action steps closely approached significance and a lack of finding may be accounted for by the decrease in sample size, it is not clear why we found selective help-seeking based on toy familiarity in this condition but not in the original Experiment 1. It is possible the individual differences can account for these discrepant findings. Some previous studies suggest that precursors to metamemory are emerging in the second year of life and continue to improve throughout the preschool years (e.g. DeLoache et al., 1985; Lockl & Schneider, 2006). It is possible that some children in Experiment 3 have a better sense of when they need help based on cues of familiarity with the toys.

Finally, we looked at patterns of children's switching behavior. We speculated that in conditions in which the contrast between experimenter characteristics was less salient (condition C & D) or more ambiguous (condition B) we would find a greater level

of switching among children. We found no significant differences between groups in the overall frequency of switching. Only children in condition A showed a pattern on this measure: children who preferred the competent and socially available experimenter at the onset of the testing trial maintained this preference. Consistent with this pattern, children in this group had the same preference for experimenter HC/HA the first and last time they sought help. Along these lines, results from condition C are interesting and allow for cautious speculation. Here, children showed no preference for an experimenter the first time they sought help; the last time they sought help they showed a trend to prefer experimenter HC/HA. Certainly, this finding did not reach significance and therefore should not be over-emphasized. However, it is possible that with a greater sample size, children in this group may show a more gradual emergence of a target preference HC/HA. This is an interesting empirical question future project that promises further add to our understanding of early trait-sensitivity. If this pattern were found, this would support the hypothesis that children's preference for a target depends on salient contrast between social learning partners. The more salient, the more quickly children might acquire this preference for a highly competent and social learning partner. When contrasts are less extreme, as in condition C in which experimenters differed only along the dimension of competency, children might still be able to develop a preference, albeit in a more gradual manner. Future projects should further investigate this possibility.

In sum, our initial results from Experiment 3 indicate that by age 2 children exhibit a clear target preference only in the face of an extreme contrast between experimenters. Children showed a clear preference from an experimenter who was high in competency and social availability when she was pitted against an experimenter who

was low along these trait-dimensions. We found no evidence for a target preference in the other 3 conditions that featured less extreme contrasts between experimenters.

Importantly, we found no evidence to support our prediction of a liking bias in children at this age.

In order to fully understand the relative impact of competency and social availability on young children's social interactions in problem-solving situations we are currently collecting data in two remaining conditions. The questions we are addressing here are: Given that both partners are competent, does social availability matter? Given that both are incompetent, will children show a preference for the experimenter that exhibits a positive trait? With these data we expect to have a clearer picture of how competency and social availability influence young children's collaborative problem-solving in the second year of life.

Chapter 7: General Discussion

This set of experiments investigated whether young children distinguish between their social learning partners based on psychological cues of competency and social availability in problem-solving situations. Experiment 1 found that by age two children indeed distinguish between social-learning partners when an experimenter who is high in both competency and social availability is pitted against an experimenter who is low along these trait-dimensions, resulting in an extremely salient contrast between the social-learning partners. This is the first evidence that by age 2 children are sensitive to psychological cues associated with competency and social availability and will distinguish between social learning partners based on these cues when seeking help with a difficult task.

In Experiment 2, we used the same paradigm with slightly older children in order to investigate age-related changes in children's response to these social-learning partners who differ in psychological traits. Evidence suggests a number of important findings: a) children seem to vary their help-seeking attempts more strategically based on when help is needed, and b) one fourth of children not only exhibited selectivity when seeking help, but also selectively offered help to someone who was low in competency. This is the first evidence by age 3 children spontaneously and selectively approach a social learning partner who exhibits two negative traits and points to an important age-related change emerging in children between the second and third year of life. Importantly, children are beginning to integrate information about task demands themselves with cues about the task-related characteristics of their social learning partners. In some children, this gave rise to the following pattern: when they need help they selectively turned to the partner

who could provide the best help. When they knew how to operate on the toy, they selectively turned to and shared this information with the partner who lacked this knowledge. This reciprocity in information sharing represents a fundamental pattern of collaborative and social transmission of information that is thought to be unique to humans (Tomasello, 2001). We predict that this pattern of selective help-seeking and – offering will become more pronounced with age, as children become more sensitive to task-demands, psychological cues and are better able to integrate this information when collaboratively solving problems.

