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By

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CHILDREN'S USE  
OF INTERPRETATIONS OF EVIDENCE  
IN JUDGMENTS OF BEHAVIOR AND BELIEFS

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CHILDREN'S USE  
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by

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Dissertation

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This dissertation is dedicated to three generations of smart women:

My mother and aunt: Nancy Boerger and Barbara Hughes,

My sisters: Sue Hannon, Peg Heaney, Becca Boerger and Mary Boerger,

And my nieces: Sera, Anisa, Aliya, and Monica Boerger

Education for girls is a good thing!

It is also dedicated to the memory of my cousin,

Mike Boerger

(1960 – 2005)

Mike earned his Ph.D. in Psychology 10 years before me.

It is my hope that in my career I will carry on his legacy of excellence.

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My dedication of this dissertation to my mother, aunt, sisters and nieces is intended as an acknowledgment of the high regard for education that has been transmitted to me, primarily through my mother’s family. However, I in no way desire to slight my male relatives. Therefore I acknowledge my father, Moe Boerger, who has been bemused by his children’s seemingly never-ending pursuit of higher education. I

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CHILDREN'S USE  
OF INTERPRETATIONS OF EVIDENCE  
IN JUDGMENTS OF BEHAVIOR AND BELIEFS

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The ability to evaluate others' behavior in terms of the intentions that guide it is a key development in children's understanding of personal responsibility (Piaget, 1932/1965). According to Piaget, young children attribute responsibility on the basis of the objective effects of behavior because they are not able to understand the reasons for rules that define permitted and prohibited behaviors. In contrast, older children and adults attribute responsibility on the basis of the actor's subjective intentions. This ability reflects children's developing understanding that rules represent the rule-maker's anticipation of potential effects of the behavior for the individual and the social group. Thus, the developmental shift from objective to subjective concepts of responsibility, as seen in children's evaluations of behavior, marks underlying development in children's understanding of the ontology and purpose of rules, as well as in children's ability to use rules to guide their own behavior.



Several types of intention information may be used to attribute responsibility. These can include whether a specific outcome was intended, the actors' motives for acting, and their knowledge about potential outcomes of their actions. Research on children's evaluations of behavior has been guided by two theories, Piaget's (1932/1965) and Heider's (1958), that emphasize different aspects of intentionality as central to mature concepts of subjective responsibility. On the basis of a review of research guided by each of these theories, this paper argues that understanding of foreseeability as basis for attributing responsibility for beliefs is central to a subjective concept of responsibility.

Two experiments exploring development in children's understanding of responsibility for foreseeable outcomes are described. In Experiment 1, 5-year-olds, 6- and 7-year-olds and adults used foreseeability to attribute responsibility for unintended outcomes. In Experiment 2, although 6- to 12-year-olds and adults all used foreseeability to attribute responsibility for unintended outcomes, only 12-year-olds and adults consistently used foreseeability to attribute responsibility for false beliefs. Using foreseeability to attribute responsibility for beliefs was related, independently of age, to greater use of foreseeability in attributing responsibility for outcomes. Results are discussed in terms of developments in understanding of relations among evidence, beliefs and responsibility for behavior.

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## INTRODUCTION

### Children's and Adults' Concepts of Responsibility

In the summer between my kindergarten and first grade years, my 5-year-old sister, Peggy, and I often played with my best friend, Jimmy, in his backyard. Jimmy owned an enviable collection of toy trucks, bulldozers and backhoes, and much of our play involved moving dirt from one place to another. One day Jimmy proposed a new game. He told us that he'd found some empty baby food jars, and that we could fill these with dirt, add water from the outdoor spigot, and make mud. He assured us that this would be fun, and that his mother wouldn't mind if we did it. So we made the mud and proceeded to cover our faces, arms and legs with it. Jimmy's mother discovered us in the midst of our hilarity over this new game, and it turned out that she minded quite a bit. She pulled us all to the spigot and washed us off, all the while yelling, mostly at my sister and me, that we *knew* better, what were we *thinking*? She demanded that we march home and tell our mother what a terrible thing we had done. In addition to being terrified and ashamed, my sister and I were distressed that Jimmy's mother seemed to be angrier at us than at her own son, because, after all, it had been *his* idea. We walked home very quickly, hid in our bedroom for the rest of the day, and did not breathe a word about the incident to our mother until some point in adulthood.

This anecdote illustrates several important differences between adults' and children's understanding of responsibility for negative outcomes of behavior. One of these concerns what adults and children see as being the relevant negative outcome(s) of a given behavior. In retrospect, it seems likely that from Mrs. Pannebacker's

perspective there were two negative outcomes of our behavior: that she had three muddy children to clean up, and that my mother would think that she had failed to supervise my sister and me properly.<sup>1</sup> From my childish perspective, however, the negative outcome was that we got yelled at by someone that I had previously seen as entirely beneficent.

A second important difference concerns the ways in which young children and adults understand mental states and processes, such as knowledge, ideas and thoughts, to be related to responsibility for negative outcomes. The fact that I remember Jimmy as saying that his mother would not mind if we played with mud, suggests that we had knowledge of an implicit rule that children should not play with mud. Knowledge of this rule, however, was not sufficient to stop us from playing with mud once the idea that we could do so without making his mother angry was transmitted to us. After we had been caught, we felt that we had been unjustly punished because the bad idea had not originated with us. We did not see ourselves as having had any responsibility to independently consider why covering ourselves with mud would be bad, or, specifically, to think about how doing so would inconvenience Mrs. Pannebacker. Mrs. Pannebacker, however, clearly did think that we had such a responsibility. This was conveyed to us in her insistence that we knew better, and her question about what we had been thinking prior to covering ourselves with mud.

This anecdote also captures several of the key distinctions that Piaget (1932/1965) saw between young children's concept of responsibility, which focused on the objective aspects of social interactions and behavior, and older children's and

adults' concept, which focused on the subjective aspects. According to Piaget, young children attribute responsibility on the basis of the objective effects of behavior, because they are not able to understand the reasons for rules that define permitted and prohibited behaviors. In contrast, older children and adults attribute responsibility on the basis of the actor's subjective intentions. The ability to do so reflects children's developing understanding that rules represent the rule-maker's anticipation of potential effects of the behavior for the individual and the social group.

It is important to note that Piaget (1932/1965) did not see young children as being either unaware of, or uninterested in, the relations between motives or intentions and behavior. Rather, he argued that children's limited ability to take another's perspective, particularly the perspective of an adult, constrains their ability to make connections between the subjective processes that precede objectionable behavior and the emotional reactions of adults to the effects of the behavior. As a result young children's concepts of good and bad behavior are largely dependent upon observations of the observable physical effects of a behavior, as well as on others' reactions to the behavior and its effects, rather than on subjective processes that guided the behavior. Thus, although young children may have some understanding of the relation between mental states and responsibility for behavior, their ability to use this understanding to attribute responsibility is limited. This limited ability to consider the relation between subjective experiences and responsibility for outcomes is illustrated, for example, by my belief as a 6-year-old that responsibility for my muddiness should be determined by

whose idea it had been to play with mud, rather than by my uncritical acceptance of the idea and willing participation in the activity.

This example suggests that increasing understanding of ideas or intentions as products of thinking, rather than as static entities, is an important component of the developmental shift from an objective to a subjective concept of responsibility. This may be especially crucial with respect to children's evaluations of behavior that has negative effects for the actor, but which does not involve a violation of moral standards. This category includes a broad range of regrettable, but not morally blameworthy, actions. For example, a child who impulsively gives his favorite toy to another child as a birthday present has not done something bad. Nonetheless, if the child later wants the toy back, he is likely to be told that he is responsible for his decision to give away the toy, and must accept the sorrow that he feels at its loss as part of the consequences of his decision. The responsibility attributed to the child in this case relates to his failure to think through how his behavior will affect his future self rather than to anything immoral or unworthy in his motive for acting, or in the intended effect of his behavior.

Such situations may be especially perplexing for young children, who cannot fall back on their categories of good and bad motives or actions in order to attribute responsibility for the toy-giving child's subsequent unhappiness. In the case of the toy-giver, wanting to do something nice for another child is a good motive, and giving a present is a good action. Yet this good motive and good action have led to what, from an adult perspective, is a predictable negative outcome for the child who acted upon the motive. It seems likely that learning to understand the relation between thinking and

responsibility in cases like these is a fundamental part of how children develop the ability to regulate their own behavior so as to achieve desired goals, and to balance their own needs with the needs of others in social relationships.

Although considerable research has explored development in children's ability to use information about others' mental states (*e.g.*, knowledge, desires and intentions) in their evaluations of behavior, very little has focused on how children's developing understanding of mental *processes* affects such evaluations. However, an expanding body of literature demonstrates that there is considerable development in understanding of mental processes between the preschool and early elementary school years (see Flavell, 2000, for a review). For example, preschoolers appear to have little awareness of their own ongoing "stream of consciousness," and are more likely to claim that a person who is sitting quietly is not thinking anything than are older children (Flavell, Green & Flavell, 1993; 2000). In addition, 5- and 9-year-olds attribute a stronger degree of control over unwanted thoughts to individuals in emotionally charged situations than do older children or adults (Flavell, Green & Flavell, 1998). It therefore seems reasonable to expect that this development should be related to increasing ability to attribute responsibility for unintended outcomes in situations involving personal decision-making.

The purpose of this dissertation is to present a re-conceptualization of children's development from objective to subjective concepts of responsibility in terms of underlying development of relations between the mind and the physical and social worlds. This re-conceptualization is grounded in a review of literature related to two

theories, those of Piaget (1932/1965) and Heider (1958), that explored development in children's ability to use information about mental states to attribute responsibility for outcomes of behavior. A much smaller body of literature addressing relations between children's understanding of thought processes and responsibility for beliefs or outcomes of behavior is also reviewed. Finally, two experiments are reported, which explore two levels of development in children's understanding of the relation between thinking and responsibility. Experiment 1 assesses 5- to 7-year-olds' understanding that individuals who misinterpret information, and therefore form false beliefs about the foreseeable outcomes of their actions, are more responsible for these outcomes than are individuals who did not have access to information that was necessary in order to foresee the outcomes. Experiment 2, examines the relation between understanding that individuals can be held responsible for having false beliefs, and attributions of responsibility for causing foreseeable and unforeseeable outcomes. This experiment includes participants between 6 and 12 years of age, as well as adults.

#### Overview of Reviewed Literature

Development in children's understanding of responsibility has traditionally been closely linked to development in their understanding of intentionality. In particular, numerous studies have addressed children's ability to use information about other's motives (i.e., desire component of intention), knowledge about probable effects of their actions (i.e., belief component of intention), and information about consequences of the action for others in when evaluating their behavior (Shantz,1983). Two theories have guided research on children's evaluations of behavior, both of which center on concepts



of intentions and responsibility. The first of these is Piaget's (1932/1965) description of developmental changes in the extent to which children draw upon objective and subjective concepts of responsibility in their evaluations. According to this theory, young children's evaluations are based on the objective effects of behavior, whereas older children and adults base their evaluations on subjective factors, such as motives. The second is Heider's (1958) description of five concepts of responsibility that lead to increasingly narrow circumstances in which attributions of responsibility are made to a person rather than to the environment. In the most advanced of these concepts, personal responsibility is attributed only for outcomes that were intended. Thus, according to both Piaget (1932/1965) and Heider (1958), mature evaluations reflect more concern with the intentions that guide behavior than with the effects of behavior. However, their theories differ in important ways with respect to both the aspects of intentionality they emphasized, and the extent to which they consider a specific intention to cause an effect to be necessary for attributions of responsibility.

According to Piaget (1932/1965), the motivational aspect of intention, particularly whether the behavior was inspired by a self-oriented or socially oriented goal, is key to the concept of subjective responsibility. Thus, for individuals reasoning from a concept of subjective responsibility, responsibility for the effects of behavior is mitigated by the motive that guided the behavior. As a result, determination of an individual's responsibility for an effect is not limited to an assessment of whether the behavior was performed with the intention of causing the effect. Individuals can be considered responsible for unintended as well as intended effects, but the extent to

which they are considered responsible will reflect their motive for engaging in the behavior. For example, a motorist who loses control of his car while speeding may be considered less responsible for any damage he causes if he was trying to get his injured child to the hospital than if he was speeding for fun. For individuals reasoning from a concept of objective responsibility, responsibility depends on the observable effects of behavior. Evaluations based on objective responsibility therefore do not depend on either an assessment of whether the effect was intended, or consideration of the motive for engaging in the behavior.

In contrast, Heider's (1958) theory focuses on the issue of intentional causation and posits a more limited concept of responsibility as the endpoint of development. In his view, the epistemic aspect of intention (i.e., whether an individual knew about potential effects and expected to cause them) was an important factor in attributions of responsibility, whereas the role of the motivational aspect was minimal. Specifically, Heider argued that adults generally attribute responsibility for an effect only to individuals who freely intended to cause the effect. Thus, in his view, personal responsibility would ideally be attributed only to those individuals who both expected the effect to result from their actions and chose to cause it in order to satisfy some goal of their own. Individuals would not be held accountable for any foreseeable but unintended effects of their behavior. Likewise, individuals whose intentions were influenced by environmental forces such that "anyone would have behaved in the same way" would not be considered personally responsible for even the intended effects of their behavior.

The differences between these theories are perhaps best illustrated with examples of how two actors who engage in similar behavior would be evaluated by individuals at different developmental levels according to each of the theorists. This example is drawn from one of the classic story pairs that Piaget (1932/1965) used as stimuli to elicit evaluations from children. Each story concerned a child who accidentally made an inkblot on a tablecloth. Julian, who thought that it would be fun to play with his father's inkpot, made a small blot. Augustus, who thought that he would help his father by filling the inkpot for him, made a large blot. Piaget found that older children (9 years and older) usually claimed that Julian was naughtier because he made a mess while pursuing the self-oriented goal of having fun rather than the social goal of helping his father. Piaget described these children as reasoning from the concept of subjective responsibility. However, younger children (6- and 7-year-olds) usually claimed that Augustus, who wanted to help, was naughtier than Julian, who wanted to have fun, because Augustus made a bigger mess. According to Piaget, these children based their evaluations on the concept of objective responsibility.

Heider's (1958) model predicts different patterns of responses to these stories by children with more and less advanced concepts of responsibility. According to Heider, individuals with a subjective understanding of responsibility, in which responsibility is derived from intentional causation, would attribute responsibility to neither Julian nor Augustus because neither intended to make an ink blot. Those reasoning from an objective understanding of responsibility, in which responsibility derives from having a necessary causal role in the event, would attribute responsibility to both boys. Finally,

individuals reasoning from an immature subjective understanding of responsibility, in which responsibility derives from the foreseeability of the outcome, would presumably (given the high probability of a spill) attribute responsibility to both boys.

It appears that Piaget's and Heider's theories each present a partial description of how perception of objective causes and effects, and inferences about subjective aspects of causation, influence mature judgments of responsibility. This suggests that integration of the two models might produce a more complete theory of development in children's concepts of responsibility. Unfortunately, previous research has failed to recognize the differences between Piaget's and Heider's concepts of objective and subjective responsibility. Therefore the findings of these studies have contributed little toward the development of such a theory. As a result, in recent years the study of children's evaluations of behavior has largely been abandoned as a means of understanding how children represent the social world (Rest, 1983).

The decline in interest in children's understanding of intentionality as a factor in their evaluations of behavior has coincided with increased interest in children's understanding of intentions as mental states. This has led to research on children's understanding of desires and beliefs as sources of intentions (*e.g.*, Moses, 1993; Joseph and Tager-Flusberg, 1999; Shultz, 2002) and on the cues that children use to differentiate between intentional and unintentional outcomes (*e.g.*, Shultz & Wells, 1985; Smith, 1978). Other recent work has addressed development in children's understanding of the relations among desire, belief and emotion, including children's understanding of the possibility of diversity and conflict in desires, beliefs and emotions

both within and between individuals (*e.g.*, Bennett & Galpert, 1993; Harris, 1995; Lagatutta, Wellman & Flavell, 1997). Development in these areas should enhance children's ability to reason about the role of motives and intentions in individuals' choices, and should therefore enhance children's ability to use information about motives, knowledge and intentions in their evaluations of behavior.

This suggests that the time is ripe for a reintegration of these literatures. In the following sections of this paper I review the findings of research inspired by Piaget's and Heider's theories. I next describe recent research in the theory of mind area that focuses on children's understanding of foreseeability as a factor in their evaluations of others' beliefs and behavior. This research provides the rationale for two studies exploring development in children's ability to use information about others' interpretations of evidence as a basis for attributing responsibility for foreseeable, but unintended, outcomes.

## INTENTIONS AND OUTCOMES IN EVALUATIONS OF BEHAVIOR

### Piaget's Theory

According to Piaget (1932/1965), children develop from understanding rules as derived from relations of social constraint to understanding rules as derived from cooperation and interdependence in social relationships. This development is reflected in children's increasing consideration of subjective information such as others' motives and knowledge in evaluating their behavior. The ability to use subjective factors in evaluations of behavior depends upon both the ability to infer and consider others' goals and intentions and experience in using such inferences to guide one's own behavior. Although Piaget believed that young children begin to seek information about others' motives to explain their behavior by 3- to 4-years of age, he found that most children younger than 9-to-10 years evaluated others' behavior in terms of its outcomes rather than the actor's motive.

According to Piaget, children's focus on the effects of behavior, rather than the motive that guided the behavior, derived from two sources: the cognitive limitations characteristic of preoperational thought, and the unequal social relationships between parents and children. The limitations of preoperational thought include an inability to represent the perspectives of others, including their desires, beliefs and emotions, and a tendency to focus on the most perceptually salient aspect of a problem. Piaget argued that although young children generally believed parental directives to require absolute obedience, children were unable to use these rules to regulate their behavior because they could not understand their parents' reasons for establishing the rules. In other

words, children had no notion of the relations among the rules, behavior, and the potential effects of behavior that the rules were meant to preclude. Similarly, children often did not understand the reasons for their parents' anger in response to their behavior, and so they attributed these responses to the observable effects of the behavior. As a result, they developed a concept of responsibility based primarily on the effects of behavior rather than on motives or intentions.

In contrast, older children's understanding of rules was more influenced by their experiences of creating and enforcing rules during the course of competitive games with their peers. These games provided children with experiences of conflicts between self-oriented goals (*e.g.*, to win) and socially-oriented goals (*e.g.*, to promote a fair and friendly competitive environment) as well as with conflicts between alternative self-oriented goals (*e.g.*, to win versus to improve one's skills). In addition, as children entered the concrete operations stage, they became able to represent the perspectives of their peers and to simultaneously consider both motives and outcomes when reasoning about behavior. As a result these children were better able to use rules to regulate their own behavior, and to understand adults' reactions to rule violations.

#### Tests of Piaget's Theory

Piaget (1932/1965) tested this theory by telling children two stories in which children accidentally caused either a small amount or a larger amount of physical damage to some household item. He selected the theme of "clumsiness" for these stories because he believed that it represented an area of frequent conflict between parents and children, but one in which the offending behavior (*e.g.*, spilling or dropping something)

was often relatively innocent. Therefore, the extent to which the child's behavior could be called "bad" depended to a large extent on the motive that drove the behavior. Each pair of stories included one in which a child with a good or neutral motive accidentally caused a large amount of damage, and one in which a child with a selfish motive accidentally caused a small amount of damage. After hearing both stories, children were asked which of the two characters was naughtier and were asked to explain their answers. Children were classified as reasoning on the basis of objective responsibility if they selected the character who caused more damage as the naughtier one despite being challenged to consider the role of motive in the interview following the stories. As noted above, most of the 6- to 7-year-olds judged on the basis of objective responsibility, whereas by 9 or 10 years of age most children judged on the basis of subjective responsibility. Subsequent studies using the paired-story paradigm replicated this age difference (see Karniol, 1978; Keasey, 1977 for reviews).

Although the stories Piaget used as prompts allowed children to discuss both motives and outcomes as factors in their evaluations, the story pairs simultaneously varied both the valence of an actor's motive and the extent of the damage caused by his/her action. Therefore children were forced to base their final judgment on a single factor. Thus, this method may have underestimated young children's understanding of the relevance of motives to evaluations of behavior. Subsequent "post-Piagetian" studies addressing the motive-outcome question were conceived of as challenges to Piaget's description of young children as limited to an objective view of responsibility (Rest, 1983). These studies typically varied the valence of actors' motives and the



valence and/or severity of outcomes of the behavior in a factorial design. Children were asked how good or bad each character was, or how much punishment each character should receive, rather than which of two characters was naughtier.

These studies also differed from Piaget's in that the stories frequently involved differences in the intentionality of the outcome as well as differences in motives. In many studies, variation in the valence of motive involved actors who explicitly wanted to help or hurt others (Berndt & Berndt, 1975; Costanzo, Coie, Grumet & Farnill, 1973; Feldman, Klosson, Parsons, Rholes & Ruble, 1976; Nelson, 1980; Suls, Gutkin & Kalle, 1979; Suls & Kalle, 1978; Weiner & Peter, 1973). In many of these studies the relations among the actor's intention, his or her action, and the effect on the other character were more direct than those in Piaget's stories. For example, in stories used by Nelson (1980), the actors in both good and bad motive stories threw a ball toward another child. In the good motive stories they did so in order to initiate a game of catch, in the bad motive stories they did so in order to hit the other child. In contrast to Piaget's clumsiness stories, in which the outcomes were unrelated to both the good and bad motives, these stories highlighted the extent to which the outcome each character achieved matched the one he intended. These differences in the stories subtly changed the nature of the question from one concerning motives as an important factor in evaluation independent of intentionality, to one that centered on intentionality.

This body of research produced two major findings: that children begin to understand intentionality as a criterion for evaluations of behavior in the preschool

period, and that they begin to integrate intention and outcome information in their evaluations by the early elementary school years.

*Preschoolers' Understanding of Intentions and Outcomes as Criteria for Evaluating Behavior*

Piaget's (1932/1965) work on children's concepts of responsibility was based on interviews with school-age children, therefore one important question addressed by subsequent researchers was the nature of this understanding in children younger than six years of age. As in Piaget's work, children's concepts of responsibility were inferred from the types of criteria they used to evaluate behavior. Wellman, Larkey and Somerville (1979) found that 4-year-olds reliably judged a child who injured a friend as naughtier than one who injured himself, judged a child who caused a large amount of material damage as naughtier than one who caused a little damage, and judged a child who did not apologize for injuring his friend as naughtier than one who apologized. In addition to the criteria used by the 4-year-olds, 5-year-olds judged a child who seriously injured a friend as naughtier than one who caused a minor injury, judged a child who injured a friend as naughtier than one who damaged a toy, and judged a child who intentionally caused an injury as naughtier than one who accidentally did so. Three-year-olds did not use any of these criteria in their evaluations.

In contrast to Wellman and colleagues (1979), Nelson (1980) found that 3-year-olds used information about both the valence of motive and amount of damage in judging characters in single stories that varied with respect to both types of information. However, the extent to which they used each kind of information depended upon the

order in which it was presented. In contrast to older children (7-year-olds), 3-year-olds' judgments were more influenced by negative information regardless of whether it referred to motive or outcome. Three-year-olds also showed little ability to use positive information in their judgments if it was presented after negative information in the stories.

Taken together, these results indicate that, during the preschool period, children begin to understand that there are multiple criteria that can be used in evaluations of behavior. Nonetheless, young children have difficulty using information about more than one criterion at a time, and in most instances will weight any negative information they receive more heavily than neutral or positive information.

Perhaps as a result of this negativity bias, children appear to be able to use information about motives to make judgments in the context of positive outcomes at an earlier age than they are able to use such information in the context of negative outcomes. The effect of valence of outcome has been demonstrated using stories involving both material outcomes (Suls & Kalle, 1978; Surber, 1977) and social outcomes (Costanzo et al. 1973; Feldman et al., 1976; Suls et al., 1979) and appears to influence the responses of children younger than 6- or 7-years of age.

Not all studies have shown that younger children use motive information in the context of positive outcomes prior to using them in the context of negative contexts, however. For example, Imamoglu (1975) found that 5-year-olds did not use information about characters' intentions in the context of either positive or negative outcomes, whereas 7-, 9-, and 11-year-olds used intention information to judge actions that led to

both positive and negative outcomes. However, Imamoglu's stories varied in intentionality as well as valence of motive. Thus, the actions that led to positive or negative outcomes were described as being either unintentional (and therefore unmotivated) or intentional (and therefore guided by good or bad motives). Although good outcomes could occur as the result of an intentional behavior guided by a good motive or an unintentional behavior, they never resulted from a bad motive. If young children's evaluations are largely driven by the valence of information available, and are more strongly influenced by negative than by positive information, then one would not expect children to respond differentially to stories, such as Imamoglu's positive outcome stories, in which no negative information is provided.

*Integration of Intention and Outcome Information by Children with Objective and Subjective Concepts of Responsibility*

The classic Piagetian interpretation of the shift from objective to a subjective responsibility is that it occurs as children learn to disregard information about outcomes and to base their evaluations on motives. This suggests that an increase in attention to motives and intentions should be accompanied by a decrease in attention to outcomes. Several studies suggested that the valence or severity of the outcome continued to be an important contributor to children's evaluations even as their use of intention information increased. For example, Weiner and Peter (1973) tested 4- to 18-year-olds' use of knowledge, intent and outcome information in their decisions about whether and how much to reward or punish characters in moral and achievement domain stories. Use of intent information in moral domain stories, which involved a decision about whether

to help a lost child, increased substantially between the 4- to 6-year-olds and the 7- to 9-year-olds. However, use of outcome information declined much more gradually, and approached zero only among the 16- to 18-year-olds. In addition, the rate at which participants rewarded characters associated with good outcomes declined much more rapidly than the rate at which they punished characters associated with bad outcomes.

In a study of 6- to 10-year-old boys, Buchanan and Thompson (1973) used a standard Piagetian paired stories task to classify children as having an objective or subjective responsibility orientation. Children were also told 8 stories in which intention and outcome information were systematically varied. Following each story children were asked to indicate how naughty the character was and how much he should be punished. Buchanan and Thompson compared children's ratings for five pairs of stories. In addition to the bad intention/no damage and neutral intention/damage stories (the comparison that most resembled the paired story task), these included stories involving different amounts of damage but the same intentions, and stories involving different intentions but the same level of damage. These comparisons indicated that both the objective and subjective responsibility groups used both intention and damage information in their judgments. Nonetheless, the two groups of children appeared to use the two types of information differently. Mean differences in the subjective groups' ratings were greater between stories in which intentions varied but damage did not than when damage varied but intention was constant. The objective responsibility group also rated the characters whose actions were intentional as naughtier than the characters whose actions were accidental in both the high damage and no damage stories.

However, the mean differences in their judgments were greater between stories in which intention was held constant and damage varied than vice versa. Thus, it appears that, although children with an objective responsibility orientation use intention information in their evaluations, they give more weight to outcome information.

*Explanations for Developmental Differences in Use of Subjective and Objective Information in Evaluations of Behavior*

Two hypotheses have been advanced to explain the differences in younger and older children's use of subjective and objective information in their evaluations of behavior. The first of these is that the tendency for young children to focus on objective factors is an artifact of the standard intention–outcome structure of the stories used to prompt evaluations. Specifically, researchers have argued that young children are especially likely to show recency effects in processing stories that involve multiple pieces of information (Feldman et al., 1976; Nelson, 1980; Nunmedal & Bass, 1976, Parsons, Ruble, Klosson, Feldman & Rholes 1976). Thus, the use of stories in which the description of the outcome always follows the description of the intention could produce inflated estimates of young children's reliance on objective aspects of behavior in attributing responsibility. The second hypothesis is that there are developmental changes in the types of information integration rules used in evaluations of behavior (Anderson, 1991; Grueneich, 1982, Leon, 1977; Surber, 1982). Research based on each of these hypotheses is evaluated in the following sections.

*Order Effects on Children's Use of Intention and Outcome Information in Evaluations*

Five investigations (Feldman et al., 1976; Grueneich, 1982; Nelson, 1980; Nunmedal & Bass, 1976; Parsons et al., 1976) systematically varied the order in which subjective and objective factors were presented in the stimulus stories. The participants in these studies ranged in age from three years (Nelson, 1980) to twelve years (Grueneich, 1982). All studies included measures of the extent to which order of information influenced children's use of subjective and objective factors in their evaluations. Several also included measures of the effect of order of presentation on children's memory for subjective and objective information (Feldman et al, 1976; Nelson, 1980), or controlled for memory deficits by repeating stories for children who responded incorrectly to memory checks (Grueneich, 1982). Although the order in which the intention and outcome information was presented was found to effect the responses of children up to 10 years of age (Nunmedal & Bass, 1976) there were important differences in the aspects of children's performance that were affected across age groups.

Nelson (1980) found that three-year-olds remembered the valence of outcomes better than the valence of intentions when stories were presented in the standard intention-outcome order, and remembered the valence of intentions better than the valence of outcomes when the stories were presented in an outcome-intention order. Despite the effects of order on children's memory, however, Nelson did not find different patterns of use of intention and outcome information between 3-year-olds who heard the stories in the intention-outcome order and those who heard them in the

outcome-intention order. Rather, 3-year-olds responded on the basis of the total amount of negative information in both types of stories.

In the only other study that tested for order effects on memory as well as evaluations, Feldman and colleagues (1976) found that 5-year-olds both remembered the valence of intentions better, and relied more on intention information in their evaluations, when stories were presented in the outcome-intention order. When 5-year-olds' evaluations were reanalyzed in terms of the valence of intentions and outcomes that the children remembered, 5-year-olds in both order conditions relied more on intention information than on outcome information. However, 9-year-olds tested in the same study showed a different pattern of order effects on memory for the valence of intentions and outcomes, and use of intention and outcome information in their evaluations. Specifically, 9-year-olds remembered the valence of intentions equally well when stories were presented in the intention-outcome and outcome-intention orders. Despite this, whereas they appeared to integrate intention and outcome information in their evaluations of characters in intention-outcome stories, they relied overwhelmingly on intention information in their evaluations of characters in outcome-intention stories.

Similarly to Feldman and colleagues (1976), Nunmedal and Bass (1976) found different types of order effects on 6- to 7-year-olds' and 8- to 11-year-olds' evaluations of behavior. Six- to 7-year-olds' evaluations were most strongly influenced by whichever information came second, suggesting that the outcome-intention order facilitated their ability to use intention information in their evaluations. However, 8- to 11-year-olds' evaluations suggested that they integrated intention and outcome



information in their evaluations of characters in the intention-outcome stories, but based their evaluations entirely on intentions in the outcome-intentions stories.

The findings of these studies can be summarized as follows: 1) Order of presentation affects memory for the valence of intentions and outcomes in preschool-aged children, but not in older children. 2) Improved memory for intention information is associated with increased use of intention information to attribute responsibility among 5-year-olds, but not among 3-year-olds. 3) Order of presentation of intention and outcome information continues to affect children's evaluations beyond the age at which the effect can be explained by improved memory. 4) Among children in the age range typically associated with the ascendance of subjective responsibility (8 to 11 years), presentation of stories in the standard intention-outcome order leads to integration of intention and outcome information in evaluations, whereas the outcome-intention order leads to evaluations based solely on intentions.

Thus, although the order in which intention and outcome information are presented clearly influences children's representations of the events described in stories, it has different effects on children who might be seen as not yet having either objective or subjective concepts of responsibility (*i.e.*, 3-year-olds); those for whom subjective responsibility is still subordinated to objective responsibility (*i.e.*, 5- to 7-year-olds), and those who are most likely to base their evaluations on a subjective concept of responsibility (*i.e.*, 9- to 10-year-olds). Therefore, age-related changes in children's use of objective and subjective factors in their evaluations cannot be satisfactorily explained as an artifact of the standard intention-outcome order of the stimulus stories.

### *Information Integration Rules in Children's and Adults' Evaluations of Behavior*

The results described in the previous section suggested that children of different ages might use different rules to integrate motive or intention information with outcome information in their evaluations. They did not, however, provide any information about what these rules might be. Several researchers attempted to discover the types of rules used by children and adults to integrate these two types of information. These researchers drew heavily on Anderson's (1974; 1991) information integration theory, which attempted to describe the implicit integration rules individuals use to make sense of complex stimuli that vary along multiple dimensions. The key question addressed by the information integration studies was not whether children attend to motive or outcome information but what type of integration rule they use to coordinate various types of information in their evaluations. In particular, investigators were interested in which of two types of multidimensional rules children and adults used in their evaluations. The first type of multidimensional rules includes linear combinations of intention and outcome information, in which the influence of each dimension either remains the same regardless of the presence of the other dimension or is computed as a weighted average of both dimensions. The second type includes configural rules, in which the effect of one dimension depends on the presence or level of the other.

Proponents of the information integration approach to studying children's evaluations of behavior (*e.g.*, Leon, 1977; Surber, 1977) argued that it enabled researchers to differentiate between qualitative and quantitative differences in children's and adults' thinking. Specifically, if children's responses reflect the use of the same

type of rule as do adults' responses, then differences in the relative importance that children and adults assign to each of the dimensions can be said to be quantitative rather than qualitative. The main theoretical claim made by these researchers was that if young children, like adults, use multidimensional integration rules when evaluating behavior, then age differences in children's responses to the paired story task could not be explained by appealing to broad cognitive limitations, such as the inability to decentrate.

Leon (1977) and Surber (1977) both tested the extent to which children's evaluations, like those of adults, could be explained by linear multidimensional integration rules. Although Leon and Surber used generally similar methods and studied children of similar ages, they came to seemingly contradictory conclusions on two points. The first of these was the extent to which the severity of the outcome is integrated with motive information in adults' evaluations of accidentally caused events, and the second was the extent to which there is individual variation in the types of integration rules used by children and adults.

Surber (1977) conducted two experiments exploring the types of integration rules used by children and adults in their evaluations of the behavior of characters in a series of stories that were closely modeled on Piaget's (1932/1965) clumsiness stories. In both experiments the outcomes were accidental effects of the same intentional behavior (e.g., climbing into a cabinet). In the first experiment, the outcomes varied from neutral to highly negative; in the second experiment, the outcomes varied from highly positive to highly negative. In both experiments Surber found that the

evaluations of children and adults could be modeled with the same type of multidimensional integration rules. The primary distinction between the rules used by young children and by adults was in the absolute weight on outcome information, which declined significantly with age. She concluded that among adults the severity of accidentally caused damage (or the amount of reward received on the basis of chance) is considered largely irrelevant to evaluations of the behavior associated with the outcome. In contrast, among young children the disproportionate weight on outcomes could lead to patterns of evaluations in which well-intentioned individuals who cause large amounts of damage were judged more harshly than less-well-intentioned individuals who caused little or no damage.

Leon (1977) also found that children and adults tend to use the same type of rule to integrate information about intentions and outcomes when evaluating behavior. Specifically, he found that from about 8 years of age, the predominant rule used by children and adults in evaluations of actors who cause neutral to negative outcomes is an averaging rule. In contrast to Surber (1977), however, Leon found considerable variability in the types of rules used by younger children. Among 6- and 7-year-olds he identified three distinct patterns of responses that fit three types of integration rules. As would be predicted on the basis of Piaget's (1932/1965) description of 6- to 7-year-olds' reliance on an objective concept of responsibility, the first of these patterns reflected the use of a single dimension outcome-only rule. The second pattern suggested use of a multiplying rule, which resulted in no differentiation on the basis of intent when there was no damage and increasing differentiation with higher levels of damage.

The third pattern reflected use of an averaging rule similar to the one used by 8- through 12-year-olds and adults.

In addition, a subgroup of participants from across age groups, including a few adults, recommended low levels of punishment for characters in the accidental stories regardless of the amount of damage caused, but based their evaluations of characters who intentionally caused damage on both motive and outcome information. Leon (1977) described this pattern of evaluations as reflecting the use of two different rules, the choice of which depended on whether the outcome was intended. He suggested that these participants used a motive-only single dimension rule when the outcome was accidental, but an averaging rule when the outcome was intended.

In a comment on Leon's (1977) findings, Anderson (1991, p. 149) argued that this pattern of results by adults reflected an immature understanding of responsibility that overlooked the relevance of "foresight and prudence." This interpretation seems to contradict Surber's (1977) conclusion that the mature attitude toward accidentally caused damage is that the amount of damage is largely irrelevant to evaluations of the behavior that produced the outcome. However, the character in each of Surber's stories was described as being a 5-year-old child, whereas the age of the characters was not included in Leon's stories. Anderson's comment suggests that the justification for considering both motive and outcome information in evaluations of accidentally caused outcomes is that the actor should have been able to foresee the possibility of damage. If so, the typical adult response to Surber's stories may have been to discount outcome

information because the characters were presumed to be too young to be expected to foresee unintended effects of their actions.

Anderson's (1991) comment highlights the fact that adults usually consider numerous factors in addition to motives and outcomes when evaluating others' behavior. These include the foreseeability of outcomes and inferences about the whether they were intentionally caused. Although neither of these factors are addressed by Piaget's theory, they are central to Heider's theory, which is considered in the next section of this paper.

#### *Summary and Evaluation of Piagetian Literature*

Before moving on to a consideration of the Heiderian literature, however, it is necessary to consider the contributions of the Piagetian literature to understanding of objective and subjective concepts of responsibility. Taken together, these studies reveal that three-year-olds have little understanding of either motives or intentions as factors in responsibility for outcomes. At this age, children's evaluations are largely driven by any negative information about the actor or the outcome (Nelson, 1980). By 4 years of age, children are sensitive to different categories of negative outcomes in their evaluations. Specifically, they judge actions that cause damage to social relationships as more serious than actions that damage property or cause injury to the actor (Wellman et al., 1979). Four-year-olds also attribute more responsibility to actors with pro-social intentions than to those with selfish intentions (Weiner & Peter, 1973). These findings suggests that 4-year-olds have at least an initial understanding that responsibility, as opposed to simple causality, is grounded in social relationships. Nonetheless, it is not

until 5 years of age that children show understanding that individuals bear more responsibility for intended than for unintended outcomes (Wellman et al., 1979).

The extent to which the valence of motives is considered an important factor in attributions of responsibility for intended and unintended outcomes increases between the early elementary and later elementary school years (Buchanon & Thompson, 1973; Leon, 1977; Weiner & Peter, 1973). The increase in consideration of the valence of motives, however, is not invariably accompanied by a decrease in consideration of the severity of the outcome. Rather, the extent to which the valence or severity of the outcome continues to be considered in older children's and adults' evaluations appears to depend on a number of factors, including, perhaps, inferences about the actor's competence to foresee unintended outcomes.

This literature adds more detail to the picture Piaget (1932/1965) presented of differences in younger and older children's concepts of responsibility. However, it does not provide a convincing case that there is no important development in children's understanding of the relation between subjective states and responsibility during the elementary school years. Rather, it suggests that there are two points in development at which children's understanding undergoes important changes. One of these appears to occur late in the preschool period, and to affect children's understanding of the relation between intentional action and responsibility. The second appears to occur, as Piaget suggested, at 8 to 10 years of age, and to relate to a more complex understanding of how diverse subjective factors, (i.e., knowledge, desires and intentions) contribute to decisions to act and affect responsibility for the outcomes of one's actions.

## FORESEEABILITY IN ATTRIBUTIONS OF RESPONSIBILITY

### Heider's Theory

Heider's (1958) theory was meant as a description of how individuals perceive and interpret social events. Heider presented an analysis of how individuals infer whether another is trying to do something, has the ability to do something, and should be considered personally responsible for having done it. According to Heider, perception of human causation is based on an analysis of the relative contribution of environmental and personal factors to the occurrence of the event. Heider further argued that there are two types of personal factors that must be individually considered in perception of human action. These include power factors, the most important of which is ability, and motivational factors, which include what the individual is trying to do (i.e., his/her goal) and the amount of effort he or she expends to achieve it. Notably, Heider did not consider desires to be part of the motivational factor. This is because an individual can want something without either intending to achieve it or expending any effort to achieve it.

Environmental and personal factors have an additive relation to each other. For example, the movement of a rowboat across a body of water may result from both environmental factors, such as the current of the stream, and personal factors, such as the amount of effort expended by the human rowing the boat. However, even if the causal quotient of one or the other of these factors is set at zero, the action may still occur. Thus, the boat would continue to move even if the person inside was unconscious and therefore had no motive and exerted no effort. Power and motivational factors,



however, have a multiplicative relation to each other; if either is set at zero the action will not occur. Further, both the intention and effort elements of the motivational factor must be present in order for the action to be perceived as an instance of personal causation. Thus, actions that are intended, but toward which the individual expends either no effort or insufficient effort to overcome opposed environmental forces, will not occur. In contrast, actions and effects that occur but that are not what the individual intended are considered impersonally rather than personally caused. These events are considered impersonally caused regardless of whether the individual could have foreseen that actions performed in order to achieve an intended effect would or might also produce the unintended effect. From Heider's perspective, the individual is not personally responsible for these effects.

Heider's (1958) justification for this narrow view of personal causation and personal responsibility was based on his analysis of how individuals infer that another is trying to do something. Specifically, Heider argued that what differentiates personal causation, which is characteristic of humans and other intelligent agents, from impersonal causation, which is characteristic of inanimate agents, is the ability of intelligent agents to alter their actions in order to achieve a specific intended end. For example, a human may be struck by a rock as the result of a number of different impersonally caused physical events, but the particular human could avoid any of these events by not being in the way of the particular falling rock. In this case, nature would not continue to pursue the individual and create additional instances of falling rocks in order to harm the individual. Similarly an individual could be hit by a rock as an

“aftereffect” of a human action, for example if the rock were struck by the tire of a moving car driven by a human, or idly thrown by a small child. Despite the involvement of a human agent in these events, the victim could still have avoided harm by not being in the vicinity of the event. Because the human agent has no intention to harm the individual he or she will not engage in additional actions in order to bring about harm. However, a human who intends to harm another might first attempt to do so by throwing a rock, then by swinging a club, then by hiring someone else with better aim to throw a rock or swing a club, and so on until he or she achieves the intended result. The prospective victim of these efforts could not avoid harm simply by moving out of the vicinity of the first attempt.

Although both environmental and personal factors are considered in inferences about ability, Heider (1958) argued that attributions of responsibility for an effect are usually made only to the individual or to the environment. Heider delineated five concepts of responsibility that represent “successive stages in which attribution to the person decreases and attribution to the environment increases” (p.113). The five stages include 1) attribution of responsibility to any individual who has some connection to the causal agent; 2) attribution of responsibility to any individual who was a necessary element in the causal chain leading to the event; 3) attribution of responsibility to any individual who could have foreseen that an effect might occur as a result of his action, regardless of whether the effect was intended; 4) attribution of responsibility to any individual who intended the effect that s/he caused, and 5) attribution of responsibility

to the environment rather than to the individual if the environmental forces motivating the action were such that most people would have acted the same way.

According to Heider (1958), only the last two stages reflect concepts of responsibility that are based on the ability to differentiate between impersonal and personal causation. Furthermore, the last stage provides for attributing responsibility to the environment even in circumstances that would superficially indicate personal causation. Thus the five stages reflect a gradual attenuation of situations in which individuals might properly be said to be responsible for events.

Heider (1958) explicitly described the second of these stages (causation) as equivalent to Piaget's description of young children's objective concepts of responsibility, and the fourth stage (intentional causation) as equivalent to subjective responsibility. This implied that the third stage (foreseeability) represented an intermediate concept of responsibility that children would acquire prior to the concept of subjective responsibility. Thus a key prediction of Heider's theory was that children would differentiate in their evaluations between individuals who caused foreseeable but unintended effects and those who cause unforeseeable unintended effects at an earlier age than they would differentiate between individuals who caused unintended effects and those who caused intended effects.

#### Tests of Heider's Theory

Studies of Heider's model did not confirm this prediction. Specifically, studies by Fincham and Jaspars (1979), Hook (1989) and Yuill and Perner (1988) all concluded that children differentiated between unintended and intended outcomes at an earlier age

than they could differentiate unforeseeable and foreseeable unintended outcomes. The age at which children differentiated on the basis of foreseeability, however, varied across these studies.

Fincham and Jaspars (1979) and Hook (1989) used a similar method, which involved telling children stories that represented each of Heider's levels of responsibility and asked children to rate how much they would blame each of the characters. Fincham and Jaspars found that 10-year-olds and adults differentiated between unforeseeable and foreseeable accidents in their attributions of responsibility, but that 6-year-olds, 8-year-olds and 12-year-olds did not. Hook found that 5-, 7-, and 9-year-olds did not differentiate between unforeseeable and foreseeable accidents when they were asked to attribute responsibility to characters in each story individually, whereas 11-, 13- and 15-year-olds did. However, Hook also asked children to judge which character from pairings of stories at adjacent levels of Heider's sequence was naughtier and to explain their choices. In response to this task, 9-year-olds, as well as older children, unanimously chose the characters who caused foreseeable accidents as naughtier than characters who caused unforeseeable accidents, suggesting an earlier understanding of the relevance of foreseeability to attributions of responsibility than was suggested by the single stories. Nonetheless, older children and adolescents were more likely to justify their choices in terms of foreseeability than were 9-year-olds.

Yuill and Perner (1988) used a simpler task to test 3- to 7-year-olds' ability to make differential judgments with respect to three types of stories: intended outcome stories, foreseeable accident stories, and unforeseeable accident stories. Each story

involved three characters. In Experiment 1 these included two protagonists with different amounts of knowledge and/or intentions with respect to the effect of their behavior on a third character. For example, one story involved two boys throwing a ball back and forth over a wall and a girl who was playing on a swing on one side of the wall. Children were told that the girl was only visible to the boy on the same side of the wall. While running to catch the ball, both boys bumped the swing, causing the girl to fall. The test question concerned which of the two boys the girl would be most angry at. In Experiment 2, the stories included an actor, the intended recipient, and another child who, in the case of the accidental outcome stories, was the actual recipient of the action. As in Experiment 1, one story theme involved children playing catch over a wall. In the unforeseeable accident story, the third character was not visible to the actor, whereas in the foreseeable accident s/he was. The test questions concerned how much the actor was to blame for hitting either the intended recipient or the other character. Results indicated that whereas even 3-year-olds evaluated actors in the intended outcome stories more negatively than those in the unforeseeable accident stories, only the 6-year-olds also evaluated characters in the foreseeable accident stories more negatively than those in the unforeseeable outcome stories.

These results indicate that the ability to use the foreseeability of unintended outcomes as a basis for attributing responsibility is a late developing skill. Furthermore, children's proficiency at using foreseeability as a basis for attributing responsibility varies considerably depending on the specific content of the stimulus stories and the type of task used to assess their understanding. One possible source of variability in

children's ability to use information about foreseeability to attribute responsibility is the extent to which they have to infer what the individual could have known and actually did know about potential outcomes. Fincham and Jaspars' (1979) stories required children to infer the foreseeability of a negative outcome from information about the character's competence at a physical activity and the proximity of other individuals. For example, the foreseeable accident level was represented by a story about a runner who continually slipped while running on a wet surface and who hurt another individual as a result of running too close and bumping into him during a slip. The relative subtlety of this manipulation may account for the finding that 12-year-olds did not differentiate between unforeseeable and foreseeable accidents in their attributions of responsibility, although 10-year-olds and adults did.

In contrast to Fincham and Jaspars (1979), Hook (1989) provided explicit information about what the character at each of the five levels knew about possible outcomes. This information was included in addition to cues to foreseeability in the stories and the pictures that accompanied them. For example, the foreseeable accident story involved a boy who broke a cup when he opened a door and knocked over the tray on which it was sitting. The story indicated that the boy had seen cups stored behind the door in the past and the picture showed the boy facing away from a Dutch door with the upper half open as he pushed on the door. Children were told that, although the boy did not know the cup was there, he could have known if he had remembered it being there in the past and looked through the top half of the door before entering. Although the explicit description of what the character knew and could have known appeared to help

children differentiate between unforeseeable and foreseeable accidents in the paired story tasks, it does not seem to have influenced their attributions of responsibility in response to the single stories.

Finally, children in Yuill and Perner's (1988) study did not have to judge how the character's actual belief (or state of knowledge) compared to the state of knowledge afforded by the evidence. Foreseeability was defined simply as visual access to the victim. This may explain why Yuill and Perner found that 6-year-olds could differentiate between foreseeable and unforeseeable accidental outcomes, whereas Hook (1989) placed the ability to do so at 9- to 11-years of age. Recall that Hook provided children with explicit descriptions of both what each character knew about the impending outcome and what he could have known (but did not know). Rather than simplifying the task for children, this information may have highlighted the inherent tension between actual and potential states of knowledge that forms the basis for the adult concept of negligence.

Taken together, the results of these studies point to two conclusions about children's understanding of the relation between the ability to foresee an outcome and responsibility for causing it. First, children's ability to use foreseeability information in their evaluations of behavior depends on the extent to which the foreseeability must be inferred from the stimulus materials. Second, children can use foreseeability information at an earlier age if they are not required to compare what was actually foreseen to what was potentially foreseeable as part of their determination that an individual was responsible for the outcome.