Experiment 3 followed up on the results from Experiment 1 and sought to tease apart the relative influence of competency and social availability on children's preference to seek help from a given social-learning partner. Results suggest that children exhibit a preference only when one of the experimenter-choices is both high competency and high social availability. When experimenters are high on only one trait-dimension, 20-24 month old children do not seem to be swayed to selectively seek help from this person. This runs counter to our hypothesis that children would exhibit behavior akin to the “liking bias” reported in previous work on children age 3-6 (Feldman & Ruble, 1988; Thompson et al., 1995). In these studies children had favored social availability in a social-learning partner over competency, choosing a friendly but incompetent partner over one who was competent albeit unfriendly one, even though they understood that this came with the cost of receiving inferior help.

We propose as a preliminary hypothesis that 20-24 month old children require extremely salient and unambiguous contrasts along these trait-dimensions before seeking

help selectively from a given partner. Data from the conditions E and F, in which experimenters are equally competent but differ along the dimension of social availability, promise to address our open questions. A lack of target preference would support our hypothesis; given that contrasts in condition E and F are less salient than in condition A, children may have insufficient information to elicit a target preference. However, if children did show a preference, this would suggest that social availability represents a more salient cue for 20-24 month old children compared to competency.

Young children may have an easier time processing social information and making predictions based on these cues compared to information related to ability. Infants are already highly sensitive to social information in learning contexts (Bigelow & Birch, 2002; Striano et al., 2006). Processing of competency is a more complex skill. It requires an understanding of the goal of an action, that human agents act in an intentional and goal-directed manner and that the effectiveness with which an intentionally acting agent brings about a goal signals something about competency. Infants begin to grasp that actions involving objects have goals and that humans tend to interact in a goal-directed manner relatively early on in infancy (Kenward et al., 2009; Elsner, 2009). In the second year of life, infants can distinguish between intentional and accidental actions and are sensitive to the efficiency of goal-directed actions (Meltzoff, 1995; Nielsen, 2006). Beginning around age 3, children seem to know that some people are more competent than others, but tend to make mistakes when reasoning about ability (Heyman et al., 2003; Leonova & Dubois, 2002; Stipek & Tannatt, 1984). Especially in situations in which a child expects to interact with an unfamiliar person, their choice of a partner for a collaborative task is biased towards likeability versus competency (Feldman & Ruble,

1988). Similarly, our current task measures children's spontaneous interactions with a relatively novel person which may highlight the relative salience of social availability.

The main question with respect to the current project is: Do 20-24-month olds respond differently to cues of competency and social availability? Findings from conditions E and F promise to provide more insight.

Future Directions

Future projects will continue to further investigate the age-related changes in young children's sensitivity to cues of competency and social availability in problem solving situations. The first step involves conducting experiment 3 with all possible 6 conditions with 32-36 month old children. At this age children might require less salient contrasts along trait-dimensions in order to exhibit selective interactions. In contrast to younger children, we might expect older children might show a clear preference for someone who is competent and socially available even when she is paired with a partner who differs along only one dimension (i.e., in condition C or E).

Other questions of interest concern children's selective help-seeking. In particular, we are interested in exploring the influence of social availability on spontaneous help-offering in children. Will 3-year-olds be more likely to help someone who is incompetent but socially available?

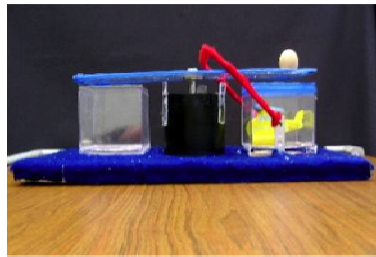
Finally, a more exploratory area of investigation concerns children's understanding competency as domain-specific. Once children have a better understanding of competency, will they understand that competency is not necessarily generalizable? For example, someone who is mechanically gifted is not necessarily a coordinated dancer

or semantically skilled. When do young children understand that competency is domain-specific?