## Foreseeability And Subjective Responsibility

The wide disparity in the ages at which children used foreseeability in their evaluations across the various studies discussed in the previous section raises the question of what concept of responsibility is reflected in attributions of responsibility on the basis of foreseeability. One possibility is that these attributions do, as Heider proposed, indicate that children are inferring intentionality from foreseeability. From Heider's perspective, attributions of responsibility on this basis would reflect an incomplete understanding of the roles of desire and belief in intentional causation. That is, inferences of intentionality on the basis of foreseeability alone ignore the fact that only the outcome(s) that one specifically desired and expected to cause through one's behavior are intended. Therefore, according to Heider, attributions of responsibility on the basis of this flawed understanding of intentions would not reflect a concept of subjective responsibility.

However, it is also possible that attributions of responsibility on the basis of foreseeability reflect a more Piagetian concept of subjective responsibility. In contrast to Heider's, Piaget's concept derives as much from understanding the necessity of regulating social interactions as it does from understanding of intentionality. According to this view, the concept of personal responsibility does not become attenuated as a result of cognitive development, but instead expands to encompass impersonally caused effects that the actor might have prevented by acting differently. In other words, the onus for preventing or avoiding undesirable impersonally caused outcomes is on the agent rather than the recipient. From this perspective, attributions of responsibility on



the basis of foreseeability can be seen as evidence of reasoning from a concept of subjective responsibility rather than as evidence of an incomplete understanding of the relation between intentionality and responsibility. In order to infer that differential evaluations of behavior in response to differences in the foreseeability of outcomes reflect concern for whether an individual has considered potential unintended outcomes, however, it is necessary to rule out the possibility that participants have used the foreseeability information to attribute intentionality as well as responsibility.

The results of Fincham and Jaspars' (1979), Hook's (1989), and Yuill and Perner's (1988) studies do not provide a clear answer to the question of which of these concepts of responsibility is reflected in children's evaluations on the basis of foreseeability. Hook's method, which included an explicit mention that the character in the foreseeable outcome story did not know, but could have known, that the outcome could occur, provides the best evidence that children may have based their evaluations on foreseeability rather than an inference that the outcome was intended. This suggests that children begin to use foreseeability to attribute responsibility for outcomes that they believe were unintended between 9 and 11 years of age.

Nonetheless, it is unclear that attributions of responsibility on the basis of foreseeability, even among children and adults who presumably understand both foreseeability and intentionality as distinct bases for such attributions, are invariably free from inferences about intentions. This is illustrated by a study by Sanvitale, Saltzstein, and Blank (1987) of adolescents' use of foreseeability in evaluations of behavior. Sanvitale and colleagues tested the effects of foreseeability and the extent to

which the outcome matched the actor's self-interest on the evaluations of normal and aggressive 13-year-old boys. The comparison of these two groups was intended to explore the extent to which children's ability to judge good and bad behavior in others, as measured by their evaluations of story characters, is related to differences in their social behavior in real life situations. Specifically, the authors expected that the normal boys would be more sensitive to differences in foreseeability as a cue to intentionality, whereas aggressive boys, who were expected to have a generally suspicious view of others, would be more sensitive to information about how the outcome affected the character's self-interest.

All stories involved themes in which the protagonists' self-interest conflicted with his overt intention in acting. For example, one story theme involved a boy providing directions to a party to a friend with whom he was competing for the attention of a girl who would be at the party. Therefore, although the first boy was explicitly described as wanting his friend's company at the party, he could be seen as wanting to prevent his friend from attending the party so that he would have less competition for the girl's attention. In all versions of this story, the boy fails (for a foreseeable or unforeseeable reason) to provide adequate directions to his friend and the friend misses the party. In the self-interest-fulfilled version the boy meets the girl and starts dating her, in the self-interest-unfulfilled version the girl is already dating someone else and pays no attention to the boy.

Results indicated that both groups of boys evaluated the characters who achieved self-interested goals more harshly than they evaluated those who did not.

However, as expected, the normal adolescents made greater use of foreseeability information in their evaluations than did aggressive adolescents. Specifically, the normal boys gave more negative evaluations to the characters in the foreseeable outcome stories and less negative evaluations to the characters in the unforeseeable outcome stories than did the aggressive boys.

Despite this difference in use of foreseeability as a basis for evaluation between the two groups, both normal and aggressive boys indicated that the characters in the foreseeable outcome stories both could have known and did know that the outcomes might occur. Therefore, the group difference in the use of foreseeability information to attribute responsibility does not appear to reflect a difference in ability to infer foreseeability between the two groups. Both groups of boys also used foreseeability information to infer intentionality, although all stories indicated that the characters did not intend to cause the outcomes. Specifically, boys referred to the unintentional nature of the outcome to justify their evaluations of characters in unforeseeable outcome stories more frequently than they did so to justify evaluations of characters in the foreseeable outcome stories. In addition, over one third of the boys explicitly described the outcomes of at least one of the foreseeable outcome stories as intended. Inferences of intentionality on the basis of foreseeability were more frequent in response to stories in which the character's self-interest was fulfilled than those in which it was not.

Thus, Sanvitale and colleague's (1989) results suggests that by early adolescence, failure to foresee and avoid negative outcomes is weighted more heavily in evaluations when it is perceived as being related to a conflict in the actor's goals. In this

case the normal adolescents appear to be integrating understanding of foreseeability as a knowledge cue to intentionality, and self-interest as a desire cue to intentionality. It remains unclear, however, to what extent they were responding to the foreseeability of the outcome as a separate factor from intentionality in their evaluations. Although the characters' self-interested goals were fulfilled in only half of the stories, all the stories involved conflicts in the characters' goals. Therefore it is possible that the normal adolescents blamed all the foreseeable outcome characters more than unforeseeable outcome characters because they believe that there was a greater probability that the foreseeable outcome characters actually intended the negative outcomes.

Thus the question remains, at what age do children differentiate on the basis of foreseeability alone when there is strong evidence that an actor does not intend to cause an outcome? This question has begun to be addressed in several recent studies of children's evaluations of self-deception or motivated false beliefs. Such beliefs occur when individuals misinterpret information that otherwise implies that they will not be able to achieve some desired goal (Martin, 1986). Thus, for example, a woman who sees charges from local hotels that she has never visited on her husband's credit card statement might misinterpret the charges as business expenses rather than as evidence that her husband is having an affair. By doing so she can avoid considering the threatening implications of her husband's infidelity for her goal of having a happy marriage. Because such beliefs do not accurately reflect evidence that directly relates to the believer's goals they can lead to actions that cause undesired and unintended outcomes. In such cases, both belief and desire cues, which children might ordinarily

use to attribute responsibility on the basis of intentionality, point to the unintentional nature of the outcome. Thus children should be unlikely to attribute responsibility on the basis of intentionality in response to these situations. However, children who understand foreseeability as an independent basis for attributing responsibility should judge these actors as responsible for their own misfortunes.

## INTERPRETATION OF EVIDENCE AND RESPONSIBILITY

As we have seen, most studies of young children's ability to use foreseeability information in their evaluations of behavior have defined foreseeability in terms of individuals' access to evidence relevant to various outcomes (Fincham & Jaspars, 1979; Hook, 1989; Yuill & Perner, 1988). These studies have assumed that individuals who perceive evidence invariably interpret it in an unbiased way. Thus in Hook's "foreseeable accident" story, a child was not looking as he opened a Dutch door and failed to see that there were cups stacked behind the door. Because he did not see the cups he also failed to foresee that they would break if he opened the door. The blameworthy element of this child's behavior was his failure to perceive information that was available and to adjust his behavior accordingly. However, it seems likely that many instances of foreseeable but unintended outcomes in real life result from biased interpretation of evidence that has been perceived. For example, consider the student who claims to be shocked at receiving a poor final course grade despite having earned correspondingly poor grades on all work throughout the semester. It seems more likely that this student discounted the implications of each of the poor grades throughout the semester than that s/he was unaware of the grades. In such cases, the blameworthy aspect is the individual's improper interpretation of the evidence rather than failure to perceive it.

Several recent studies (Boerger, 2003; Boerger & Woolley, 2005; Johnson, 1997) have explored development in children's evaluations of individuals who hold and/or act upon beliefs derived from biased interpretations of evidence. Such beliefs can

be described as being foreseeably false, in contrast to false beliefs that result from misleading evidence or lack of evidence, which are unforeseeably false. These studies have led to inconclusive findings with respect to development in children's understanding of the relation between thinking and responsibility.

Both Johnson (1997) and Boerger and Woolley (2005) found increases with age in 4- to 9-year-old children's willingness to blame story characters for forming false beliefs when multiple pieces of evidence supported a true belief. However, in both studies only about half of the oldest children correctly blamed the characters who formed foreseeably false beliefs while correctly excusing those who formed unforeseeably false beliefs. Similar results were found among a group of adults included in Boerger and Woolley's study. Specifically, only 50% of the adults reliably attributed responsibility for false beliefs to characters who could have foreseen the outcomes, but not to characters who could not have foreseen the outcomes.

Thus, both children and adults appear to be reluctant to blame individuals for their false beliefs, even when they should have been able to form true ones. However, reluctance to blame individuals for holding foreseeably false beliefs may not imply reluctance to blame them for outcomes caused by acting on such beliefs. Boerger (2003) found that 7-year-olds, as well as 10- and 13-year-olds, judged characters who acted on foreseeably false beliefs as more at fault for the outcomes of their actions than characters who acted on unforeseeably false beliefs. The relatively mature performance of the 7-year-olds in Boerger's (2003) study raises two questions about the age at which children understand biased interpretation of evidence as a basis for negative evaluations

of outcomes. Do children younger than 7 years also understand that individuals can be held accountable for acting on false beliefs derived from biased interpretations of evidence? What is the relation between understanding that individuals are (or are not) responsible for the outcomes of acting on false beliefs, and understanding that individuals can also be responsible for forming such beliefs?

The present research includes two experiments designed to answer these questions. Experiment 1 investigates 5- to 7-year-olds' attributions of responsibility to individuals whose actions, which are based on either motivated or unmotivated interpretations of evidence, lead to unexpected negative outcomes. Experiment 2 investigates 6- to 12-year-olds' attributions of responsibility for both having a false belief about the relation between one's actions and an outcome, and their attributions of responsibility for the outcome. In both experiments, children's attributions of responsibility are compared to attributions made by adults.

Both experiments include two measures of participants' attributions of responsibility for the outcomes. The first of these is an explicit question about how much an individual was at fault for an outcome. The second is a question about how much sympathy the participant felt for the individual as a result of the outcome. This question was included because several studies in the Heiderian literature (*e.g.*, Sanvitale, et al., 1989; Yuill & Perner, 1988) used questions about participants' emotional responses to an event as measures of attributions of responsibility. The rationale for doing this was that children's emotional responses to the event include an implicit attribution of responsibility, and that asking children to report on their



emotional responses might reveal a more sophisticated understanding of responsibility than would questions requiring explicit attributions of responsibility (Yuill and Perner, 1988). However, it is not clear that young children understand the effect of attributions of causality or responsibility on emotions sufficiently well to report emotions that reflect such attributions (see Graham, 1988; Thompson, 1987; 1989 for development of understanding of attribution-based emotions). Inclusion of both the more explicitly evaluative fault question and the sympathy question in the present experiments allows for an experimental test of this claim.

## EXPERIMENT 1

### Method

#### *Participants*

One hundred eighteen children (62 boys and 56 girls) and thirty-seven adults (8 men and 29 women) participated. Participants included thirty-nine 5-year-olds (*mean age = 5:6; range = 5:0 – 5:11*), forty-two 6-year-olds (*mean age = 6: 6, range = 6:0 – 6:11*) and thirty-seven 7-year-olds (*mean age = 7:6; range = 7:0 – 7:10*), and 37 adults (*mean age = 18:8, range = 17:0 – 20:0*). The sample included participants from diverse racial and ethnic groups, including Hispanic, African-American, South Asian, East Asian and Native American participants. However, the majority of the participants were from European-American families.

Children were recruited from the database maintained by the Children's Research Laboratory. Parents were contacted by letter and phone call. Appointments were scheduled individually for each child, and each child received a small toy at the end of the experiment. Adults were undergraduate students who were recruited from the Psychology 301 pool. They received partial credit toward fulfilling a research participation requirement in exchange for their participation.

#### *Procedure*

Children were tested individually in an experiment room at the University of Texas Children's Research Laboratory. All tasks were completed in a single session, which lasted approximately 30 minutes. Test stories were read aloud to the children,

and they responded to questions verbally and by pointing to the appropriate pictures on fault and sympathy rating response scales.

Adults were tested in small groups of 1 to 10 participants. They read and responded to written versions of the stories and questions. All participants were told that the characters in the test stories were “about your age.” Therefore, some details of the stories used with adults were changed from the stories used with children in order to present the characters as university students rather than as young children.

### *Tasks and Materials*

#### *“Whose fault is it?” Pre-training*

Pilot testing with 5-, 6- and 7-year-olds revealed that the youngest children had trouble using a 5-point scale to attribute responsibility when they did not have some prior orientation to the concept of fault. In order to provide this orientation, children were first invited to play a game called “Whose fault is it?” In this game, children were shown two paper dolls, given a brief description of what each doll was doing when an accident occurred, and asked to say whose fault it was that the accident occurred. Boys were shown dolls representing boys and told that their names were Michael and Donny; girls were shown dolls representing girls and told that their names were Michelle and Donna. The script for the game was as follows: “This is Michael. He’s outdoors playing ball. He’s throwing his ball toward the house. This is Donny. He’s inside watching TV. So, Michael is throwing his ball toward the house, and Donny is watching TV. Oh no! Here comes the ball! It is flying toward the window. It crashes through the window and the window is all broken. Whose fault was it that the window got broken?”

Was it Michael's fault or was it Donny's fault?" Children unanimously selected Michael as the guilty party, and were given the following feedback: "That's right. It was Michael's fault. He threw the ball and it broke the window. It was completely his fault. It was not Donny's fault. He was watching TV when the window got broken. It was not his fault at all."

### *Fault and Sympathy Response Scale Training*

Immediately following the pre-training, children were told, "Now sometimes things are completely a kid's fault, and sometimes they are not at all a kid's fault. But sometimes things are partly a kid's fault and partly not. In this next game I'm going to tell you some stories and I want you to tell me *how much* what happened was the kid's fault." Children were then shown a figure depicting five water glasses with varying amounts of water, ranging from empty to full. The pictures were labeled with the numbers zero through four. Children were told, "You can use these pictures to show me what you think. If you think it was *not at all* the kid's fault point to this one (Experimenter pointed to the picture of the empty glass). If you think it was *completely* her/his fault point to this one (Experimenter pointed to the picture of the full glass). If you think it was *partly* the kid's fault, point to one of these: this one (Experimenter pointed to 1/4 full glass) means it was a *little bit* her/his fault; this one (Experimenter pointed to 1/2 full glass) means it was *half* her/his fault, and this one (Experimenter pointed to 3/4 full glass) means it was *a lot* her/his fault."

Children were told five two- to three-sentence stories involving negative events (*e.g.*, a toy being broken) and were asked how much they thought the outcome was the

fault of the child in the story. These stories were pilot tested with adults to ensure that they represented each of the points on the fault scale. Children who did not use both endpoints and at least one midpoint of the fault scale in response to these stories were asked to describe a situation that would be “not at all”, “about half” and/or “completely” someone’s fault.

Training in use of the sympathy scale began with a question about whether the child knows what it means to feel sorry for someone.<sup>2</sup> All children were given the following feedback, “That’s right (actually) it means that something bad has happened to them and you feel sad because they are sad.” Next, children were shown the sympathy scale, which depicted five faces ranging from a smiling face to a frowning face with several tears under each eye. These faces were labeled with the numbers zero (the smiling face) through four (the copiously crying face). Children were told, “You can use these pictures to show me how sorry you feel for the children in these stories. If you *don’t feel at all sorry* for them, point to this one (Experimenter pointed to smiling face). If you feel *very, very sorry* for them, point to this one (Experimenter pointed to crying face with several tears). If your feeling is somewhere in between, point to this one (Experimenter pointed to face with straight line mouth); if you feel just a *little bit sorry* for them, point to this one (Experimenter pointed to frowning face); if you feel *about half sorry* for them, or if you feel *a lot sorry* for them, point to this one (Experimenter pointed to crying face with one tear).”

Children were told five stories to give them practice using the sympathy scale. These stories were pilot tested with adults to ensure that they represented each of the

points on the sympathy scale. Children who did not use each endpoint and at least one midpoint of the scale were asked to describe a situation in which they would feel the amount of sympathy which they did not use in response to the practice stories.

### *Evaluation Task*

This task consisted of six short stories about children who wanted to achieve a particular goal. In each story, a knowledgeable advisor provided information about how to achieve an outcome that he/she believed matched the child's goal. Although these stories were derived from the stories used in Boerger (2003), three types of stories were used to control for the possibility that children were attributing responsibility on the basis of whether the characters followed advice rather than on the basis of the foreseeability of the outcome. Thus, participants heard two stories each of the following three types:

1) *Foreseeable outcome stories*: Child wants the outcome that the advice is intended to help him/her achieve but does not follow the advice. The desired outcome does not occur.

2) *Unforeseeable outcome-does not follow advice stories*: Child does not want the outcome that the advice is intended to help him/her achieve and so does not follow the advice. Nonetheless the undesired outcome occurs.

3) *Unforeseeable outcome-follows advice stories*: Child wants the outcome that the advice is intended to help him/her achieve and follows the advice. However, the desired outcome does not occur.

As each story was read, participants were asked a comprehension question, an inference question, and a memory check question. The comprehension question (*e.g.*, “what did Jim’s teacher say he should do?”) and the inference question (*e.g.*, “what do you think Jim should do?”) assessed children’s understanding of the advice. The memory check question (*e.g.*, “Did Jim do what his teacher said he should do?”) assessed their understanding of whether the character had done as advised. If a child answered the comprehension question incorrectly, the experimenter re-read the part of the story containing the advice and asked the question again. All participants were given feedback following the memory check question. If they answered the question correctly they were told, for example, “That’s right. Jim did do what his teacher told him to do.” If they answered incorrectly, they were told, “Actually, Jim did do what his teacher told him to do.”

The outcome to the story was revealed after the child received feedback to the second comprehension question. In all stories the outcome violated the character’s expectation and desire. Two test questions were asked after the outcome was revealed: 1) “How much was it (character’s) fault that (the outcome happened)?” and 2) “How much do you feel sorry for (character) because (the outcome happened)?” Responses to each question were made on a 5-point (0 – 4) scale.

*Variations to tasks presented to adult participants.* Adults received written versions of the tasks used with children, which differed from the oral versions in several ways. First, the adults did not receive the “whose fault is it?” pre-training. Second, Both the *comprehension* and *inference* questions were presented to children as open-ended

questions, which were followed with forced choice alternatives for children who did not respond to the open-ended questions. In the written versions, *comprehension* questions were presented with forced choice alternatives, and *inference* questions were presented as open-ended questions. Finally, the feedback for *control* questions was printed directly below each question, but was covered with a slip of white paper. Participants were instructed to lift the slip of paper and compare their answers to the feedback immediately after answering each control question. In the case that their answers did not match the feedback, they were instructed to re-read the story to make sure that they understood why the answer given in the feedback was correct.

### *Design*

#### *Story Themes and Variation in Types of Outcomes*

Three story themes were written to include *foreseeable outcome* and *unforeseeable outcome-follows advice* (Unforeseeable-FA) versions. Three additional themes were written to include *foreseeable outcome* and *unforeseeable outcome-does not follow* (Unforeseeable-DNF) versions (see Table 1 for a summary).

The three themes that varied between foreseeable and unforeseeable-follows advice versions included:

1) *Cassie*: in which a girl with a limited amount of spending money wants to buy a camp t-shirt, but does not want to pay for it in advance. In the foreseeable outcome version, Cassie does not pay in advance and there aren't enough t-shirts for her to buy one. In the unforeseeable outcome-follows advice version, she pays in advance,



but there are not enough t-shirts for all the kids who paid in advance, so she gets a refund instead of a t-shirt.

2) *Jim*: in which a boy wants to join a tumbling club, but finds that learning the routine that is required for the try-outs is frustrating and difficult. In the foreseeable outcome version, Jim practices and performs a simpler routine and does not get picked to join the club. In the unforeseeable outcome-follows advice version, he practices and performs the required routine but does not get picked to join the club because he cannot perform additional tumbling moves for which he has not prepared.

3) *Glenn*: in which a boy has a scooter that he hopes will last a long time. He receives advice about how to care for the scooter from the saleswoman, but one day he is tired and does not want to do the work necessary to take care of the scooter. In the foreseeable outcome version, Glenn does not take care of the scooter and the scooter is ruined. In the unforeseeable outcome-follows advice version, he does take care of the scooter, but the scooter is ruined.

The three themes that varied between foreseeable outcome and unforeseeable outcome-does not follow advice versions included:

1) *Peter*: in which a boy is told that if his robotic dog does not do tricks it previously learned it needs to be returned to the factory for a new battery. In the foreseeable outcome version, Peter sees signs that his robotic dog needs the new battery but decides it is in a “bad mood” and doesn’t send it. The robotic dog is ruined. In the unforeseeable outcome-does not follow advice version, Peter sees signs that his robotic dog needs the new battery but decides he would rather buy a new robotic dog than get

the old one fixed. He gives his mother money to buy a new robotic dog, but she sends the old one in to be fixed instead.

2) *Sandra*: in which a book-loving girl has to decide whether to spend her savings on a new book or on a raffle ticket for a “special surprise.” In the foreseeable outcome version, although Sandra has seen a book price list, and knows the price for the raffle ticket, she decides that she has enough money to buy both. She doesn’t win the raffle and cannot afford to buy a book. In the unforeseeable outcome-does not follow advice version, Sandra does not want to buy any of the books at the book fair, so she decides she would like the “special surprise” better. She wins the raffle, but the prize is one of the books that she doesn’t want.

3) *Karen*: in which a girl thinks it would be fun to walk in the rain and get wet but is told to wear a rain jacket so she won’t be cold and uncomfortable when she gets to school. In the foreseeable outcome version, Karen thinks that she won’t be cold or uncomfortable no matter how wet she gets. So she walks in the rain, gets wet, and is cold and uncomfortable all day at school. In the unforeseeable outcome-does not follow advice version, Karen decides that she wants to experience getting wet in the rain and won’t be able to if she wears a rain jacket. But the rain stops before she leaves the house, so she does not get a chance to get wet in the rain.

In order to help children attend to the stories, each story was illustrated with one line drawing depicting the character and the situation (*e.g.*, the story about the girl who wanted to buy a t-shirt was illustrated with a drawing of the girl receiving money from her mother).

Complete stories used with children are included in Appendix A. The stories used with adults are included in Appendix B.

#### *Counterbalancing of Types of Stories and Story Themes*

Nine response forms were used based on variation in the order of presentation of the three types of stories (i.e., foreseeable outcome, unforeseeable outcome-followed advice and unforeseeable outcome-did not follow advice) and six story themes (e.g., Jim, Sandra). Table 2 lists the story themes and types of outcomes included on each response form.

Three orders of types of stories were used. Each order included two sequences of the three types of stories. Order 1 consisted of 2 sequences of a foreseeable outcome story, an unforeseeable outcome-follows- advice story and an unforeseeable outcome-does not follow advice story. Order 2 consisted of 2 sequences of an unforeseeable outcome-does not follow advice story, a foreseeable outcome story and an unforeseeable outcome-follows advice story. Order 3 consisted of 2 sequences of an unforeseeable outcome-follows advice story, an unforeseeable outcome-does not follow advice story and a foreseeable outcome story.

Within each of these three orders of types of stories, there were three sub-orders of story themes. The foreseeable outcome version of each of the story themes (e.g., Jim, Sandra) occurred once, and the unforeseeable outcome version occurred twice, across the three sub-orders within each order. Within each sub-order, the two foreseeable outcome stories included one from the three story themes that varied between foreseeable and unforeseeable-follows advice versions (i.e., Jim, Cassie, or Glenn) and

one from the three story themes that varied between foreseeable and unforeseeable-does not follow advice versions (*i.e.*, Sandra, Karen and Peter). Approximately equal numbers of participants within each age group received stories in each of the nine resulting sub-orders.

## Results

In order to be included in the analyses, participants were required to show evidence of being able to use a 5-point scale to respond to the test questions, to have understood and followed the test stories, and to have responded meaningfully to the test questions. Participants were considered to have shown evidence of being able to use a 5-point scale if they either 1) used both endpoints and at least one midpoint in response to the fault and sympathy scale training items, or 2) used both endpoints and at least one midpoint in response to the fault and sympathy test questions. Data from two children, one 5-year-old and one 6-year-old, were excluded from the analyses because the children did not meet these criteria. Data from two additional 5-year-olds were also excluded. In one case, the child gave incorrect responses to 50% of the comprehension, inference and memory check questions across the six test stories; in the other, the child gave the maximum rating in response to all the test questions. Finally, one adult was excluded because he did not complete the experiment.

### *Overview of Analyses*

In order to ensure that participants understood each of the six story themes equally well, tests for story theme effects were conducted on responses to the comprehension, inference, and memory check questions, as well as on responses to the

fault and sympathy test questions. These revealed significant effects of story theme on responses to the fault and sympathy questions. However, only with respect to the sympathy questions did these reflect differences in the extent to which foreseeability affected responses across story themes. Therefore, responses to the fault question were summed across the two stories of each type (i.e., foreseeable outcome, unforeseeable outcome-does not follow advice, unforeseeable outcome-follows advice). The main analyses, which assessed the effects of age and the foreseeability of the outcome on attributions of responsibility, were conducted on these summary scores. Results of the analyses on the summary fault scores are presented first, followed by analyses of responses to the fault question across the six story themes.

Inspection of mean expressions of sympathy for the foreseeable and unforeseeable outcome versions of each story theme indicated that participants responded differently to the unforeseeable outcome versions of the foreseeable vs. unforeseeable-does not follow advice story themes than they responded to the unforeseeable outcome versions of the foreseeable vs. unforeseeable-follows advice story themes. However, they responded similarly to the foreseeable outcome versions of the two types of story themes. Therefore, the main analyses were conducted on summary sympathy scores created by summing across the responses to the two stories of each type (i.e., foreseeable outcome; unforeseeable outcome-does not follow advice stories, and unforeseeable outcome-follows advice). These included analyses of variance assessing the effects of age and the foreseeability of the outcome on expressions of sympathy, and correlations calculated separately for each age group to

assess development in the relationship between attributions of responsibility and expressions of sympathy. Results for the sympathy question are reported in the following order: 1) effects of age and foreseeability on the summary sympathy scores; 2) the relation between attributions of fault and expressions of sympathy for each of the three types of stories, calculated separately for each age group, and 3) differences in amount of sympathy expressed across the six story themes, and in response to the foreseeable and unforeseeable outcome versions of each story theme.

#### *Comprehension, Inference and Memory Check Questions*

As expected, participants of all ages performed at, or near, ceiling on the comprehension, inference and memory check questions for each of the six story themes. Correct responses to the comprehension question (*i.e.*, “What did the advisor say the protagonist should do?”) ranged from 98 to 100% across the six themes; correct responses to the inference question (*i.e.*, “What do you think the protagonist should do?”) ranged from 91 to 100%, and correct responses to the memory check question (*i.e.*, “Did the protagonist do what the advisor said s/he should do?”) ranged from 93 to 100%. Friedman tests revealed no significant effects of story theme on the responses to any of these questions. Specific results were, for the comprehension question,  $X^2(5) = .2, p > .99$ ; for the inference question,  $X^2(5) = 3.0, p > .69$ , and for the memory check questions,  $X^2(5) = .9, p > .95$ .

#### *Fault Ratings*

For each participant, the amount of fault attributed was summed across the two stories of each type, resulting in summary scores for foreseeable outcome stories,

unforeseeable-does not follow advice stories, and unforeseeable-follows advice stories. Each score had a potential range from 0 to 8. A 4 (age group) x 2 (sex) x 3 (order) x 3 (type of story: foreseeable, unforeseeable-DNF, unforeseeable-FA) ANOVA, with repeated measures on type of story, was conducted on these scores. The analysis revealed no significant main effects or interactions involving sex or order, so these variables were not considered in subsequent analyses.

A 4 (age group) x 3 (type of story: foreseeable, unforeseeable-DNF, unforeseeable-FA) ANOVA, with repeated measures on type of story, yielded significant main effects of age group,  $F(3, 146) = 7.8, p < .0001$ , and type of story,  $F(2, 292) = 209.0, p < .0001$ , as well as a significant interaction of age group and type of story,  $F(6, 292) = 6.2, p < .0001$ . Inspection of means (see Table 3) suggested that participants of all ages attributed higher levels of fault in response to the foreseeable outcome stories than to either type of unforeseeable outcome stories. Nonetheless, 5-year-olds appeared to have attributed higher levels of fault in response to both types of unforeseeable outcome stories than did older children or adults.

Paired t-tests comparing the summary fault scores for the foreseeable outcome stories to those for each type of unforeseeable outcome story were performed separately for each age group. These revealed significant differences between the foreseeable outcome and unforeseeable-does not follow advice scores among the 5-year-olds,  $t(35) = 3.9$ ; the 6-year-olds,  $t(40) = 6.4$ ; the 7-year-olds,  $t(36) = 5.9$ , and the adults,  $t(35) = 9.1, p < .01$  with Bonferroni correction for each comparison. Similarly, significant differences were found between the foreseeable outcome and unforeseeable outcome-

follows advice scores among the 5-year-olds,  $t(35) = 6.4$ ; the 6-year-olds,  $t(40) = 10.5$ ; the 7-year-olds,  $t(36) = 14.6$ , and the adults,  $t(35) = 18.2$ ,  $p < .01$  with Bonferroni correction for each comparison.

One-way ANOVAs were conducted to explore the effect of age group on the summary fault scores for the unforeseeable-does not follow advice stories and the unforeseeable-follows advice stories. Both analyses yielded significant main effects of age group:  $F(3, 146) = 3.9$ ,  $p < .01$ , for the analysis of the unforeseeable-does not follow advice scores, and  $F(3, 146) = 14.3$ ,  $p < .0001$ , for the analysis of the unforeseeable-follows advice scores. Post-tests using Fisher's PLSD indicated that 5-year-olds attributed higher levels of fault in response to the unforeseeable outcome-does not follow advice stories than did either 6-year-olds,  $p < .01$ , or adults,  $p < .01$ . Five-year-olds also attributed higher levels of fault in response to the unforeseeable-follows advice stories than did 6-year-olds,  $p < .0001$ , 7-year-olds,  $p < .0001$ , or adults,  $p < .0001$ .

In summary, across the age range tested in this study, participants attributed higher levels of fault for unintended outcomes to characters who misinterpreted evidence and therefore failed to foresee the outcomes, than to characters who could not have foreseen the outcomes. Nonetheless, the extent to which participants differentiated in the fault ratings on the basis of foreseeability increased with age, with 5-year-olds attributing significantly higher levels of fault to characters who could not have foreseen the outcomes than were attributed by older children and adults.



### *Attributions of Responsibility by Story Theme*

A repeated measures ANOVA of fault ratings made in response to each of the six story themes revealed a significant main effect of story theme,  $F(5, 705) = 14.0, p < .0001$ . Inspection of means indicated that participants made higher fault ratings in response to the Sandra ( $M = 2.8$  out of 4,  $sd = 1.4$ ), Glenn ( $M = 2.4, sd = 1.6$ ), and Peter ( $M = 2.3, sd = 1.7$ ) themes, than to the Karen ( $M = 1.8, sd = 1.9$ ), Jim ( $M = 1.7, sd = 1.7$ ) or Cassie ( $M = 1.5, sd = 1.7$ ) themes. Paired t-tests with alpha set at  $p < .05$  with Bonferroni correction, revealed significant differences between mean fault ratings in response to the Sandra and Peter themes,  $t(141) = 2.9$ , as well as between those in response to Peter and Jim,  $t(141) = 2.9$ , and Peter and Cassie,  $t(141) = 4.0$ . The differences between Sandra and Glenn,  $t(141) = 2.5$ , Peter and Karen,  $t(141) = 2.5$ , and Karen and Cassie,  $t(141) = 1.8$ , were non-significant. Thus, participants attributed more responsibility overall to the characters in the Sandra, Glenn and Peter story themes than to those in the Karen, Jim and Cassie themes.

These results do not indicate, however, whether the differences in the overall amount of fault reflected differences in attributions of responsibility on the basis of foreseeability, which was the crucial difference for this experiment. Unpaired t-tests were therefore conducted on the fault ratings of participants who heard the foreseeable and unforeseeable outcome versions of each story theme (see Table 4). These confirmed that participants who received the foreseeable outcome version of each story theme rated the protagonist as more at fault than did those who received the unforeseeable outcome version. This finding suggests that, although the foreseeability of the outcome

was an important factor in participants' attributions of responsibility, it was not the only factor that they considered in making their attributions.

### *Sympathy Ratings*

Summary sympathy scores were calculated by summing across participants' responses to the two stories of each type: foreseeable outcome; unforeseeable outcome-does not follow advice, and unforeseeable outcome-follows advice. A 2 (sex) x 3 (order) x 3 (type of story: foreseeable, unforeseeable-DNF, unforeseeable-FA) ANOVA, with repeated measures on type of story, was conducted on these scores. This analysis yielded no significant main effects or interactions involving sex or order, therefore these variables were not considered in subsequent analyses.

A 4 (age group) x 3 (type of story: foreseeable, unforeseeable-DNF, unforeseeable-FA) ANOVA, with repeated measures on type of story, yielded significant main effects of age group,  $F(3, 146) = 13.4, p < .0001$ , and type of story,  $F(2, 292) = 100.8, p < .0001$ . These effects were qualified by a significant age group x type of story interaction,  $F(6, 292) = 13.9, p < .0001$ . Inspection of mean scores (see Figure 1) suggested that the amount of sympathy expressed in response to both the foreseeable outcome and the unforeseeable outcome-does not follow advice stories decreased with age, whereas high levels of sympathy were expressed in response to the unforeseeable outcome-follows advice stories across age groups. Separate one-way ANOVAs examining the effect of age on sympathy scores for each type of story confirmed this interpretation. Specifically, age was significantly related to expressions of sympathy in response to the foreseeable outcome stories,  $F(3, 146) = 20.7, p <$

.0001, as well as in response to the unforeseeable outcome-does not follow advice stories,  $F(3, 146) = 14.3, p < .0001$ , but was unrelated to expressions of sympathy in response to the unforeseeable outcome-follows advice stories,  $F(3, 146) = .3, p > .8$ .

Post-tests using Fisher's PLSD revealed that 5-year-olds ( $M = 6.1, sd = 1.9$ ) expressed greater sympathy in response to the foreseeable outcome stories than did 6-year-olds ( $M = 4.8, sd = 2.8$ ),  $p < .05$ , 7-year-olds ( $M = 4.2, sd = 2.6$ ),  $p < .001$ , and adults ( $M = 1.9, sd = 1.6$ ),  $p < .0001$ . Six-year-olds and 7-year-olds also expressed significantly greater sympathy in response to the foreseeable outcome stories than did the adults, both comparisons  $p < .0001$ . Similarly, 5-year-olds ( $M = 5.4, sd = 2.2$ ) expressed greater amounts of sympathy in response to the unforeseeable outcome-does not follow advice stories than did 6-year-olds ( $M = 3.7, sd = 2.1$ ),  $p < .001$ , 7-year-olds ( $M = 3.2, sd = 2.2$ ),  $p < .0001$ , and adults ( $M = 2.3, sd = 1.9$ ),  $p < .0001$ . Six-year-olds also expressed more sympathy in response to these stories than did adults,  $p < .01$ .

In order to determine whether expressions of sympathy were related to the foreseeability of the outcomes, paired  $t$ -tests comparing the sympathy scores from the foreseeable outcome stories to those from each type of unforeseeable outcome stories were conducted for each age group. These tests indicated that 6-year-olds,  $t(40) = 3.3$ ,  $p < .01$ , 7-year-olds,  $t(36) = 4.4$ ,  $p < .001$ , and adults,  $t(35) = 12.3$ ,  $p < .001$ , expressed *less* sympathy in response to the foreseeable outcome stories than in response to the unforeseeable outcome-follows advice stories. However, the 6-year-olds,  $t(40) = 3.4$ ,  $p < .01$ , and 7-year-olds,  $t(36) = 3.1$ ,  $p < .01$ , also expressed *more* sympathy in response

to the foreseeable outcome stories than in response to the unforeseeable outcome-does not follow advice stories.

The age-related decline in expressions of sympathy in response to foreseeable outcomes suggested that that older participants withheld sympathy in situations in which they believed the characters had brought their misfortunes upon themselves. If this were the case, one would expect to see high correlations between the fault and sympathy ratings of older participants, but not of younger participants. To check for this possibility, correlations between participants' fault ratings and sympathy scores were conducted separately for each age group and each type of story (see Table 5).

For the foreseeable outcome stories, the two responses were significantly related, but only among the youngest and oldest participants. Among the 5-year-olds, the relation was positive,  $r = .51$ ,  $z = 3.2$ ,  $p < .05$ , whereas among the adults, it was negative,  $r = -.67$ ,  $z = -4.7$ ,  $p < .001$ . Adults' fault and sympathy ratings in response to the unforeseeable-follows advice stories were also significantly negatively related,  $r = -.49$ ,  $z = -3.1$ ,  $p < .05$ . Attributions of fault and expressions of sympathy in response to the unforeseeable-does not follow advice stories, however, were not significantly related among any age group.

#### *Expressions of Sympathy by Story Theme*

A repeated measures ANOVA on the sympathy ratings in response to the six story themes yielded a significant main effect,  $F(5, 705) = 27.2$ ,  $p < .0001$ . Unpaired t-tests comparing responses by participants who heard the foreseeable and unforeseeable versions of each theme were conducted to determine whether the differences in overall

expressions of sympathy across the story themes were related to differences in the foreseeability of the outcomes (see Table 6). Participants who heard the foreseeable outcome versions of the three foreseeable *vs.* unforeseeable-follows advice story themes expressed less sympathy than those who heard the unforeseeable outcome versions,  $t_s(141) = -3.14$  to  $-4.62$ ,  $p < .05$  for all comparisons. In contrast, there were no significant differences in the sympathy ratings of participants who heard the foreseeable and unforeseeable outcome versions of the three foreseeable *vs.* unforeseeable-does not follow advice story themes,  $t_s(141) = .08$  to  $1.8$ , n.s. These results parallel the results of the summary sympathy scores, and indicate that participants responded similarly to the three story themes of each type.

#### Discussion

The results of Experiment 1 indicate that children as young as 5 years of age do use foreseeability to differentially attribute responsibility for the outcomes of behavior, even in contexts in which they know that the individual did not foresee the outcome because s/he misinterpreted information. It is particularly noteworthy that 5-year-olds, like older children and adults, attributed lower levels of fault in response to the unforeseeable-does not follow advice stories than in response to the foreseeable outcome stories. In order to make such judgments they had to determine that the children in the foreseeable outcome stories were not just wrong because they decided not to do as they were advised, but also because they could have foreseen that their actions would not lead to desired outcomes. Thus, the good performance of even the

youngest children cannot be explained as reflecting judgments made on the basis of whether the characters “obeyed” or followed the advice of the authoritative advisor. This finding indicates that young children grasp the relation between knowledge of potential outcomes and responsibility for the outcome at a younger age than has previously been reported (Fincham & Jaspars, 1979; Hook, 1989; Yuill & Perner, 1988).

The apparent precocity of the 5-year-olds in the present study is all the more impressive because the stories were designed to eliminate any possibility that children would infer intentionality from foreseeability, and attribute responsibility on the basis of what the character intended rather than what s/he could have foreseen. Rather than merely stating that the outcome was accidentally caused (Hook, 1989, Yuill & Perner, 1988), the stories included two strong cues that the characters in the foreseeable outcome stories, like those in the unforeseeable outcome stories, did not intend the outcomes. The first cue was each character’s belief that a different outcome would occur. The second cue was the fact that the outcome was the opposite of what each character wanted. Therefore, there is little possibility that children’s judgments actually reflected beliefs that the characters in the foreseeable outcome stories were at fault because they wanted to cause the outcomes, whereas the characters in the unforeseeable outcome stories did not want to do so.

Although the results of Experiment 1 provide evidence of an earlier understanding of the relation between foreseeability and responsibility than has been previously demonstrated, they also indicate that this understanding develops between 5

and 6 years of age. This refinement in children's understanding primarily reflects an increase in understanding that individuals who *could not* foresee the outcomes are not at fault for causing them. Thus, the 5-year-olds considered the children who caused unforeseeable outcomes to be "about half" to "a lot" responsible for the outcomes (in comparison to "a lot" to "completely" responsible for those who caused foreseeable outcomes). In contrast, 6- and 7-year-olds and adults considered children who caused unforeseeable outcomes to be "a little bit" to "about half" responsible for the outcomes. This suggests that despite young children's understanding of the relation between foreseeability and responsibility, their attributions of responsibility also reflect simpler criteria, such as association (*i.e.*, Heider's level 1) or causation (*i.e.*, Heider's level 2), to a greater extent than do the attributions of older children or adults.

In addition to the finding of early understanding of the relation between foreseeability and responsibility in children's fault ratings, the results of Experiment 1 also suggest that children consider foreseeability in their expressions of sympathy at a younger age than was indicated by my previous research (Boerger, 2003.) Specifically 7-year-olds, as well as adults, expressed significantly more sympathy in response to the unforeseeable outcome-follows advice stories than they did in response to the foreseeable outcome stories. This finding must be interpreted with caution, however, because the addition of the foreseeable outcome *vs.* unforeseeable outcome-does not follow advice stories does not control for the effect of the characters' decisions to not follow advice on sympathy ratings in the same way that it does for the fault ratings. Recall that as a result of not following the advice, the characters in the unforeseeable

outcome-does not follow advice stories achieved the presumably desired outcome that the advice was intended to help them achieve. Thus, it is likely that for many of the participants, the outcomes that occurred in the unforeseeable outcome versions of the three foreseeable *vs.* unforeseeable-does not follow advice story themes were seen as less sad than the outcomes of the foreseeable versions.<sup>3</sup> Indeed the 6 and 7-year-olds expressed less sympathy in response to the characters in the unforeseeable outcome-does not follow advice stories than they did in response to the foreseeable outcome stories, which is the opposite direction of effect than would occur if expressions of sympathy were related to attributions of responsibility.

A second finding that counters the interpretation of the 6- and 7-year-olds' responses to the sympathy question as an indication of understanding of foreseeability as a basis for attributing responsibility, concerns the absence of a significant correlation between their fault and sympathy ratings. Specifically, among the children, there were no significant correlations between the two types of ratings for any of the three types of stories. In contrast, among adults, the two measures were negatively correlated for both the foreseeable and unforeseeable-follows advice stories. Thus, it seems possible that the difference in the 6- and 7-year-olds' expressions of sympathy in response to the foreseeable outcome stories, as compared to the unforeseeable outcome-follows advice stories, may actually have reflected the difference in whether the characters in these stories followed advice. In other words, it is possible that these children felt less sympathy toward characters in the foreseeable outcome stories, who chose not to follow good advice, than they did toward characters who followed the advice. This may have



been the case even though the children did not base their judgments of how much the characters were at fault solely on whether the characters had followed advice.

On the other hand, the negative correlations between adults' fault and sympathy ratings in response to the foreseeable and unforeseeable-follows advice stories suggest that the adults systematically expressed less sympathy when they felt that outcomes were the characters' fault. Specifically, this interpretation is suggested by the finding that adults' expressions of sympathy in response to the unforeseeable outcome-follows advice stories were comparable to those of the children, whereas the adults expressed significantly less sympathy in response to the foreseeable outcome stories than did children. Thus, with development, sympathy appears to be subtracted from a generalized high level in response to assessments of whether the individual deserves sympathy.

This interpretation is attractive, in part because it dovetails with findings from the social psychology literature on adults' tendency to base decisions about helping behavior on assessments of how much the potential recipient deserves help (Hoffman, 2000). According to Hoffman, judgments that an individual has in some way contributed to his/her misfortune allow bystanders to counteract the empathetic distress that they would otherwise feel in response to witnessing or hearing about the misfortune. In addition to lowering their immediate level of empathetic distress, bystanders who judge that an individual is responsible for the event that led to the request for help can also avoid feeling bystander guilt should they decide not to help.

However, the results from this study do not unambiguously support this hypothesized relation between attributions of responsibility and sympathy. For example, adults' expressions of sympathy with respect to the unforeseeable outcome-does not follow advice stories, like their expressions of sympathy in response to the foreseeable outcome stories, were significantly lower than the children's. Nonetheless, adults' expressions of sympathy in response to the unforeseeable-does not follow advice stories were unrelated to their fault ratings. This suggests that adults may be more conservative overall in their expressions of sympathy. If this is the case, then their relatively high expressions of sympathy in response to the unforeseeable outcome-follows advice story might reflect an exceptional circumstance in which adults are willing to express high levels of sympathy, rather than a situation in which they are *not* minimizing their emotional response.

Finally, although a significant *positive* correlation was found between fault and sympathy ratings among the 5-year-olds, it seems likely that this correlation was an artifact of the testing situation, rather than a true measure of a relation between the children's attributions of responsibility and their feelings of sympathy for the characters. Specifically, the 5-year-olds appear to have been captivated by the maximum rating, so that when they assigned 4 in response to the fault question, they also attributed 4 more frequently than any other score in response to the sympathy question. This 4/4 pattern of responses to the two questions occurred on 43% of the 5-year-olds' responses to the foreseeable outcome stories, as compared to 28% of the responses of the 6-year-olds, 9.7% of the responses of the 7-year-olds and 4% of the

responses of the adults. Similar patterns of exact correspondence between fault ratings and sympathy ratings at other points on the 5-point scale were rare, and did not occur more frequently among the 5-year-olds than among the older participants. Therefore, it is possible that the decline with age in expressions of sympathy in response to the foreseeable outcome stories was driven in part by increasing ability to consider the sympathy question separately from the fault question, given the prior attribution of the highest level of fault.

In summary, the findings of Experiment 1 point to early understanding that individuals are more responsible for causing foreseeable than unforeseeable outcomes, even in circumstances in which the individuals held false beliefs about the outcomes. However, the results of Experiment 1 do not provide much evidence that this understanding is reflected in children's expressions of sympathy in response to foreseeable and unforeseeable outcomes. Rather, this understanding appears to develop between 7 years of age and adulthood.

## EXPERIMENT 2

The primary goal of Experiment 2 was to determine the relation between attributing responsibility for false beliefs and attributing responsibility for outcomes caused by acting on such beliefs. Previous studies that asked children to judge others on the basis of their beliefs found that 4- to 9-year-olds were reluctant to blame others for holding false beliefs (Boerger & Woolley, 2005; Johnson, 1997). However, the results of Experiment 1 (see also Boerger, 2003) indicate that by 6- to-7 years of age children's ability to use foreseeability to attribute responsibility for outcomes is quite similar to that of adults. This suggests that understanding that others can be held responsible for *causing foreseeable outcomes* as a result of acting on false beliefs about the outcomes develops earlier than understanding that individuals can be held responsible for *having the false beliefs*. In order to compare development in understanding of responsibility for causing foreseeable outcomes to understanding of responsibility for holding foreseeably false beliefs, participants in Experiment 2 were asked to attribute responsibility for both false beliefs and the outcomes caused by acting on them.

A second goal was to establish the extent to which differences in attributions of responsibility for false beliefs reflect developmental or individual differences. In light of the failure of 8-year-olds to attribute responsibility reliably for the self-deceptive belief, Johnson (1997, p. 1130) concluded, "Future research in this domain should determine the age at which older children grasp that self-deceivers bear epistemic responsibility for their false beliefs." The implication was that cognitive development in late childhood or early adolescence would lead to this more advanced understanding.

This hypothesis seems plausible, especially in light of recent findings of developments in children's understanding of mental processes, as opposed to mental states, in late childhood. For example, studies by Flavell and colleagues (Flavell, Green & Flavell, 1998; Flavell & Green, 1999) indicate that 5- to 10-year-old children have little understanding that people sometimes cannot completely suppress unwanted thoughts, and have difficulty discriminating between thoughts that are easy to control versus those that are difficult to control. In particular, children appear to lack adults' intuitions about situational factors that influence one's ability to monitor and control thoughts until some time between 10 and 13 years of age. In an exploration of children's understanding of fictional mental states, Woolley and Boerger (2002) found that 5- to 9-year-old children have considerably greater faith that individuals can control dreams than do 11-year-olds and adults. Taken together, these findings indicate that children younger than 11 to 13 years have substantially different beliefs about the possibility of controlling mental processes. It seems highly likely that these differences might be associated with differences in children's understanding of the relation between mental processes and responsibility.