Some evidence suggests that children begin to treat sources of information selectively as a function of domain. For example, VanDerBorghet and Jaswal (2009) found that while preschoolers consider adults a better source of information on matters of food-choice (i.e., which foods are healthy), they predict peers will provide better information when it comes to choice of toys (i.e. which toy is fun to play with). Between age 3 and 5 children are increasingly likely to predict expertise associated with status in this domain-specific manner (VanderBorghet & Jaswal, 2009). By age 5 children understand that there is a division of cognitive labor and can make a prediction about what domain someone is likely to know something about based on their area of expertise (Lutz & Keil, 2002). The current paradigm could be used to assess children's understanding of domain-specificity and expertise, for example by contrasting a mechanically skilled person with someone who is semantically skilled (e.g., a good object labeler) and presenting children with tasks that demand different sets of skills. At what point might we see children selectively seek help based on the domain of the problem? Can we expect to see children spontaneously extend help to the non-expert?

Based on our current findings and previous research we expect to see this ability emerge throughout the preschool years. This set of studies is the first to find that by age 2 children will spontaneously and selectively seek help from others in problem-solving situations. We have shown that by age 3 children selectively seek and offer help. Together the current and future projects promise to inform us about how young children selectively engage with others in problem-solving situations.

APPENDIX



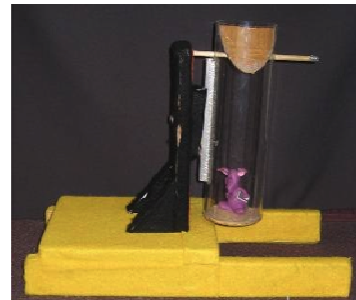
“helicopter”



“fish”



“Winnie the Pooh”



“kangaroo”

FIGURE 1: Sets of toys.



“I pull the stick out.”



“I turn it.”



“I got the kangaroo!”



“I try sliding it.”



“I try getting it.”



“I can’t get the kangaroo.”

FIGURE 2: Competent (top row) and incompetent (bottom row) experimenter demonstrations.

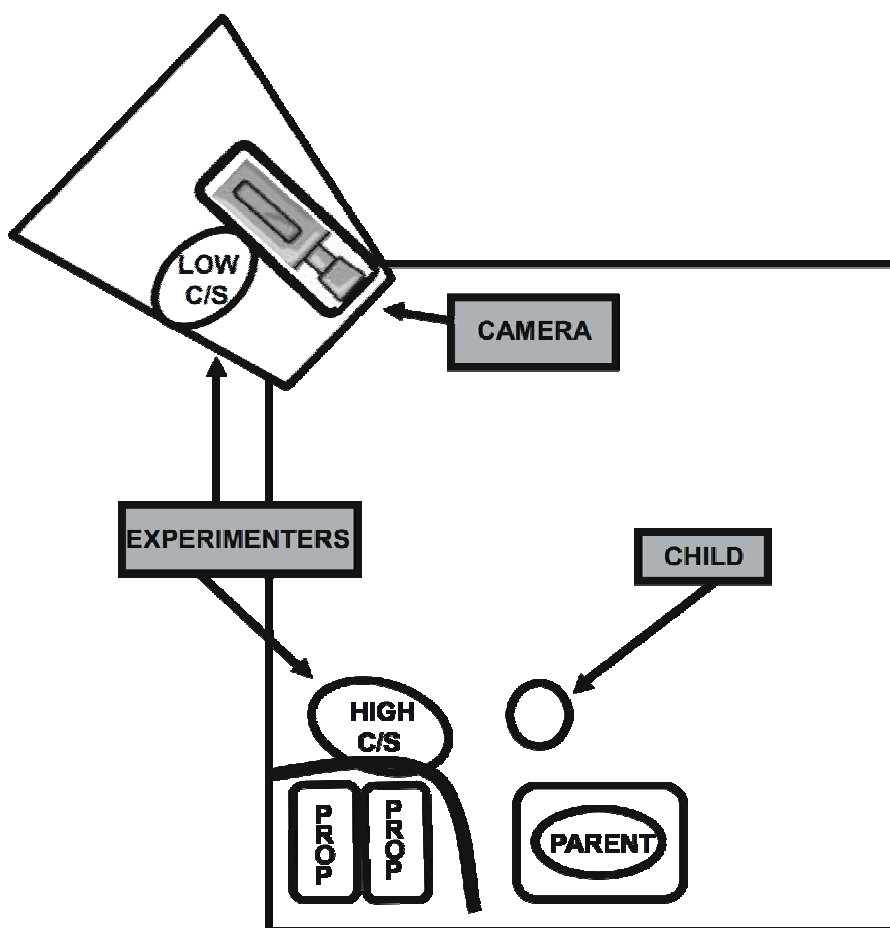


FIGURE 3: Room set-up during the exposure-session.