Nonetheless, Boerger and Woolley's (2005) finding that 9-year-olds performed approximately as well as adults in judging both true and false beliefs about foreseeable outcomes suggests that there may not be substantial development in understanding of "epistemic responsibility" past 9 years of age. Instead, differences in willingness to attribute responsibility for foreseeable false beliefs may reflect individual differences in, for example, awareness of mental states, or ability to differentiate between emotions

and thoughts, rather than developmental change. Thus, the second question addressed by this study was whether understanding that foreseeability can be a basis for attributing responsibility for false beliefs is a universal developmental achievement, or one that reflects both developmental and individual differences.

In order to address these two questions, it was necessary to test children across a broader age range than were tested in Experiment 1. In particular, it was important to include children in the 9- to 13-year-old age range, in order to assess the age at which children first show understanding that individuals can be held accountable for having false beliefs about foreseeable outcomes. At the opposite end of the developmental spectrum, however, the results of Experiment 1, suggest that young school-age children have greater understanding of foreseeability as a basis for attributing responsibility in the context of misinterpretations of evidence than had been suggested by previous research (Boerger and Woolley, 2005; Johnson, 1997). Therefore, it seemed possible that young school-age children might also have previously undemonstrated understanding of foreseeability as a basis for attributing responsibility for false beliefs. In order to test for both early competence and later development in understanding that individuals can be held responsible specifically for having false beliefs about foreseeable outcomes, participants in Experiment 2 included 6-year-olds, 9-year-olds, 12-year-olds and adults.

Specifically, six-year-olds were included because the results of Boerger and Woolley (2005) and Johnson (1997) indicated that they would not reliably attribute responsibility for false beliefs on the basis of the foreseeability of the outcomes. Nine-

year-olds were included because the results of Boerger and Woolley (2005) suggested that, although some children of this age would reliably attribute responsibility for false beliefs on the basis of foreseeability, the majority would not. Twelve-year-olds were included because it was expected that increased understanding of mental processes that develops between 9 and 12 would lead to increased willingness to attribute responsibility for having foreseeably false beliefs. Finally, adults were included to ensure that interpretations of the children's performance were grounded in data on adults' actual folk psychology in addition to theoretical descriptions of adults' folk psychology.

## Method

### *Participants*

One hundred eight children (49 boys and 57 girls) and 39 adults (15 men and 24 women) participated. Participants included thirty-six 6-year-olds (*mean age* = 6:7; *range* = 6:0 – 6:11), thirty-six 9-year-olds (*mean age* = 9: 6, *range* = 9:0 – 9:11) and thirty-six 12-year-olds (*mean age* = 12:6; *range* = 12:0 – 12:11), and 39 adults (*mean age* = 19:4, *range* = 18 – 26 years). Data from two adults were not included in the analyses because of experimenter error, leaving a sample of 108 children and 37 adults.

The sample included participants from diverse racial and ethnic groups, including Hispanic, African-American, South Asian and East Asian participants. However, the majority of the participants were from European-American families.

Children were recruited from the database maintained by the Children's Research Laboratory. Parents were contacted by letter and phone call. Appointments

were scheduled individually for each child, and each child received a small toy at the end of the experiment. Adults were primarily undergraduate students who were recruited from the Psychology 301 pool. They received partial credit toward fulfilling a research participation requirement in exchange for their participation. Two additional adults were volunteers from an upper division undergraduate Psychology seminar. They received either a Children's Research Lab coffee mug or a small toy as a thank you gift for their participation.

### *Procedure*

Testing procedures for both children and adults were quite similar to those used in Experiment 1. Children were tested individually in a quiet room at the Children's Research Lab. The average length of the testing session was 45 minutes. Pilot testing indicated that by 6 years of age most children could respond to the question of *how much* an outcome was a child's fault without a prior orientation to the concept of fault, therefore the "whose fault is it?" pre-training was not included in Experiment 2. Participants received training in the use of the 5-point response scales for the Fault and Sympathy test questions as in Experiment 1.

The 6 story themes used in Experiment 1 were also used in Experiment 2. As in Experiment 1, these included three themes that were presented in either foreseeable outcome or unforeseeable outcome-does not follow advice versions, and three themes that were presented in foreseeable outcome or unforeseeable outcome-follows advice stories. The orders and suborders of story versions (*i.e.*, foreseeable, unforeseeable-does



not follow, unforeseeable-follows advice) and story themes (*e.g.*, Cassie, Peter) were identical to those used in Experiment 1.

### *Tasks & Materials*

Although the story themes used in Experiment 2 were identical to those used in Experiment 1, several questions were modified or added to focus on the characters' beliefs, rather than on the outcomes of their behavior. Changes from Experiment 1 included 1) the substitution of an inference question that referred to the probable factuality of the character's belief for the behaviorally oriented inference question used in Experiment 1, 2) the addition of a second memory check question to ensure that children understood that each character had a false belief about the outcome prior to acting, and 3) the addition of a belief-oriented fault question.

Thus, as in Experiment 1, children were asked a *comprehension question*, which concerned the advice the character received about how to behave, immediately following the first segment of each story. In contrast to Experiment 1, however children were not asked what they thought the character should do. Instead, they were told the next segment of the story, ending with the character's interpretation of the evidence. They were then asked an *inference question* assessing whether they thought the character's belief was right or wrong (*e.g.*, "So Cassie thinks that she will get a t-shirt even if she waits until the t-shirts arrive to give her money to the counselor. What do you think? Is Cassie right about that or is she wrong about that?"). The order of "right" and "wrong" alternatives was counterbalanced across story themes. Children were asked to explain their inferences. If their explanations revealed misunderstanding of the

advice, the first and second segments of the story and the inference question were repeated.

The third segment of the story began with the statement of how the character decided to behave, and continued until the outcome was revealed. Children were then asked two *memory check questions*. *Memory Check 1* was “Did the character do what s/he was advised to do?” *Memory Check 2* was “Did things turn out as the character expected them to?” All children were given feedback on their responses to these questions in order to ensure that, prior to being asked the test questions, all participants understood 1) the relation of the character’s behavior to the advice, and 2) that the character had acted on a false belief about the outcome of his/her action.

Following the two memory check questions, children were asked three test questions. These included 1) a *belief-oriented fault* question, 2) an *outcome-oriented fault* question, and 3) a *sympathy* question. The belief-oriented fault question was a dichotomous question measuring whether children attributed responsibility to the character for having a false belief. For each story, children were reminded what the character thought would happen, and told that the character was wrong. They were then asked whether it was the character’s fault that s/he was wrong. For example, with respect to the Cassie story, children were told, “So Cassie thought that she would get a t-shirt, but she was wrong. Was it her fault that she *thought* the wrong thing?” This phrasing of the question was selected in order to emphasize that 1) what was wrong about the character’s belief was that it did not represent the actual outcome, and 2)

children were being asked to judge the character's responsibility for having formed a false belief, rather than to make a value judgment on the content of the belief.

Following the belief-oriented fault question, children were asked the *outcome-oriented fault question*, "How much was it his/her fault that (outcome occurred)?" and the *sympathy question*, "How much do you feel sorry for him/her because (outcome occurred)?" Responses to these questions were made using the 5-point fault and sympathy response scales used in Experiment 1.

Children were asked to explain their responses to each of the test questions.

## Results

All participants showed ability to use the full range of the 5-point response scales and responded correctly to at least 2/3 of the comprehension, memory checks and inference questions. Therefore, no participants were dropped from the analyses for failure to understand the stories or the testing procedure.

### *Overview of Analyses*

Tests for story theme effects were conducted on responses to the comprehension, first and second memory check, and inference questions, as well as on responses to the three test questions. These revealed significant effects of story theme on responses to the inference question and all three of the test questions. Further probing of these effects indicated that they reflected consistent differences between the responses of participants who heard the three B sub-orders of story themes and those of participants who received the other six sub-orders (see Table 2). Specifically, participants who received the B sub-orders showed less differentiation on the basis of

foreseeability in response to the two fault questions than did those who received either the A or the C sub-orders. Participants who received the B sub-orders also expressed less sympathy in response to the unforeseeable outcome-does not follow advice stories than did those who received the A or C sub-orders.

Nonetheless, inclusion of the participants who received the B sub-orders with those who received the A and C sub-orders did not significantly alter the pattern of age and foreseeability effects found with respect to any of the three test questions. Therefore the results for each of the test questions are presented first with data from participants who heard all nine sub-orders combined. This is followed by a more detailed description of the story theme sub-order effects on performance on each question. Speculation as to what it was about the three combinations of story versions (*i.e.*, the A and C vs. B sub-orders) that either facilitated or hindered participants' understanding of the relation between foreseeability and responsibility is offered in the discussion of this experiment, as well as in the general discussion.

Results are reported in the following order:

1) *Preliminary analyses*: a) tests for story effects on the comprehension, first and second memory check, and inference questions; b) tests for story effects on the three test questions, c) tests for sex and order effects on the three test questions;

2) *Attributions of Responsibility for Beliefs and Outcomes*: a) effect of age group on belief-oriented fault scores; b) story theme sub-order effects on belief-oriented fault scores; c) effects of age group and the foreseeability of the outcome on outcome-oriented fault ratings; d) story theme sub-order effects on outcome-oriented fault

ratings, e) relation between belief-oriented faults scores and differentiation on the basis of foreseeability in outcome-oriented fault ratings,

3) *Expressions of Sympathy*: a) effects of age group and foreseeability on sympathy ratings; b) correlations between outcome-oriented fault ratings and sympathy ratings for foreseeable outcome, unforeseeable outcome-does not follow advice, unforeseeable outcome-follows advice stories, c) story theme sub-order effects on sympathy ratings.

### *Preliminary Analyses*

#### *Tests for Story Theme Effects*

##### *Comprehension, first and second memory check and inference questions.*

Participants of all ages performed at, or near, ceiling on the comprehension question and the two memory check questions for each of the six story themes. Correct responses to the comprehension question (i.e., “What did the advisor say the character should do?”) ranged from 98.6 to 100% across the six themes; correct responses to the first memory check question (i.e., “Did the character do what the advisor said s/he should do?”) ranged from 86.9 to 98.5%, and correct responses to the second memory check question (i.e., “Did things turn out the way character thought they were going to?”) ranged from 97.2 to 99.3%. Friedman tests revealed no significant effects of story theme on responses to any of these questions. Specific results were, for the comprehension question,  $X^2(5) = .07, p > .99$ , for the first memory check question,  $X^2(5) = 4.1, p > .5$ , and for the second memory check question,  $X^2(5) = .17, p > .99$ .

There was, however, a significant difference in performance across the six story themes in response to the inference question, Friedman test,  $X^2(5) = 14.8, p < .05$ . When the Peter and Sandra themes were dropped from the analysis, a Friedman test revealed no differences among the four remaining themes,  $X^2(3) = 2.2, p > .53$ . In addition, a paired sign test revealed no difference between the Peter and Sandra themes,  $p > .27$ . Thus, it appeared that participants responded differently to the Peter and Sandra themes than to the other four themes. Table 7 presents the percentage of correct responses to the inference question for the foreseeable and unforeseeable outcome version of each story theme. Inspection of these percentages suggests that the difference in performance was more pronounced with respect to the unforeseeable outcome versions than with respect to the foreseeable outcome versions of the story themes. That is, fewer participants who heard the unforeseeable outcome versions of the Peter and Sandra themes predicted that these characters' beliefs would be true (*i.e.*, that the characters were right about what would happen) than did participants who heard the unforeseeable outcome versions of the Karen, Cassie, Jim, or Glenn themes.

As mentioned previously, subsequent analyses revealed that this story theme effect was reflected in participants' responses to the belief-oriented and fault-oriented fault questions as well. Specifically, participants who heard the three B sub-orders of stories, which included the unforeseeable outcome versions of both the Sandra and Peter story themes, showed less differentiation between foreseeable and unforeseeable outcome stories in their attributions of responsibility than did participants who heard the A and C sub-orders.<sup>4</sup>

*Belief-oriented fault scores.* Mean scores in response to the belief-oriented fault question ranged from .22 out of 1.0 (Cassie) to .5 out of 1.0 (Peter). Although there were significant differences among belief-oriented fault scores when all six story themes were considered together, Friedman test,  $X^2(5) = 23.7, p < .01$ , follow-up tests revealed no differences among either the three foreseeable vs. unforeseeable-does not follow advice themes (*i.e.*, Peter, Sandra and Karen),  $X^2(2) = 4.8, p = .10$ , or among the three foreseeable vs. unforeseeable-follows advice themes (*i.e.*, Cassie, Jim and Glenn),  $X^2(2) = 1.4, p > .5$ . Therefore, subsequent analyses were performed separately on the two types of story themes. Within each type of story theme, mean belief-oriented fault scores were calculated for the unforeseeable outcome stories by summing across the two unforeseeable outcome stories and dividing by two. These were compared to responses to the belief-oriented fault question for the single foreseeable outcome story of each type of story theme.

*Outcome-oriented fault ratings.* A repeated measures ANOVA of outcome-oriented fault ratings made in response to each of the six story themes revealed a significant main effect of story theme,  $F(5, 720) = 13.6, p < .0001$ . Inspection of means indicated that participants made higher fault ratings in response to the Sandra ( $M = 2.3$  out of 4,  $sd = 1.6$ ) and Peter ( $M = 2.1, sd = 1.5$ ) themes, than to the Jim ( $M = 1.5, sd = 1.6$ ), Glenn ( $M = 1.4, sd = 1.7$ ), Karen ( $M = 1.3, sd = 1.7$ ) or Cassie ( $M = 1.0, sd = 1.5$ ) themes. To determine whether these differences in the overall level of fault attributed across the story themes reflected differences in the extent to which foreseeability affected responses, unpaired t-tests were conducted on the fault ratings of participants

who heard the foreseeable and unforeseeable outcome versions of each story theme (see Table 8). These revealed that participants who received the foreseeable outcome version of each story theme rated the protagonist as more at fault for the outcome than did those who received the unforeseeable outcome version,  $t_s(143) = 6.4$  to  $17.2$ , all  $p < .001$ . Therefore, the foreseeable outcome versions of all six story themes, the unforeseeable outcome versions of the three foreseeable *vs.* unforeseeable-does not follow advice story themes, and the unforeseeable outcome versions of the three foreseeable *vs.* unforeseeable-follows advice story themes were combined in subsequent analyses of the outcome-oriented fault ratings.

*Sympathy ratings.* A repeated measures ANOVA on the sympathy ratings in response to the six story themes yielded a significant main effect,  $F(5, 720) = 30.1$ ,  $p < .0001$ . Inspection of means indicated that participants expressed more sympathy in response to the three foreseeable *vs.* unforeseeable-follows advice story themes (*i.e.*, Cassie,  $M = 2.5$ ,  $sd = 1.3$ ; Jim,  $M = 2.3$ ,  $sd = 1.3$ , and Glenn,  $M = 2.5$ ,  $sd = 1.4$ ) than in response to the three foreseeable *vs.* unforeseeable-does not follow story themes (*i.e.*, Peter,  $M = 1.6$ ,  $sd = 1.2$ ; Sandra,  $M = 1.8$ ,  $sd = 1.2$ , and Karen,  $M = 1.4$ ,  $sd = 1.2$ ). Separate repeated measures ANOVAs conducted on the three foreseeable *vs.* unforeseeable-follows advice story themes and the three foreseeable *vs.* unforeseeable-does not follow advice story themes, confirmed that there were no difference in amount of sympathy expressed across the three foreseeable *vs.* unforeseeable-follows advice stories,  $F(2, 288) = 1.6$ ,  $p > .2$ . However, a significant difference remained among the three foreseeable *vs.* unforeseeable-does not follow advice stories,  $F(2, 288) = 7.2$ ,  $p <$



.001. These differences are discussed further in the section describing story theme sub-order effects on sympathy ratings.

The preceding analyses suggested that the difference in expressions of sympathy in response to the two types of story themes primarily reflected a difference in the amount of sympathy expressed in response to the unforeseeable outcome versions of the two types of themes. A paired t-test confirmed that there was no significant difference in the amount of sympathy expressed in response to the foreseeable outcome versions of the two types of themes,  $t(144) = 1.5, p > .14$ . Therefore, subsequent analyses were conducted on summary sympathy scores for the foreseeable outcome stories; the unforeseeable outcome-does not follow advice stories, and the unforeseeable outcome-follows advice stories.

#### *Tests for Sex and Order Effects*

Separate 2 (sex) x 3 (order) x 2 (type of outcome: foreseeable, unforeseeable) mixed ANOVAs, with repeated measures on the type of outcome factor, were conducted on the belief-oriented fault scores for each type of story theme. These revealed no significant main effects or interactions involving either sex or order on the belief-oriented fault scores. Similarly, separate 2 (sex) by 3 (order) x 3 (type of story: foreseeable, unforeseeable-DNF, unforeseeable-FA) ANOVAs, with repeated measures on the type of story factor, yielded no significant main effects or interactions involving sex or order on responses to either the outcome-oriented fault or sympathy questions. Therefore, these factors were dropped from subsequent analyses of the test questions.

## *Attributions of Responsibility for Beliefs and Outcomes*

### *Belief-oriented Fault Scores*

*Age effects on attributions of responsibility for false beliefs.* Figure 2 presents mean belief-oriented fault scores by age group, type of story theme (i.e., foreseeable vs. unforeseeable-does not follow advice, foreseeable vs. unforeseeable-follows advice) and type of outcome (foreseeable, unforeseeable). Each score represents the average number of claims made by participants within an age group that a protagonist was at fault for having a false belief. The figure suggests a gradual development in understanding of the types of beliefs for which individuals are and are not responsible. That is, participants of all ages reliably judged that the protagonists of the unforeseeable outcome-follows advice stories were *not* at fault for their false beliefs,  $t_s(35 - 36) = -12.0$  to  $-17.2$ ,  $p < .0001$  for each comparison. However, t-tests comparing participants' attributions of responsibility for each of the other types of beliefs to chance revealed much greater uncertainty about whether protagonists were at fault for their false beliefs.

Specifically, 6-year-olds' attributions of responsibility did not differ from the number that would be expected by chance in response to the foreseeable outcome versions of either type of story theme, or in response to the unforeseeable outcome-does not follow advice stories. Nine-year-olds reliably judged that the protagonists of the foreseeable outcome versions of the foreseeable vs. unforeseeable-does not follow advice story themes were at fault for their false beliefs,  $t(35) = 2.94$ ,  $p < .05$  with Bonferroni correction. However, they did not differ from chance in their attributions of responsibility for false beliefs in response to either the foreseeable outcome versions of

the foreseeable *vs.* unforeseeable-follows advice story themes or the unforeseeable outcome-does not follow advice stories. Only 12-year-olds and adults reliably judged that protagonists in both types of foreseeable outcome stories were at fault for their false beliefs,  $t_s(35 - 36) = 3.9$  and  $5.5$  respectively, and that protagonists in the unforeseeable outcome-does not follow advice stories were *not* at fault for their false beliefs,  $t_s(35 - 36) = -3.4$  and  $-5.9$  respectively,  $p < .01$  with Bonferroni correction for each comparison.

*Story theme sub-order effects on belief-oriented fault scores.* Separate 4 (age group) x 2 (sub-order group: B; A and C) x 2 (type of outcome) ANOVAs, with repeated measures on the type of outcome factor, were conducted on the mean belief-oriented fault scores for each type of story theme. Both analyses revealed that participants who received the B sub-orders responded differently to the belief-oriented fault questions than did participants who received either A or C sub-orders. The analysis on the foreseeable outcome *vs.* unforeseeable outcome-does not follow advice scores revealed significant interactions of sub-order group and type of outcome,  $F(1, 137) = 29.14$ ,  $p < .0001$ , and of sub-order group, age group, and type of outcome,  $F(3, 137) = 3.1$ ,  $p < .05$ . The analysis on the foreseeable outcome *vs.* unforeseeable outcome-follows advice scores revealed a significant interaction of sub-order group and type of outcome,  $F(1, 137) = 5.0$ ,  $p < .05$ . Therefore, differences in performance among participants in different sub-order groups were examined with respect to the scores for both types of story themes.

Mean belief-oriented fault scores for the foreseeable outcome *vs.* unforeseeable outcome-does not follow advice story themes are presented separately for the two sub-order groups in Table 9. These indicate that participants who received sub-orders A and C found it easier than did participants who received sub-order B to judge whether characters in both the foreseeable and unforeseeable outcome versions of these story themes were at fault for their false beliefs. Among participants in sub-orders A and C (see upper half of Table 9), 9-year-olds,  $t(23) = 4.3$ , 12-year-olds,  $t(23) = 4.3$ , and adults,  $t(24) = 7.6$ , all attributed responsibility to the characters in the foreseeable outcome stories at levels exceeding chance,  $p < .001$  for each comparison. Twelve-year-olds,  $t(23) = -4.9$ , and adults,  $t(24) = -7.1$ , also claimed that the characters in the unforeseeable outcome-does not follow advice stories were not at fault for their false beliefs,  $p < .001$  for each comparison. In contrast, participants who received sub-order B did not differ from chance in responses to either type of story.

With respect to the foreseeable outcome *vs.* unforeseeable outcome-follows advice story themes (see Table 10), participants of all ages judged that the characters in the unforeseeable outcome stories were *not* at fault for their false beliefs at levels that were significantly different from chance. This finding did not vary across the sub-order groups. Specific results for each age group were: 6-year-olds,  $t(35) = -12.0$ ,  $p < .0001$ ; 9-year-olds,  $t(35) = -14.9$ ,  $p < .0001$ ; 12-year-olds,  $t(35) = -14.9$ ,  $p < .0001$ , and adults,  $t(36) = -17.2$ ,  $p < .0001$ . Responses to the foreseeable outcome stories did vary across the sub-order groups, however. Among participants in the sub-orders A and C group (see upper half of Table 10), 12-year-olds,  $t(23) = 4.3$ ,  $p < .001$ , as well as adults,

$t(24) = 4.5, p < .001$ , judged that the character in the foreseeable outcome story was at fault for his/her false belief at a level exceeding chance. Among participants who received sub-order B stories, only adults,  $t(11) = 3.0, p < .05$ , judged that the character in the foreseeable outcome story was at fault for his/her false belief at a level exceeding chance.

*Summary of belief-oriented fault score results.* Participants of all ages, including 6-year-olds, understood that the characters in the unforeseeable outcome-follows advice stories were not at fault for their false beliefs. Nine-year-olds showed some evidence of understanding that characters in foreseeable outcome stories were at fault for their false beliefs, but their understanding was limited to the foreseeable outcome versions of the foreseeable vs. unforeseeable-does not follow advice story themes. Only 12-year-olds and adults judged the beliefs in all three types of stories on the basis of the foreseeability of the outcome. That is, they attributed responsibility for false beliefs in the foreseeable outcome versions of both types of story themes, and refrained from attributing responsibility for false beliefs in the unforeseeable outcome versions of both types of story themes, at levels that indicated they were different from chance. However, the responses of even the oldest participants were influenced by the story theme sub-orders, so that participants who heard the “non-facilitative” versions of the foreseeable vs. unforeseeable–does not follow advice stories did not reliably attribute responsibility for the beliefs in these stories on the basis of foreseeability.

### *Outcome-oriented Fault Ratings*

Outcome-oriented fault ratings were submitted to a 4 (age group) x 2 (sub-order group: B; A& C) x 3 (type of story: foreseeable; unforeseeable-DNF, unforeseeable-FA) ANOVA with repeated measures on the type of story factor. This analysis yielded significant main effects of age group,  $F(3, 137) = 2.9, p < .05$ , sub-order group,  $F(1, 137) = 10.3, p < .01$ , and type of story,  $F(2, 274) = 396.3, p < .0001$ . These effects were qualified by significant interactions of type of story and age group,  $F(6, 274) = 4.6, p < .001$ , and type of story and sub-order group,  $F(2, 274) = 39.2, p < .0001$ .

#### *Effects of age and foreseeability on attributions of responsibility for outcomes.*

Figure 3 presents the mean outcome-oriented fault ratings by age group and type of story. Inspection of these scores suggests that whereas participants of all ages attributed significantly higher levels of fault in response to the foreseeable outcome stories than in response to either type of unforeseeable outcome story, the amount of differentiation on the basis of foreseeability increased with age. Paired t-tests confirmed that 6-year-olds, 9-year-olds, 12-year-olds and adults attributed higher levels of fault in response to the foreseeable outcome stories than in response to either the unforeseeable outcome-does not follow advice stories,  $t_s(35 - 36) = 5.1$  to  $10.6$ , or the unforeseeable outcome-follows advice stories,  $t_s(35 - 36) = 8.1$  to  $20.6, p < .001$  with Bonferroni correction for each comparison. Nonetheless, a one-way ANOVA on the amount of differentiation between fault ratings for foreseeable outcome and unforeseeable outcome-does not follow advice stories yielded a significant effect of age group,  $F(3, 141) = 4.5, p < .01$ ,

as did a one-way ANOVA on the amount of differentiation between fault ratings for foreseeable outcome and unforeseeable outcome-follows advice stories,  $F(3, 141) = 6.2, p < .001$ . Post-tests using Fisher's PLSD indicated that 6-year-olds showed less differentiation between their attributions of responsibility for foreseeable outcomes and their attributions for unforeseeable outcomes of both types than did any of the older age groups,  $p < .05$  for each comparison.

*Story theme sub-order effects on attributions of responsibility for outcomes.* In order to interpret the type of story x sub-order group interaction, separate one-way ANOVAs, with sub-order group (B; A & C) as the independent variable, were conducted on outcome-oriented fault ratings for the foreseeable outcome; unforeseeable outcome-does not follow advice, and unforeseeable outcome-follows advice stories. These revealed significant main effects of sub-order group on outcome-oriented fault ratings for the foreseeable outcome stories,  $F(1, 143) = 5.6, p < .05$ , and the unforeseeable outcome-does not follow advice stories,  $F(1, 143) = 46.3, p < .0001$ . Post-tests using Fisher's PLSD revealed that, relative to participants in the sub-orders A & C group, participants in sub-order B group attributed *less* fault in response to the foreseeable outcome stories,  $p < .05$ , and *more* fault in response to the unforeseeable outcome-does not follow advice stories,  $p < .0001$ . Thus, participants in the sub-orders B group showed less differentiation between the foreseeable outcome and unforeseeable outcome-does not follow advice stories ( $M$  difference = 1.2 from a range of -8 to 8,  $sd = .22$ ), than did the participants in the sub-orders A & C group ( $M$  difference = 4.4,  $sd = .23$ ). Nonetheless, participants in the sub-orders B group,  $t(47) = 5.4, p < .0001$ , like

those in the sub-orders A & C group,  $t(96) = 18.7, p < .0001$ , attributed significantly more fault in response to the foreseeable outcome stories than in response to the unforeseeable outcome-does not follow advice stories.

*Summary of outcome-oriented fault ratings results* Across age groups, participants attributed higher levels of fault in response to the foreseeable outcome stories than in response to either type of unforeseeable outcome stories. Notably, participants in the sub-order B group, who heard the non-facilitative unforeseeable outcome versions of Sandra and Peter as their two unforeseeable outcome-does not follow advice stories, nonetheless attributed less fault in response to these stories than they did in response to the foreseeable outcome stories. Thus the relative difficulty that participants had with the inference question in response to the unforeseeable outcome versions of the Sandra and Peter themes did not appear to disrupt their ability to differentiate between foreseeable and unforeseeable outcomes in their outcome-oriented fault ratings.

#### *Relation between Belief-Oriented and Outcome-Oriented Fault Ratings*

Responses to the outcome-oriented fault questions indicate that by 6 years of age, children reliably differentiate between individuals who could and could not have foreseen the outcomes of their actions when attributing responsibility for the outcome of their actions. This is the case even in situations in which the individuals explicitly did not want the outcomes to occur and believed that they would not occur. However, the results from the belief-oriented fault questions suggest that this differentiation does not depend upon understanding that the individuals were at fault for the outcomes *because*



they could have foreseen, or formed true beliefs about, the outcomes. Specifically, only the 12-year-olds and adults understood that the characters in the foreseeable outcome stories were responsible for their false beliefs, whereas neither the characters in the unforeseeable outcome-does not follow advice stories, nor those in the unforeseeable outcome-follows advice stories, were responsible for their false beliefs.

It is clear from these results that ability to attribute responsibility for outcomes on the basis of foreseeability develops prior to the ability to attribute responsibility for the beliefs themselves. However, the results of the two test questions considered separately do not answer the more important question of how development in understanding that individuals can be held responsible for *having* false beliefs informs attributions of responsibility for foreseeable and unforeseeable outcomes.

To address this question, participants were categorized as belonging to one of three groups on the basis of their responses to the belief-oriented fault questions. The three belief-oriented fault groups included the *blame foreseeable only* group, the *blame foreseeable and unforeseeable-does not follow advice* group, and the *blame all types* group. The *blame foreseeable only* group consisted of participants who correctly answered that characters in the two foreseeable outcome stories were at fault for their false beliefs, and that the characters in the two unforeseeable outcome-does not follow advice and two unforeseeable outcome-follows advice were not at fault for their beliefs. The *blame foreseeable and unforeseeable-does not follow advice* group consisted of participants who correctly answered that characters in the two foreseeable outcome stories were at fault for their beliefs and that the characters in the two unforeseeable

outcome-follows advice stories were not at fault for their beliefs. However, participants in this group also incorrectly answered that at least one of the characters in the two unforeseeable outcome-does not follow advice stories was at fault for his/her false belief. The *blame all types* group consisted of participants who showed any other pattern of responses to the belief-oriented fault questions.

Table 11 shows the number of participants from each age and sub-order group in each of the belief-oriented fault groups. Chi square analyses revealed a significant age difference in the distribution of participants across the three groups,  $X^2(6) = 14.8, p < .05$ . Specifically, there was a significant decrease with age in the percentage of participants in the blame all types group,  $X^2(3) = 8.9, p < .05$ , and a significant increase with age in the percentage of participants in the blame foreseeable only group,  $X^2(3) = 9.9, p < .05$ . However, sub-order group also appeared to have affected the extent to which participants showed each of the three patterns of responses. Most notably, no participants who received the non-facilitative sub-order B stories were in the *blame foreseeable only* group, and a greater percentage of participants who received the sub-order B stories than those who received the sub-orders A and C stories were in the *blame all types* group,  $X^2(1) = 10.5, p < .01$ .

Figure 4 presents the mean outcome-oriented fault ratings by belief-oriented fault group and type of story. Inspection of the mean scores suggests that participants in each of the belief-oriented fault groups attributed higher levels of fault for foreseeable outcomes than for either type of unforeseeable outcome. However, the two groups who also differentiated on the basis of foreseeability in response to the belief-oriented fault

questions also appear to have differentiated to a greater extent in their outcome-oriented fault ratings than did those who did not respond on the basis of foreseeability in their attributions of responsibility for false beliefs.

In order to tease apart the effects of age and patterns of responses to the belief-oriented fault questions on outcome-oriented fault ratings, analyses of covariance were conducted on two difference scores calculated on the basis of participants' responses to the outcome-oriented fault questions of the three types of stories. An *easy differentiation score* was calculated by subtracting participants outcome-oriented fault ratings in response to the unforeseeable outcome-follows advice stories from their ratings in response to the foreseeable outcome stories. A *difficult differentiation score* was calculated by subtracting outcome-oriented fault ratings in response to the unforeseeable outcome-does not follow advice stories from their ratings in response to the foreseeable outcome stories. Separate analyses of covariance, with belief-oriented fault group entered as the independent variable and age in months entered as the covariate, were performed on the easy differentiation and difficult differentiation scores. Each analysis indicated that differences in ability to differentiate among the types of stories in response to the belief-oriented fault questions were related to differences in the extent to which participants differentiated between foreseeable and unforeseeable outcome stories in their outcome-oriented fault ratings (see Table 12 for means and standard deviations for each score by belief-oriented fault group).

With respect to the easy differentiation scores (foreseeable minus unforeseeable-FA outcome-oriented fault ratings), there was a significant main effect of belief-

oriented fault group,  $F(2, 139) = 11.2, p < .0001$ , which was qualified by an interaction with the covariate, age group,  $F(2, 139) = 3.7, p < .05$ . Post-tests using Fisher's PLSD showed that participants in both the *blame foreseeable only* and the *blame foreseeable and unforeseeable-does not follow advice* groups showed greater ability to differentiate between foreseeable and unforeseeable-follows advice stories in their outcome-oriented fault ratings than did those in the *blame all types* group,  $p < .0001$  for each comparison. A one-way ANOVA examining the effect of age on easy differentiation scores within the *blame all types* group,  $F(3, 68) = 3.9, p < .05$ , indicated that within this belief-oriented fault group, 12-year-olds showed greater differentiation than did 9-year-olds,  $p < .05$ , and 6-year-olds,  $p < .01$ . There was no effect of age on easy differentiation scores among participants in either of the other two belief-oriented fault groups.

With respect to the difficult differentiation scores (foreseeable minus unforeseeable-DNF outcome-oriented fault ratings), there was a significant main effect of belief-oriented fault group,  $F(2, 139) = 5.3, p < .01$ . Post-tests indicated that participants in the *blame foreseeable only* group showed significantly greater ability to differentiate between the foreseeable outcome and unforeseeable outcome-does not follow advice stories in their outcome-oriented fault ratings than did participants in either of the other groups,  $p < .0001$  for each comparison.

Thus, participants who showed systematic differences in their responses to the belief-only fault questions related to foreseeable and unforeseeable outcome stories also showed greater differentiation in their outcome-oriented fault ratings. In addition, the type of differentiation in outcome-oriented fault ratings that was associated with

differentiation in belief-oriented fault scores varied across the three belief-oriented fault groups. Specifically, participants in the *blame foreseeable and unforeseeable-DNF* group, who understood that the characters in the foreseeable outcome stories were at fault for their false beliefs but also incorrectly judged that a character in at least one unforeseeable-does not follow advice stories was at fault for his/her belief, showed greater differentiation between the foreseeable and unforeseeable-follows advice stories than did the *blame all types* group. However, they did not show greater differentiation in their outcome-oriented fault ratings between the foreseeable and unforeseeable-does not follow advice group than the *blames all types* group. In contrast, participants in the *blame foreseeable only* group differentiated more sharply on the basis of foreseeability in their outcome-oriented fault ratings than did participants in either of the other belief-oriented fault groups.

These results reveal that understanding that responsibility can be attributed to individuals for having false beliefs, and understanding when it is appropriate to attribute such responsibility, is associated with greater ability to use foreseeability as a factor in attributing responsibility in response to outcomes.

#### *Expressions of Sympathy*

*Age and foreseeability effects on expressions of sympathy.* A 4 (age group) x 3 (type of story: foreseeable, unforeseeable-DNF, unforeseeable-FA) ANOVA, with repeated measures on type of story, yielded significant main effects of age group,  $F(3, 141) = 3.5, p < .05$ , and type of story,  $F(2, 282) = 113.2, p < .0001$ . These effects were

qualified by a significant age group x type of story interaction,  $F(6, 282) = 8.3, p < .0001$ .

Inspection of mean scores (see Figure 5) suggested that the amount of sympathy expressed in response to both the foreseeable outcome and the unforeseeable outcome-does not follow advice stories decreased with age, whereas high levels of sympathy were expressed in response to the unforeseeable outcome-follows advice stories across age groups. Separate one-way ANOVAs examining the effect of age on sympathy scores for each type of story confirmed this interpretation. Specifically, age was significantly related to expressions of sympathy in response to the foreseeable outcome stories,  $F(3, 141) = 9.2, p < .0001$ , as well as in response to the unforeseeable outcome-does not follow advice stories,  $F(3, 141) = 4.4, p < .01$ , but was unrelated to expressions of sympathy in response to the unforeseeable outcome-follows advice stories,  $F(3, 141) = 1.9, p > .13$ . Post-tests using Fisher's PLSD revealed that 6-year-olds ( $M = 4.6, sd = 2.7$ ) expressed greater sympathy in response to the foreseeable outcome stories than did 9-year-olds ( $M = 3.2, sd = 2.1$ ),  $p < .01$ , 12-year-olds ( $M = 2.9, sd = 1.8$ ),  $p < .001$ , and adults ( $M = 2.1, sd = 1.8$ ),  $p < .0001$ . Nine-year-olds also expressed significantly greater sympathy in response to the foreseeable outcome stories than did adults,  $p < .05$ . Similarly, 6-year-olds ( $M = 4.7, sd = 2.6$ ) expressed greater amounts of sympathy in response to the unforeseeable outcome-does not follow advice stories than did 9-year-olds ( $M = 3.0, sd = 2.2$ ),  $p < .01$ , 12-year-olds ( $M = 3.1, sd = 1.6$ ),  $p < .01$ , and adults ( $M = 3.3, sd = 2.3$ ),  $p < .01$ .

Paired t-tests indicated that 9-year-olds,  $t(35) = -5.4, p < .0001$ , 12-year-olds,  $t(35) = -9.2, p < .0001$ , and adults,  $t(36) = -14.7, p < .0001$ , expressed less sympathy in response to the foreseeable outcome stories than in response to the unforeseeable outcome-follows advice stories. In addition, the adults expressed less sympathy in response to the foreseeable outcome stories than in response to the unforeseeable outcome-does not follow advice stories,  $t(36) = -3.0, p < .01$ . Among children there were no significant differences between the amount of sympathy expressed in response to the foreseeable outcome stories and the amount of sympathy expressed in response to the unforeseeable outcome-does not follow advice stories.

*Relation between expressions of sympathy and attributions of responsibility.* As in Experiment 1, the decline with age in expressions of sympathy in response to the foreseeable outcome stories closely paralleled the increase with age in the level of fault attributed in response to these stories. To determine whether responses to the two questions became increasingly correlated with age, as they did in Experiment 1, separate correlations were calculated for each age group. These revealed that outcome-oriented fault ratings were negatively correlated with sympathy ratings among the adults,  $r = -.45, z = -2.8, p < .05$ , but not among the children. No significant correlations between outcome-oriented fault ratings and expressions of sympathy were found with respect to either the unforeseeable outcome-does not follow advice stories or the unforeseeable outcome-follows advice stories.

*Story them sub-order effects on expressions of sympathy.* The preliminary analyses revealed significant differences in the amount of sympathy expressed across the three foreseeable vs. unforeseeable-does not follow advice story themes (*i.e.*, the Sandra, Peter and Karen themes). Paired t-tests indicated that participants expressed more sympathy in response to the Sandra theme ( $M = 1.8$  out of 4,  $sd = 1.2$ ) than in response to the Karen theme ( $M = 1.4$  out of 4,  $sd = 1.2$ ),  $t(144) = 3.9, p < .001$ , or in response to the Peter theme ( $M = 1.6$  out of 4,  $sd = 1.2$ ),  $t(144) = 2.1, p < .05$ .

It seemed likely that expressions of sympathy in response to these three story themes varied across the sub-orders in which participants heard the foreseeable outcome versions, which had relatively bad outcomes, and the unforeseeable outcome versions, which had relatively good outcomes. Therefore, paired t-tests comparing expressions of sympathy in response to the Sandra story theme to expressions of sympathy in response to the Karen and Peter story themes were conducted separately for participants in the sub-orders A and C group and for those in the sub-orders B group. These revealed that the difference between the Sandra and Karen themes was significant only among the sub-orders A & C group,  $t(96) = 4.0, p < .0001$ . These participants heard the unforeseeable outcome version of the Karen story theme, which arguably, had the least sad outcome (*i.e.*, Karen misses an opportunity to get wet while walking in the rain) of all the story versions. The difference between the Sandra and Peter themes was significant only among the sub-orders B group,  $t(47) = 2.8, p < .01$ . These participants heard the unforeseeable outcome versions of both the Sandra and Peter themes. Thus, it appears that, overall, participants found the unforeseeable outcome version of the



Sandra theme, in which Sandra wins a book that she has already read, to be more sympathy inducing than the unforeseeable outcome version of the Peter theme, in which Peter's doesn't get a new robotic dog but his old dog is fixed.

*Summary of sympathy question results.* As in Experiment 1, expressions of sympathy decreased with age in response to each type of story *except* the unforeseeable outcome-follows advice stories. The decline in sympathy in response to the foreseeable outcome stories occurred gradually. Although 6-year-olds expressed more sympathy in response to these stories than did either the older children or adults, 9-year-olds also expressed more sympathy than did adults. In contrast, the decline in sympathy expressed in response to the unforeseeable outcome-does not follow advice stories occurred abruptly between the 6- and 9-year-olds. Only among the adults were expressions of sympathy significantly negatively related to attributions of responsibility. However, the relation was found only with respect to responses to the foreseeable outcome stories, and it was less pronounced than was the negative correlation found in Experiment 1. Finally, with respect the three foreseeable outcome *vs.* unforeseeable outcome-does not follow advice story themes, expressions of sympathy appeared to be related in part to the specific details of the stories, as well as to the foreseeability of the outcome.

## Discussion

The results of Experiment 2 replicate the finding from Experiment 1 of early development in children's ability to use differences in foreseeability to attribute responsibility for outcomes. They go beyond the findings of Experiment 1 in showing a

more gradual development in understanding that foreseeability can also be used to attribute responsibility for beliefs, and in demonstrating a relation between such understanding and use of foreseeability to attribute responsibility for outcomes. Finally, although the patterns of age-related changes in both outcome-oriented fault ratings and expressions of sympathy were similar to those found in Experiment 1, the results of Experiment 2 did not fully replicate the Experiment 1 finding of a significant negative correlation between adults' sympathy and outcome-oriented fault ratings. Although a significant negative correlation was found between adults' outcome-oriented fault ratings and their expressions of sympathy in response to the foreseeable outcome stories, no correlation was found between their outcome-oriented fault ratings and their expressions of sympathy in response to the unforeseeable outcome-follows advice stories.

*Development in Attributing Responsibility for Outcomes and Beliefs*

As in Experiment 1, participants of all ages attributed higher levels of responsibility in response to foreseeable outcome stories than in response to either type of unforeseeable outcome stories when they were asked how much each character was at fault for the outcome. Most impressively, this ability was found even among a group of participants who heard both of the unforeseeable outcome-does not follow advice stories that were associated with less ability to infer that the beliefs would most likely be true. Thus, ability to use foreseeability to attribute responsibility for unintended outcomes appears to be robust as well as early developing.

In contrast to the early understanding of the relation between foreseeability and responsibility for outcomes, the ability to use foreseeability to attribute responsibility for false beliefs appeared to develop gradually. Thus, participants of all ages were nearly unanimous in their judgments that characters who could not foresee the outcome, and who followed advice, were *not* at fault for their false beliefs. However, participants showed much less certainty about whether characters in the foreseeable and unforeseeable-does not follow advice stories were at fault for their false beliefs. Six-year-olds did not differ from chance in their judgments of the beliefs represented in either of these types of stories. Nine-year-olds showed some understanding that characters who could have foreseen the outcomes were at fault for their false beliefs, but this understanding was limited to the foreseeable outcome versions of the foreseeable vs. unforeseeable-does not follow advice story themes. Only the 12-year-olds and adults appeared to have a generalized understanding that characters who could have foreseen the outcomes of their actions were at fault for having false beliefs about them, and that characters who could not have foreseen the outcomes were not at fault, regardless of whether they had followed advice.

It is not entirely clear why nine-year-olds were more confident in their judgments of the foreseeably false beliefs represented in the foreseeable vs. unforeseeable-does not follow advice story themes than in their judgments of other foreseeably false beliefs. However, at least a partial explanation for this finding is suggested by a careful look at the specific stories that were associated with frequent claims that the characters were at fault for foreseeably false beliefs. These claims were

made more frequently by 9-year-olds in the sub-orders A & C group, who heard the foreseeable outcome versions of the Sandra and Peter story themes ( $M = .833, sd = .38$ ) than by those in the sub-order B group ( $M = .500, sd = .52$ ), who heard the foreseeable outcome version of the Karen story theme.

Close examination of the evidence provided in the foreseeable outcome versions of each of the six story themes revealed that the foreseeable outcome versions of the Sandra and Peter themes included external evidence that pointed to the same outcome as the advice. In the Sandra theme, Sandra had already seen the price of the book before she encountered the teacher and was told that she could not afford to buy both the raffle ticket and the book. In the Peter theme, Skippy's failure to play catch or do tricks corresponded to the signs that a robotic dog needed a new battery that had been described by the reporter. In contrast, the evidence provided in the foreseeable outcome versions of the other four themes was provided entirely by the advisor and, in the Cassie and Jim stories, included words like "sometimes" and "usually" which suggested uncertainty about the outcome. Thus it seems possible that these stories provided the nine-year-olds with insufficient information on which to judge whether the character could have foreseen that his/her alternative belief about how to achieve the outcome would be false.

This possibility is suggested by differences in the explanations 9-year-olds offered in support of their judgments of beliefs represented in the foreseeable outcome versions of the Sandra and Peter themes and those they offered to support their judgments of beliefs in response to the Cassie, Jim and Glenn story themes. Ten of the

20 nine-year-olds who correctly stated that Peter or Sandra was at fault for his/her belief explicitly referred to both the advice and the external evidence in their explanations. For example, one girl explained her judgment that Sandra was at fault for thinking she could afford to buy both the book and a raffle ticket by saying, “Her teacher told her, and she read it in the catalogue, but she assumed they were wrong.” Eight of the remaining 20 children referred to either the advice or the external evidence to justify their decision that the character was at fault. In comparison, 9-year-olds’ explanations of their responses to the foreseeable outcome versions of the other themes were more likely to refer to the fact that the character thought that the undesired outcome would not occur or to the ambiguity in the advice. For example, in response to the foreseeable version of the Cassie theme, in which the counselor said there were sometimes extra t-shirts, one child said that it was not Cassie’s fault that she falsely believed she would receive a t-shirt, because “there [was] a chance that she could have got one.”

This somewhat informal analysis suggests that, although 9-year-olds have some understanding that individuals can be blamed for having false beliefs about foreseeable outcomes, they are cautious in attributing responsibility for such beliefs, and may only do so when converging evidence indicates that an individual really could have formed a true belief. This possibility could be examined more fully by carefully manipulating the amount and types of evidence provided in stimulus stories in future studies.

*Relations between Attributing Responsibility for Beliefs and Attributing  
Responsibility for Outcomes*

The developmental progression in children's ability to use foreseeability to attribute responsibility for false beliefs is not the entire story, however. The results of Experiment 2 also indicate that participants who differentiated completely on the basis of foreseeability in their attributions of responsibility for beliefs used foreseeability to a greater extent than did other participants in their attributions of responsibility for the outcomes. In other words, these participants were more likely to attribute the maximum amount of fault to characters in the foreseeable outcome stories, and minimal amounts of fault to characters in both types of unforeseeable outcome stories, than were participants who were more equivocal in their use of foreseeability in their judgments of beliefs. For these participants, the relation between the character's belief and the information available to him/her about the probable outcome of his/her action appears to have been a more crucial determinant of judgments of both belief and behavior than it was for the other participants.

This difference between the participants who differentiated completely on the basis of foreseeability in their judgments of beliefs and those who did so only partially, or not at all, touches on the second question addressed by Experiment 2. This was the question of whether the acquisition of a concept of epistemic responsibility, whereby individuals are responsible for thinking properly, as well as for acting properly, depends entirely upon developmental change or also involves individual differences. The results of Experiment 2 do not provide a complete answer to this question, in part because of

the differences in performance on the belief-oriented fault questions by participants who heard facilitative and non-facilitative versions of the stories. However, it is noteworthy that despite the clear developmental changes in understanding of responsibility for the beliefs represented in the foreseeable outcome and unforeseeable outcome-does not follow advice stories, only slightly more than half the adult participants who heard the facilitative story orders differentiated completely on the basis of foreseeability in their judgments of the beliefs. This suggests that there is considerable variability, even among adults, in the extent to which foreseeability is considered the most important basis on which to judge beliefs.

*Do Expressions of Sympathy Reflect Differences in Attributions of  
Responsibility?*

Experiment 2 also provides additional information about the relation between attributions of responsibility and expressions of sympathy in children and adults. The results of Experiment 2, like those of Experiment 1, indicate that there is a gradual decline with age in the amount of sympathy expressed in response to outcomes that an individual could have foreseen and avoided. In contrast, expressions of sympathy in response to the unforeseeable outcome-follows advice stories remained high across age groups, leading to an increase in differentiation between the two types of stories with age.

This pattern of responses to the sympathy question was the inverse of the pattern of responses to the outcome oriented fault ratings for the foreseeable outcome and unforeseeable outcome-follows advice stories. However, in contrast to the findings of

Experiment 1, expressions of sympathy among the adults in Experiment 2 were related to the outcome oriented fault ratings only in response to the foreseeable outcome stories. Furthermore, the relation was weaker than that found among the adults of Experiment 1. It is not clear why there was a difference in the extent to which the adults' fault and sympathy ratings were correlated across the two experiments. One possible explanation is that requiring participants to focus on the characters' beliefs about the outcomes altered the extent to which they either discounted their sympathy for characters in the foreseeable outcome stories, or felt free to express it in response to characters in the unforeseeable outcome-follows advice stories. Attribution theory (*e.g.*, Weiner, 2000) predicts that attributing responsibility for an outcome to an individual leads to a reduction in sympathy toward them, whereas considering the event from their perspective increases sympathy. This suggests that the inclusion of the belief-oriented fault question, which forced participants to consider the characters' beliefs that the outcomes would not occur, in combination with the outcome-oriented fault question, which focused participants on the characters' responsibility for the outcome, may have created a situation in which participants' sympathy ratings were affected by opposing processes.