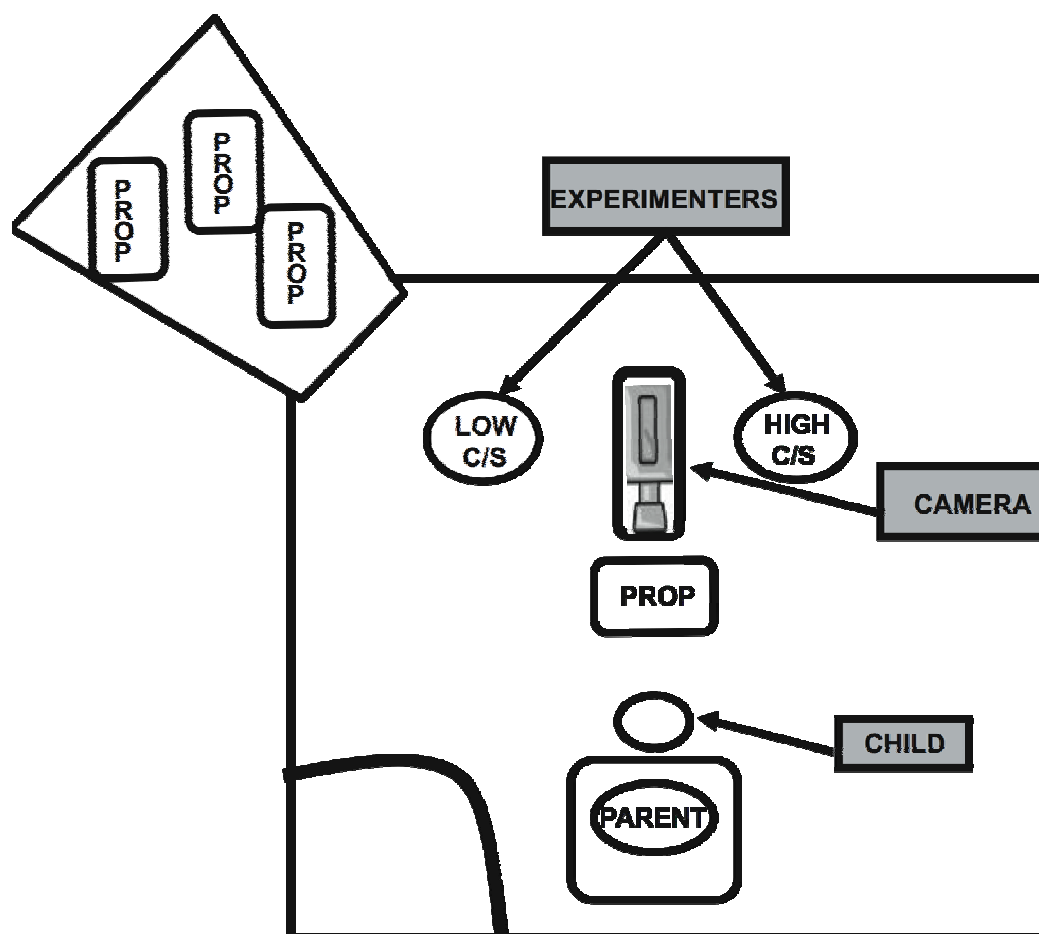


FIGURE 4: Room set-up during the testing-session.

Table 1.

Narrations for the high competency and low competency action sequences.

Toy	Step 1	Step 2	Step 3
High Competency			
Helicopter	Put the lock down	Slide the top.	I got the helicopter!
Fish	Take the ball off.	Stick the rod in.	I got the fish!
Winnie	Pull the ring out.	Open the latch.	I got Poohbear!
Kangaroo	Pull the stick out.	Turn the tube.	I got the Kangaroo!
Low Competency			
Helicopter	I try sliding it.	I try pulling the top.	I can't get the Kangaroo.
Fish	I try getting it.	I try sticking the rod in.	I can't get the fish.
Winnie	I try tapping it.	I try tipping it.	I can't get Poohbear.
Kangaroo	I try sliding it.	I try putting my hand in.	I can't get the Kangaroo.

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