## GENERAL DISCUSSION

The research presented here addressed development in an important aspect of children's understanding of subjective responsibility. This is the idea that individuals are responsible for thinking about the outcomes of their behavior prior to acting in order to avoid causing unintended but foreseeable negative outcomes. Stories involving false beliefs about outcomes that primarily affected the characters' own goals were selected for two reasons. One of these was to prevent attributions of responsibility on the basis of foreseeability from being influenced by the effect of the characters' actions on others' goals. The other was because instances of self-deceptive or motivated false beliefs, such as those represented in the foreseeable outcome stories, have been identified as playing two possible roles. First, they may have the potential to provoke reflection that leads to greater self-knowledge, as, for example, might happen with the impulsively generous child described in the introduction. Second, they may corrupt one's ability to think rationally about the relations between one's behavior and one's difficulties in social interactions (Baron, 1988). As such, motivated false beliefs seem especially relevant to children's understanding that how well they have thought about the outcomes of their behavior is an important determinant of how much responsibility they must bear for those outcomes.

Results provide new insight into early development of understanding of this aspect of subjective responsibility among 5-year-old, as well as continuing development that occurs throughout middle childhood. In addition to these developmental findings, results from the adult participants of Experiment 2 suggest that there may be individual

differences in the extent to which the foreseeability of outcomes is considered an important determinant of responsibility for beliefs and behavior.

As regards early development, the 5-year-olds of Experiment 1 consistently attributed higher levels of responsibility to story characters who could have foreseen that their actions would not lead to their desired outcomes than to characters for whom the outcomes were unforeseeable. However, 5-year-olds' differential attributions appeared to be driven by understanding that the characters who could have foreseen the outcomes were *very much* at fault for the outcomes, rather than by understanding that characters who could not have foreseen the outcomes were not responsible for them. Thus, 5-year-olds' attributions of responsibility to the characters who could have foreseen the outcomes did not differ from the attributions made by 6- and 7-year-old children, or from the attributions made by adults. Nonetheless, 5-year-olds attributed more responsibility to characters who could *not* have foreseen the outcomes of their actions than did older children or adults. In contrast, six-year-olds' attributions of responsibility for both foreseeable and unforeseeable outcome stories were comparable to the attributions made by adults. This suggests that understanding that individuals are *not* responsible for outcomes that they could not have foreseen develops between 5 and 6 years of age.

These findings reveal earlier understanding of the relation between potential knowledge and responsibility than has been demonstrated previously (Hook, 1989; Yuill & Perner, 1988), but also hint at limits in young children's understanding of relations among evidence, knowledge, and responsibility that appear to be overcome by

6 to 7 years of age. Recent research on young children's understanding of intentional action provides some insight into why the 5-year-olds in Experiment 1 performed better in response to the foreseeable outcome stories than have 5-year-olds in previous studies. Specifically, a number of studies show that by 5 years of age, children understand that intentions involve both representations of desired outcomes and representations of the actions to be performed in order to achieve these outcomes (Baird & Moses, 2001; Feinfeld, Lee, Flavell, Green & Flavell, 1999; Joseph & Tager-Flusberg, 1999; Schult, 2002). Nonetheless, Schult's (2002) research indicates that 5-year-olds have difficulty integrating these separate representations of the desire and planned action components of intentions into a single representation of the intended action and its outcome. Her research further indicates that this difficulty is overcome between 5 and 7 years of age.

Although Schult's (2002) work focused on children's ability to identify intended and unintended outcomes, her conclusion seems especially relevant to understanding the pattern of attributions of responsibility for foreseeable and unforeseeable outcomes shown by the 5-year-olds in Experiment 1. This is because the ability to form integrated representations of relations between intended actions and desired outcomes is essential to the ability to differentiate between foreseeable and unforeseeable unintended outcomes. In order to judge whether an outcome was foreseeable, children must determine whether the actor had access to sufficient information about the relation between the intended action and both the intended and actual outcomes to form a representation that included the actual outcome. Thus, it seems likely that limits on young children's ability to form integrated representations of intended actions and

outcomes would limit their ability to differentiate between foreseeable and unforeseeable outcomes, as well as their ability to differentiate between intended and unintended outcomes (Schult, 2002).

If this is the case, then the format of the stories used in previous research may have hindered young children's ability to infer the foreseeability of unintended outcomes. Recall that in the stories used by Yuill and Perner (1988) and Hook (1989), foreseeability was defined in terms of the characters' actual or potential ability to see the recipient of the unintended outcome. Although children were also told what the characters knew as a result of what they had seen, these descriptions did not make explicit links among the actor's desired outcome, intended action, and the actual outcome. For example, Yuill and Perner (1988, p. 360) told children a story in which a boy bumped into a swing set while playing ball, causing the girl who was on the swing to fall. Children were told, "This boy could see the girl because he was on this side of the wall. He knew she wanted to swing." In this story the boy's intended outcome was presumably to catch the ball. However, the information provided about the boy's knowledge described the girl's desired outcome rather than the boy's own desired outcome or his plan for how to achieve it.

In contrast, in the stories used in the present research, foreseeability was defined in terms of whether the advice provided to the protagonist was an accurate representation of the relation between the protagonist's action and the outcome. Children were also given information about the protagonists' representations of the event in the form of the protagonists' statements about how they intended to achieve

their desired outcomes. Thus, each story included two statements of anticipated relations between the protagonist's behavior and the outcome of the behavior. It seems likely that the specificity of these statements facilitated children's reasoning about the foreseeability of the outcomes. However, at least for the 5-year-olds, the facilitative effect appears to have been limited to helping them identify foreseeable outcomes. Therefore, in addition to considering how the use of advice as the primary source of evidence affected children's performance, it is necessary to consider how the different types of information provided in the three types of stories affected children's understanding of what each protagonist could foresee.

In the foreseeable outcome stories, the protagonist did not do what the advisor recommended and the desired outcome did not occur. Although not a direct verification of the advisor's claim, the protagonist's failure to achieve the desired outcome suggested that the advisor's description of the relation between the advised action and desired outcome was accurate, whereas the protagonist's belief about an alternative relation was not. As a result, children may have attributed responsibility to the protagonists in these stories not simply because they did not do as advised, but because they did not do as advised by someone who provided reliable information about how the desired outcome could be achieved. Recent research with 3- and 4-year-olds indicates that children remember whether individuals have provided reliable information and respond differentially to reliable and unreliable sources in word-learning contexts (Koenig, Clement & Harris, 2004). Thus it seems plausible that 5-year-olds might also

use evidence that an advisor's recommendation about how to achieve a desired outcome was accurate to attribute responsibility to protagonists who did not follow the advice.

The use of such a strategy might also explain the 5-year-olds' relatively high attributions of responsibility in response to both types of unforeseeable outcome stories. In contrast to the foreseeable outcome stories, the conclusions of these stories reveal that the advisors were unreliable sources of information. Thus, 5-year-olds could not use information about whether the protagonist followed advice from a reliable source as a basis for attributing high levels of responsibility to these characters. However, the 5-year-olds do not appear to have understood that the advisors' provision of unintentionally false (or, in the case of the stories in which the protagonists did not follow the advice, incomplete) information about the relation between the protagonist's behavior and the outcome caused the protagonists to have false beliefs about the effects of their actions. Thus the 5-year-olds' attributions of moderate levels of responsibility to these protagonists may have reflected uncertainty about why the outcomes did not occur as they expected. This interpretation is consistent with research on children's understanding of sources of false beliefs, which indicates that for young children an informant's intention to deceive is an especially salient cue that the recipient of the information will have a false belief (see Sodian, 1994, for a review). It is also consistent with Johnson's (1997) research, in which 4- and 5-year-olds understood that a protagonist who formed a false belief in response to deliberate deception by another character should not be blamed for the false belief, but that the character who deceived him should be blamed. This suggests that the decrease in attributions of responsibility

for unforeseeable outcomes between 5 and 6 years of age reflects development of a more fully representational understanding of testimony as source of belief.

The findings discussed thus far, when considered separately from the findings of Experiment 2, suggest that 5-year-olds have a limited understanding of the relation between foreseeability and responsibility, but that this understanding is remarkably adult-like by age six. This conclusion, however, is qualified by findings from Experiment 2 concerning children's and adults' attributions of responsibility for false beliefs. These results revealed two important differences between development in understanding of the relation between foreseeability and responsibility for false beliefs and development in understanding of the relation between foreseeability and responsibility for unintended outcomes. First, development in understanding of foreseeability as a basis for attributing responsibility for beliefs was more prolonged and gradual than development in understanding of foreseeability as a basis for attributing responsibility for outcomes. Second, the sequence in which children correctly attributed responsibility (or lack thereof) for each of the three types of beliefs was different from that observed in children's attributions of responsibility for outcomes.

As discussed previously, the findings from Experiment 1 indicate that children learn that individuals who could have foreseen unintended outcomes are *especially* at fault for causing them before they learn that those who could not have foreseen the outcomes are *not* responsible for causing them. However, once children understand that not being able to foresee an outcome means that one is not responsible for it, they

appear to apply this understanding similarly to the two types of stories in which the advice did not accurately represent the relation between the protagonist's behavior and the actual outcome. In contrast, the findings from Experiment 2 indicate that children understand that individuals *are not* responsible for having false beliefs about outcomes they *could not have* foreseen before they understand that they *are* responsible for having false beliefs about outcomes that they *could have* foreseen. However, understanding of both when to refrain from attributing responsibility for a belief, and when to attribute responsibility, appears to be limited to specific contexts among 6- and 9-year-olds but to become more generalized by 12 years of age.

Specifically, participants of all ages were confident that the protagonists in the unforeseeable outcome-follows advice stories were not at fault for having false beliefs. In these stories, the protagonists' false beliefs matched the false beliefs represented in the advisors' descriptions of how to achieve the recommended outcomes. These stories seemed to represent particularly clear instances in which the characters truly could not have known that their actions would not produce the desired results. Children's explanations for their judgments of these beliefs indicated that they understood the advisors to be knowledgeable and trustworthy sources of information. For example, one 9-year-old explained that it was not Jim's fault that he falsely believed that he would be chosen for the tumbling club after learning the three new tumbling moves because, "He believed that his teacher was telling the truth. Usually teachers tell the truth. They tell the truth every day." Similarly, a 12-year-old excused Jim by saying, "That's what the gym teacher, who knew more about the club, told him."



These explanations suggest that children may have reasoned that the characters would have been unwise not to base their beliefs about how to achieve desired outcomes on the statements of the advisors. It is noteworthy, however, that 6-year-olds did not offer explanations that explicitly referred to the advisors' usual trustworthiness or expertise. Although they appeared to share the older children's trust in the advisors' usual reliability, 6-year-olds did not appear to have explicit knowledge that the protagonists' false beliefs were warranted because of the trust they rightfully placed in the advisors.

Judging whether the protagonists who did not follow the advice were responsible for their beliefs presented more of a challenge to both 6- and 9-year-olds. But, for the 9-year-olds, the challenge appeared to be greater when the protagonists chose to pursue an outcome other than the one that the advisor recommended than when they chose an alternative means of pursuing the same outcome. Thus, 9-year-olds who heard the foreseeable outcome version of either the Sandra or Peter story themes, which included external evidence that corroborated the information provided by the advisor, showed solid understanding that these characters were at fault for their false beliefs. However, even these 9-year-olds were uncertain in their judgments of false beliefs that were presented in foreseeable outcome stories that lacked such corroborating evidence. This suggests that, among 9-year-olds, knowing that an individual based his/her belief on a presumably knowledgeable source is a sufficient basis for excusing a false belief, but that failure to accept information from a presumably knowledgeable source is only a sufficient basis for attributing responsibility for the belief if the reliability of the

advisor's information can be independently verified.

One possible explanation for this cautious attitude among the 9-year-olds is that, in comparison to the 12-year-olds and adults, they found it more difficult to draw upon their own knowledge to evaluate the advisors' and protagonists' beliefs about actions that would produce the desired outcome. This possibility is suggested by the difficulty that participants of all ages showed in their attributions of responsibility for the false beliefs of protagonists in the unforeseeable outcome-does not follow advice stories. In these stories, both the advice and the protagonists' statements of their intended actions and outcomes falsely represented the relation between the protagonists' behavior and the actual outcomes. However, the two statements reflected different desired outcomes as well as different means of achieving the outcomes.

The asymmetrical nature of these two statements appears to have made it especially difficult for children to determine whether the protagonists' beliefs were justified. Because the protagonists rejected the outcome recommended by the advisor, the advice could not be used as evidence for how the protagonist could achieve the outcome s/he elected to pursue. Instead, participants had to base their judgments of the beliefs on their own knowledge of whether the protagonist's proposed action would ordinarily produce the desired outcome. Thus, the finding that the 6- and 9-year-olds' attributions of responsibility with respect to these beliefs did not differ from chance may simply indicate the stories provided too little information to allow them to judge whether the protagonists had good reasons for expecting the desired outcomes to occur. This interpretation is supported by an examination of age-related differences in

responses to the inference questions related to the non-facilitative unforeseeable outcome versions of the Sandra and Peter story themes. These data revealed that 6- and 9-year-olds were much less certain of whether these protagonists' beliefs would be true than were 12-year-olds and adults.<sup>5</sup>

Twelve-year-olds and adults did not appear to have the same difficulty as the 6- and 9-year-olds at drawing upon their real world knowledge in order to answer either the inference questions or the belief-oriented fault questions related to these stories. Their confidence in doing so was reflected in their explanations for their answers. Thus, one 12-year-old explained that Peter was not at fault for his false belief that he would get a new robotic dog by saying, "It's pretty logical just to ask for a new dog and send for one and get one." Nonetheless, even these older participants showed less certainty in their judgments of these beliefs than in their judgments of the beliefs in the unforeseeable outcome-follows advice stories. Whereas very few participants of any age attributed responsibility for the beliefs in the unforeseeable outcome-follows advice stories, 50% of the 12-year-olds and 43% of the adults attributed responsibility for at least one of the beliefs in the unforeseeable outcome-does not follow advice stories. Furthermore, the majority of these incorrect attributions of responsibility (68% among the 12-year-olds and 59% among the adults) appeared to reflect a realist bias (Mitchell, Robinson, Isaacs, & Nye, 1996). That is, although their responses to the inference question indicated that they expected the protagonists' beliefs to be true, participants nonetheless attributed responsibility to the protagonists for having had false beliefs once these were revealed as having been false.

This suggests that once they learned the actual outcomes, they evaluated the protagonists' beliefs in terms of different evidence than they had used in their inferences about whether the belief would be true. In many instances their explanations for their inferences reflected acceptance of the protagonists' reasons for believing that the alternative outcome could be pursued successfully. Yet, in their explanations for their judgments of the beliefs, they argued that because the advice contained no information about how to achieve the alternative outcome, the protagonists should not have assumed that the alternative outcome was possible. For example, with respect to the unforeseeable outcome version of Peter, in which Peter decides to order a new robotic dog (AIBO) rather than return the old one to be repaired, one adult predicted that Peter's belief that he would get a new AIBO would be true because, " he is ordering a new one, not asking for a replacement." After learning that the factory returned the original AIBO to Peter, rather than sending him a new one, this same participant claimed that Peter was at fault for thinking he could get a new AIBO, " because the e-mail was specifically for fixing the current AIBO."

Although this finding concerns older children's and adults' attributions of responsibility to others for their false beliefs, it appears to be consistent with Mitchell and colleagues' (1996) finding with regards to young adults' judgments of whether naïve story characters who heard information that contradicted their previous beliefs would accept the information. When adults had access to information about the factuality of the new information that was not available to the story characters, they systematically judged that the characters would accept information that would allow

them to replace a false belief with a true one, but would not accept information that would lead to a true belief being replaced with a false one. Four- to 8-year-old children did not make such errors. Mitchell and colleagues argue that the adults' errors might reflect their greater awareness of the cost of failing to accept new information that represents reality better than one's pre-existing beliefs in real world contexts. Similarly, the realist errors in the 12-year-olds' and adults' attributions of responsibility to characters in the unforeseeable outcome-does not follow advice stories may reflect a real life concern with re-evaluating beliefs that have proven to be false to determine whether one could have formed true beliefs instead.

This does not seem to have been the case when the younger children showed a similar pattern of inconsistent responses to the inference and belief-oriented fault questions. In contrast to 12-year-olds and adults, 6-year-olds and 9-year-olds made a large number of errors reflecting the "realist bias" pattern of responses to the inference and belief-oriented fault questions in response to the unforeseeable version of the Karen theme.<sup>6</sup> In this story, Karen decides to go out in the rain without a raincoat or boots because she wants to get wet, and thinks she will not be able to get wet if she wears the raingear. Although children's responses to the inference question indicated that they accepted this belief as factual, their explanations for their belief judgments indicated that they attributed responsibility because they believed her desire to get wet was unwise (e.g., "It's her fault. She's not listening to her sister. She won't like it;" "She shouldn't have wanted to get wet."), or because the belief originated with her (e.g., "Her mind made it up.")

In contrast to the explanations offered by adults, these explanations do not suggest that the children re-evaluated the foreseeability of the belief in light of different evidence after discovering that the beliefs were false. Rather they suggest that children were basing their attributions of responsibility for the belief on factors other than foreseeability. Specifically, the children's attributions of responsibility in these cases appear to reflect negative judgments of Karen's intention to walk in the rain, which they recognize as having originated in Karen's mind. Such judgments indicate that these children were concerned with the relevance of subjective factors to attributions of responsibility, but that they failed to understand (or perhaps, to accept) the narrower question of whether Karen could have foreseen that she would not be able to achieve her desired outcome as a meaningful basis for attributing responsibility.

The preceding analysis of age-related changes in children's attributions of responsibility for the beliefs represented in the three types of stories supports the hypothesis that attributing responsibility for beliefs requires a more complex understanding of relations between sources of information and belief than do attributions of responsibility for outcomes. In addition, it provides some suggestions as to what is developing in children's understanding of such relations that gradually permits children to differentiate between beliefs that were and were not supported by evidence. Three of these, which seem like particularly fertile areas of future research, are described below.

The first of these concerns children's understanding of the characteristics of reliable sources of testimonial evidence. The results from both Experiments 1 and 2

indicate that children's ability to attribute responsibility on the basis of foreseeability in response to each of the three types of story depended in part on their assessments of the reliability of the advisors. In addition, children's explanations for their responses to the belief-oriented fault questions of Experiment 2 suggested that children develop an increasingly complex understanding of what makes an informant reliable between 6 and 12 years of age. By 12 years of age this concept appears to include the understanding that reliable informants are not only generally truthful, but that they have special expertise in the area in which they are providing information that increases the likelihood that it will be reliable. It seems possible that understanding that the authority to give advice derives from specific knowledge as well as from a general desire to provide accurate information may have contributed to the 12-year-olds' greater ability to attribute responsibility for false beliefs in comparison to the younger children.

A second area of development appears to be in children's understanding of how to evaluate the relation between the belief and the evidence in order to judge whether the belief was warranted. Although the 6-year-olds understood that the protagonists of the unforeseeable outcome-follows advice stories, whose beliefs were derived directly from the advice, were not responsible for having false beliefs, they appeared to have little understanding of how to evaluate the beliefs that diverged from the advice. The 9-year-olds appeared to understand that these beliefs should be evaluated in light of the evidence available to the believer, but they appeared to require greater and different amounts of evidence than did older participants in order to convict the protagonists of faulty thinking. Specifically, 9-year-olds were most likely to attribute responsibility to

protagonists whose beliefs should have been informed by first-hand experience (*e.g.*, Sandra's prior perusal of the book fair price list, Peter's observation of the signs that Skippy was malfunctioning) as well as by the advice. This finding may reflect a general belief that first-hand perceptual evidence is the most reliable source of evidence (Mitchell et al., 1996). Such a belief could lead to reluctance to attribute responsibility to protagonists who had access to testimonial evidence that countered their own false beliefs but no additional first-hand experience that would corroborate the testimonial evidence.

A third area of development appears to be in children's understanding that they can draw upon their own knowledge of regularities in social interactions in reasoning about others' beliefs. This was reflected in the difficulty 6- and 9-year-olds had with both the inference and belief-oriented fault questions related to the unforeseeable outcome versions of the Sandra and Peter story themes. There are several plausible explanations for the younger children's inability to make use of their own knowledge in responding to these stories. One of these is that the protagonists' decisions to pursue outcomes at odds with those recommended by the advisors distracted children from a focus on whether the protagonists' intentions included reasonable plans for how to achieve the alternative outcomes. However, it is also possible that the younger children were less able to access representations of prototypical purchasing events that they could use to evaluate Sandra's and Peter's beliefs about the outcomes of their decisions.

An additional goal of Experiment 2 was to determine how learning to use foreseeability as a basis for attributing responsibility for false beliefs affects attributions



of responsibility for outcomes. The results indicate that participants who showed the most stringent use of foreseeability in their attributions or responsibility for beliefs also showed the greatest differentiation on the basis of foreseeability in their attributions of outcomes.

However, this finding is limited for two reasons. First, participants' understanding that the protagonists of the unforeseeable outcome-does not follow advice stories were not responsible for their false beliefs varied significantly across the three story themes. Second, the attributions of responsibility for beliefs and attributions of responsibility for outcomes were made in response to the same stories. Both these factors limit the extent to which the results of Experiment 2 can be taken as evidence that increasing ability to use foreseeability in attributing responsibility for beliefs is related to increased likelihood to do so in attributing responsibility for outcomes. Specifically, it is not clear whether the participants who showed the most stringent use of foreseeability in their judgments of the beliefs would emphasize foreseeability as much in their attributions of responsibility for outcomes that resulted from actions guided by other false beliefs. In other words, do the participants in the blame foreseeable only group represent a population that considers strict foreseeability to be the primary basis on which to attribute responsibility for unintended outcomes, or are they a group of individuals who considered foreseeability to be the primary basis on which to attribute responsibility for the outcomes described in the set of stories used in Experiment 2? To clarify this issue, future research should assess participants' attributions of responsibility for beliefs and for outcomes with different sets of stories.

## CONCLUSION

According to Piaget (1932/1965), learning to evaluate behavior in terms of the subjective states that guide it is a crucial development in children's understanding of responsibility. In his analysis of the interviews on which he based this conclusion, Piaget found that two concepts of responsibility coexist in young children's minds: a concept of objective responsibility, whereby responsibility is attributed on the basis of the observable effects of behavior, and a concept of subjective responsibility whereby responsibility is attributed on the basis of the motives that guide behavior. Although young children in his research were able to use both concepts to explain their attributions of responsibility, children younger than 9 years usually relied on the concept of objective responsibility to make judgments that pitted the two concepts against each other.

Subsequent research has indicated that children as young as 4 years of age can use information about others' subjective states to attribute responsibility for their behavior (Wellman et al., 1979; Weiner & Peter, 1973). Nonetheless, there are developmental changes in the types of subjective states that children understand as being relevant to attributions of responsibility. Preschoolers understand the relation between the valence of motives and responsibility before they understand the relation between intentional action and responsibility (Nelson, 1980, Weiner & Peter, 1973, Wellman et al., 1979), and school-aged children younger than 8 to 10 years overemphasize information about the amount of damage caused by the action in their attributions of responsibility (Buchanon & Thompson, 1973; Leon, 1977; Surber, 1977).

Thus Piaget's (1932/1965) description of a developmental shift from reliance on the concept of objective responsibility to reliance on a concept of subjective responsibility to evaluate behavior appears to be justified. What has remained unclear is what is developing in children's understanding of relations between the mind and the world that leads to a concept of responsibility that is more centrally focused on the subjective aspects of behavior.

The experiments presented here assessed development in understanding of the link between thinking and responsibility at two levels of complexity. It was hypothesized that responding differentially to the outcome-oriented fault questions would require less understanding of relations between mental processes and behavior than would responding differentially to the belief-oriented questions. The distinctly different patterns of development that were found with respect to the two types of fault questions support a conclusion that the two questions required different aspects of participants' understanding of relations among beliefs, behavior and judgments of responsibility. The ability to make differential attributions of responsibility at each of these levels requires fairly sophisticated understanding of relations between evidence and belief, as well as among beliefs, actions, and responsibility. Thus, both involve understanding of subjective responsibility. However, only the second requires understanding of beliefs as products of dynamic thought processes that are, to a limited extent, subject to the individuals' awareness and control, and therefore also subject to normative evaluation. It may be that this more advanced concept of subjective responsibility, which Johnson (1997) referred to as epistemic responsibility, enables

children to de-emphasize the physical and social consequences of behavior, and to emphasize motives and intentions, as criteria for evaluating their own and others' behavior.

Although the research reported here specifically addressed children's understanding of subjective responsibility for outcomes that primarily affected the actors, the results suggest directions for future research on children's understanding of foreseeability as a basis for attributing responsibility for actions that affect others. Such attributions frequently are made in response to situations in which an actor's behavior has potential to cause both a positive outcome for the actor and a negative outcome for someone else. Determining the moral value of behavior in such situations may depend on the ability to simultaneously consider the foreseeability of each of these outcomes, as well as an assessment of how much the actor desired or intended each outcome. It seems likely that the findings of such research will reveal important insights into children's representations of the socio-moral world.

## NOTES

<sup>1</sup> If this was a concern for Mrs. Pannebacker, she may have felt somewhat better two years later, when Jimmy's little brother, Troy, talked my little brother, Tommy, into hiding inside the clothes dryer during a game of hide and seek. Although this incident again involved a Pannebacker child getting a Boerger child in trouble, at least it occurred at our house, where my mother was supposed to be watching them.

<sup>2</sup> For children whose definition of "what it means to feel sorry for someone" indicated that they confused feeling sorry for someone and feeling sorry about something, this sentence and all subsequent mentions of "feeling sorry for" were rephrased as "feeling sad for."

<sup>3</sup> For example, in the unforeseeable outcome version of the Karen theme, Karen misses the opportunity to walk in the rain (i.e., get rained on), whereas, in the foreseeable outcome version, she is cold and uncomfortable all day as a result of walking to school in the rain without any rain gear. It is possible that, even if participants were sympathetic toward Karen's desire to experience walking in the rain, that missing the opportunity to do so would elicit less sympathy than having to suffer the consequences of having the experience!

<sup>4</sup> Although the differences in performance related to the B vs. A or C sub-orders came to light as a result of the analysis of responses to the inference questions, the difference does not relate to good vs. poor ability to draw inferences about whether the beliefs should turn out to be true. Although participants who received the B sub-orders heard two stories that elicited incorrect inferences relatively frequently, whereas those

who received A or C sub-orders heard only one, participants in the three sub-order groups did not differ in the extent to which they made correct inferences about the characters' beliefs across the 6 stories,  $F(2, 141) = .9, p > .4$ . Therefore, it is not the case that participants in the A sub-order group performed more poorly on the inference questions in general than other participants.

It is also not the case that participants in the B sub-order group performed more poorly in response to the inference questions in response to either the Sandra or Peter story themes than did other participants who heard the unforeseeable outcome versions of these story themes. For the Sandra theme, the relevant comparison is between participants in the sub-order B group and those in the sub-order C group,  $t(92) = -.07, p > .9$ . For the Peter theme, the relevant comparison is between participants in the sub-order B group and those in the sub-order A group,  $t(96) = -.03, p > .9$ .

<sup>5</sup> The percentage of participants at each age who inferred that the beliefs of each of these characters would be correct were: 46% of 6-year-olds, 55% of 9-year-olds, 88% of 12-year-olds, and 79% of adults in response to Sandra, and 50% of 6-year-olds, 42% of 9-year-olds, 83% of 12-year-olds, and 72% of adults in response to Peter.

<sup>6</sup> Although 6- and 9-year-olds made few belief judgments that were inconsistent with their inferences in response to the unforeseeable outcome versions of the Sandra and Peter themes, this may well have been because they made relatively few inferences that these protagonists' beliefs would be correct.

TABLES AND FIGURES

Table 1. *Story themes by type of variation*

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*Type of Story Theme*

---

<i>Foreseeable or Unforeseeable-Follows Advice</i>	<i>Foreseeable or Unforeseeable-Does Not Follow</i>
Cassie	Peter
Jim	Sandra
Glenn	Karen

---

Table 2. Summary of story themes and types of outcomes by order and sub-order.

<i>Order</i>	<i>Stories by Theme and Type of Outcome</i>
1	<p>A <b>Jim (Foreseeable)</b>, Cassie (Unforeseeable-FA), Karen (Unforeseeable-DNF),  <b>Sandra (Foreseeable)</b>, Glenn (Unforeseeable-FA), Peter (Unforeseeable-DNF)</p> <p>B <b>Cassie (Foreseeable)</b>, Jim (Unforeseeable-FA), Sandra (Unforeseeable-DNF);  <b>Karen (Foreseeable)</b>, Glenn (Unforeseeable-FA), Peter (Unforeseeable-DNF)</p> <p>C <b>Glenn (Foreseeable)</b>, Cassie (Unforeseeable-FA), Karen (Unforeseeable-DNF),  <b>Peter (Foreseeable)</b>, Jim (Unforeseeable-FA), Sandra (Unforeseeable-DNF)</p>
2	<p>A Karen (Unforeseeable-DNF), <b>Cassie (Foreseeable)</b>, Jim (Unforeseeable-FA),  Peter (Unforeseeable-DNF), <b>Sandra (Foreseeable)</b>, Glenn  (Unforeseeable-FA)</p> <p>B Peter (Unforeseeable-DNF), <b>Glenn (Foreseeable)</b>, Jim (Unforeseeable-FA),  Sandra (Unforeseeable-DNF), <b>Karen (Foreseeable)</b>, Cassie  (Unforeseeable-FA)</p> <p>C Sandra (Unforeseeable-DNF), <b>Peter (Foreseeable)</b>, Glenn (Unforeseeable-FA),  Karen (Unforeseeable-DNF), <b>Jim (Foreseeable)</b>, Cassie (Unforeseeable-FA)</p>
3	<p>A Cassie (Unforeseeable-FA), Karen (Unforeseeable-DNF), <b>Jim (Foreseeable)</b>,  Glenn (Unforeseeable-FA), Peter (Unforeseeable-DNF), <b>Sandra (Foreseeable)</b></p> <p>B Jim (Unforeseeable-FA), Sandra (Unforeseeable-DNF), <b>Cassie (Foreseeable)</b>,  Glenn (Unforeseeable-FA), Peter (Unforeseeable-DNF), <b>Karen (Foreseeable)</b></p> <p>C Cassie (Unforeseeable-FA), Karen (Unforeseeable-DNF), <b>Glenn (Foreseeable)</b>,  Jim (Unforeseeable-FA), Sandra (Unforeseeable-DNF), <b>Peter (Foreseeable)</b></p>



Table 3. Mean Fault Summary Scores (Out of 8) by Age and Type of Story

	<i>Type of Story</i>		
	<i>Foreseeable</i>	<i>Unforeseeable-DNF</i>	<i>Unforeseeable-FA</i>
5-year-olds	6.9 (1.6)	5.4 (2.7)	4.4 (2.5)
6-year-olds	6.6 (1.7)	3.3 (2.9)	2.2 (2.4)
7-year-olds	7.1 (1.6)	4.3 (3.0)	1.6 (1.9)
adults	7.3 (.9)	3.3 (2.6)	1.3 (1.7)

Table 4. Mean Fault Ratings (Out of 4) for the Foreseeable and Unforeseeable Outcome Versions of Each Story Theme.

<i>Story Theme</i>	<i>Type of Outcome</i>		<i>Mean difference</i>	<i>t</i> (148)	<i>p</i> <
	<b>Foreseeable</b>	<b>Unforeseeable</b>			
Sandra	3.42 (1.0)	2.55 (1.5)	.87	3.77	.01
Glenn	3.74 (.6)	1.73 (1.5)	2.01	9.24	.001
Peter	3.60 (.7)	1.67 (1.7)	1.93	7.88	.001
Karen	3.66 (.8)	.85 (1.5)	2.81	12.64	.001
Jim	3.40 (1.0)	.90 (1.3)	2.50	12.09	.001
Cassie	2.94 (1.4)	.77 (1.4)	2.17	8.94	.001

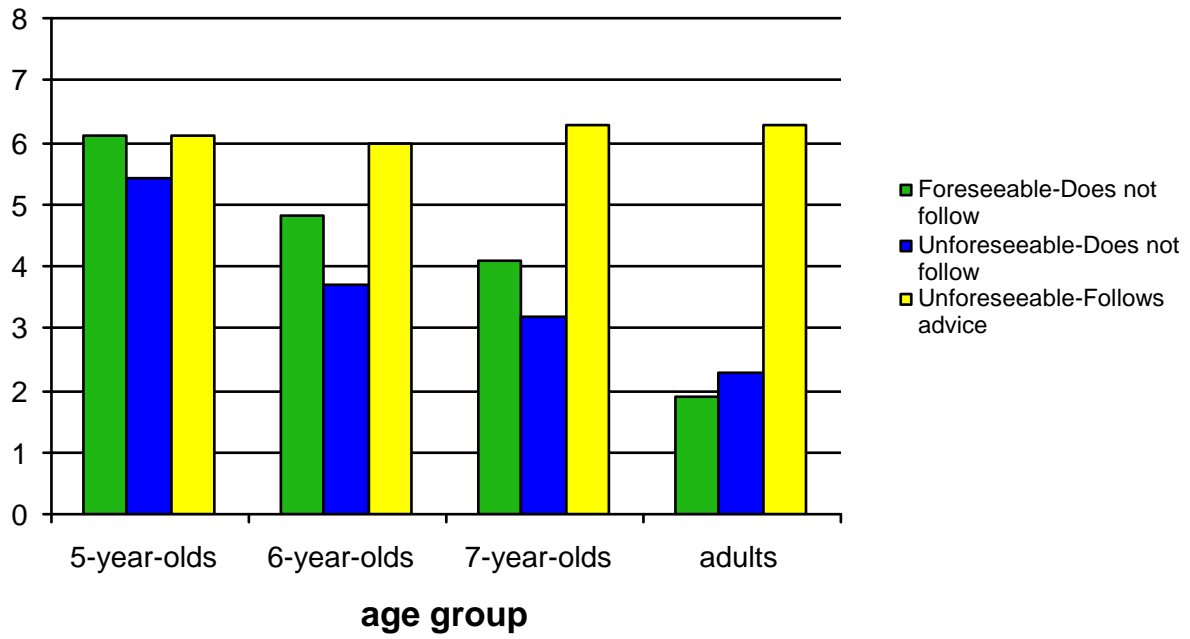


Figure 1. Sympathy ratings (means out of 8) by age group and story type.

Table 5. *Correlations between Fault and Sympathy Ratings by Age and Type of Story*

	<i>Type of Story</i>		
	<i>Foreseeable</i>	<i>Unforeseeable-DNF</i>	<i>Unforeseeable-FA</i>
5-year-olds	.51*	.38	.19
6-year-olds	-.03	.16	-.11
7-year-olds	-.09	-.12	-.12
adults	-.67***	-.21	-.49*

Notes: \*  $p < .05$ , \*\*\*  $p < .001$

Table 6. *Mean Sympathy Ratings (Out of 4) for the Foreseeable and Unforeseeable Outcome Versions of Each Story Theme.*

<i>Story Theme</i>	<i>Type of Outcome</i>		<i>Mean difference</i>	<i>t</i> (148)	<i>p</i> <
	<b>Foreseeable</b>	<b>Unforeseeable</b>			
Cassie	2.27 (1.4)	3.16 (.9)	-.9	-4.70	.0001
Jim	1.96 (1.6)	3.10 (1.1)	-1.1	-5.10	.0001
Glenn	2.34 (1.6)	3.00 (1.1)	-.7	-2.95	.01
Sandra	2.02 (1.6)	2.05 (1.4)	-.03	-.12	n.s.
Peter	2.46 (1.4)	1.99 (1.6)	.47	1.79	n.s.
Karen	1.78 (1.6)	1.55 (1.4)	.23	.92	n.s.

Table 7. *Percent of Correct Responses to Inference Question by Story Theme and Version.*

	<i>Type of Story Theme</i>					
	<i>Foreseeable vs. Unforeseeable- Follows Advice</i>			<i>Foreseeable vs. Unforeseeable- Does Not Follow Advice</i>		
	<i>Cassie</i>	<i>Jim</i>	<i>Glenn</i>	<i>Karen</i>	<i>Sandra</i>	<i>Peter</i>
Foreseeable	83	100	91	98	94	100
Unforeseeable	88	75	75	89	67	56
Combined	86	83	83	92	76	70

Table 8. *Mean Outcome-oriented Fault Ratings (Out of 4) for the Foreseeable and Unforeseeable Outcome Versions of Each Story Theme.*

<i>Story Theme</i>	<i>Type of Outcome</i>				
	<b>Foreseeable</b>	<b>Unforeseeable</b>	<i>Mean difference</i>	<i>t (144)</i>	<i>p</i> <
Sandra	3.30 (1.2)	1.75 (1.5)	1.56	6.37	.001
Peter	3.17 (.9)	1.52 (1.5)	1.65	7.16	.001
Jim	3.22 (1.0)	.67 (1.0)	2.55	14.48	.001
Glenn	3.33 (1.4)	.45 (.8)	2.88	16.34	.001
Karen	3.06 (1.2)	.44 (1.1)	2.62	13.58	.001
Cassie	2.69 (1.5)	.14 (.3)	2.54	17.21	.001

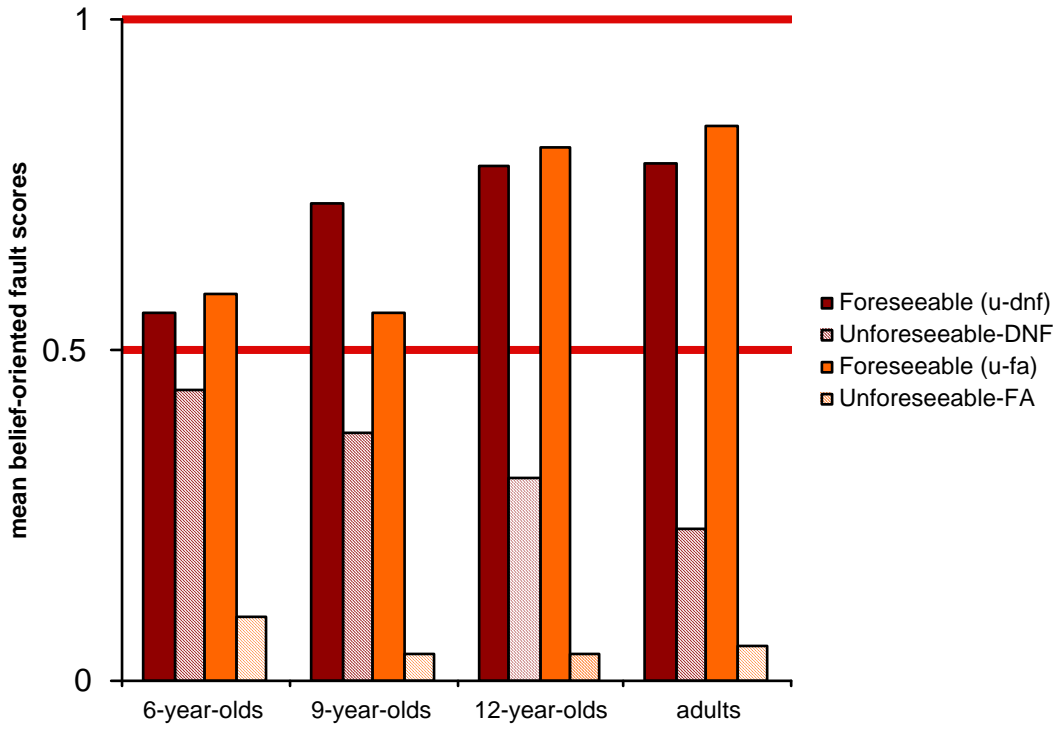


Figure 2. Mean number of claims that protagonist was at fault for his/her false belief (line at .5 represents number of claims that would be expected by chance.)

Table 9. *Belief-oriented Fault Scores for the Foreseeable vs. Unforeseeable-Does Not Follow Advice Story Themes by Sub-order Group, Type of Outcome, and Age Group.*

	<i>Type of Outcome</i>	
	<i>Foreseeable</i>	<i>Unforeseeable-Does Not Follow Advice</i>
<i>Sub-orders A &amp; C (Facilitative)</i>		
6-year-olds (n = 24)	.542 (.509)	.417 (.408)
9-year-olds (n = 24)	.833 (.381)*	.354 (.403)
12-year-olds (n = 24)	.833 (.381)*	.208 (.292)*
adults (n = 25)	.920 (.277)*	.160 (.238)*
<i>Sub-order B (Non-Facilitative)</i>		
6-year-olds (n = 12)	.583 (.515)	.500 (.477)
9-year-olds (n = 12)	.500 (.522)	.417 (.417)
12-year-olds (n = 12)	.667 (.492)	.500 (.369)
adults (n = 12)	.500 (.522)	.375 (.311)

Note: results marked with an asterisk are significantly different from the mean score, .5, that would be expected by chance,  $p < .001$ , two-tailed.

Table 10. *Belief-oriented Fault Scores for the Foreseeable vs. Unforeseeable Follows Advice Story Themes by Sub-order Group, Type of Outcome, and Age Group.*

	<i>Type of Outcome</i>	
	<i>Foreseeable</i>	<i>Unforeseeable- Follows Advice</i>
<i>Sub-orders A &amp; C (Facilitative)</i>		
6-year-olds (n = 24)	.625 (.495)	.083 (.190)**
9-year-olds (n = 24)	.667 (.482)	.021 (.102)**
12-year-olds (n = 24)	.833 (.381)**	.021 (.102)**
adults (n = 25)	.840 (.374)**	.060 (.166)**
<i>Sub-order B (Non-Facilitative)</i>		
6-year-olds (n = 12)	.500 (.522)	.125 (.226)**
9-year-olds (n = 12)	.333 (.492)	.083 (.289)**
12-year-olds (n = 12)	.750 (.452)	.083 (.289)**
adults (n = 12)	.833 (.389)*	.042 (.144)**

Note: results marked with asterisk(s) are significantly different from the mean score, .5, that would be expected by chance, \*  $p < .05$ ; \*\* $p < .001$ , two-tailed.

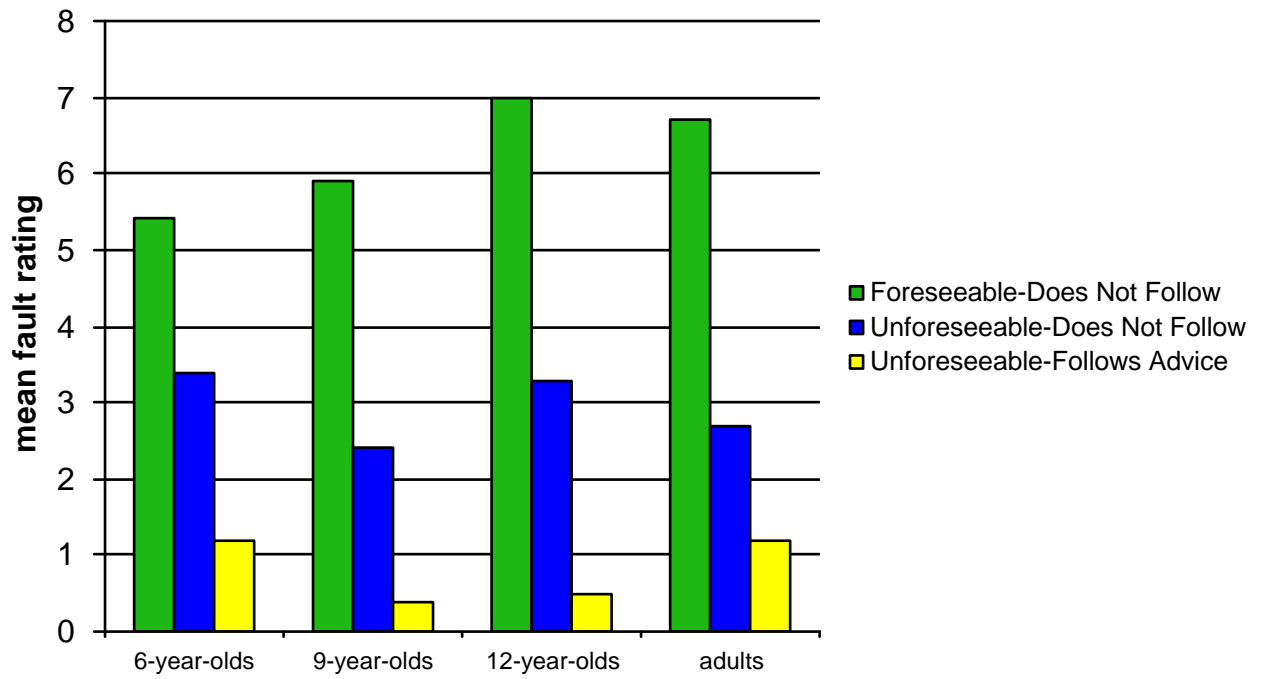


Figure 3. Outcome-oriented fault ratings (mean out of 8) by age group and type of story.



Table 11. *Number (and Percent) of Participants from each Age and Sub-Order Group in each Belief-Oriented Fault Group.*

	<i>Age Group</i>			
	<i>6 years</i>	<i>9 years</i>	<i>12 years</i>	<i>adults</i>
<i>Blame Foreseeable Only</i>				
Sub-orders A & C	3 (12.5)	5 (21)	10 (42)	13 (52)
Sub-order B	0	0	0	0
<i>Blame Foreseeable &amp; U-DNF</i>				
Sub-orders A & C	5 (21)	10 (42)	8 (33)	4 (16)
Sub-order B	3 (25)	3 (25)	5 (42)	4 (33)
<i>Blame All Types</i>				
Sub-orders A & C	16 (67)	9 (37.5)	6 (25)	8 (32)
Sub-order B	9 (75)	9 (75)	7 (58)	8 (67)

Note: The percentage of participants who would be expected to show the Blame Foreseeable Only pattern of responses by chance is 1.6.

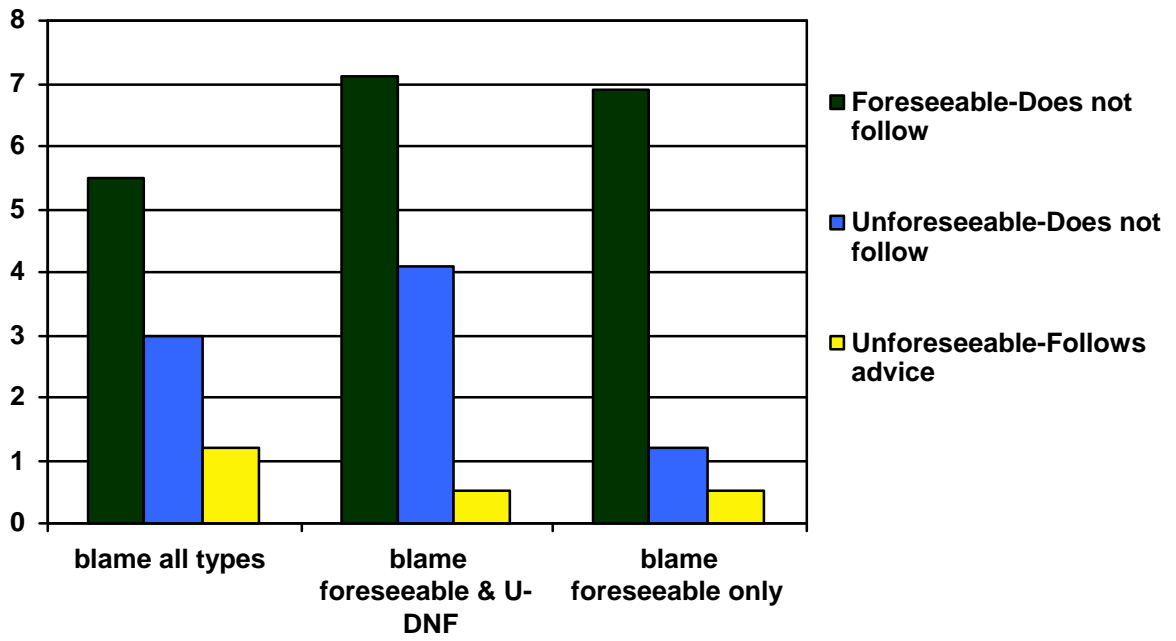


Figure 4. Outcome-oriented fault ratings (means out of 8) by belief-oriented fault group and type of story.

Table 12. *Outcome-oriented Fault Differentiation Scores by Belief-oriented Fault Group.*

	<i>Type of Differentiation</i>	
	<i>Easy</i>	<i>Difficult</i>
<i>Blame Foreseeable Only</i> (n = 31)	6.4 (1.6)	5.7 (1.6)
<i>Blame Foreseeable &amp; U-DNF</i> (n = 42)	6.6 (1.5)	3.0 (2.4)
<i>Blame All Types</i> (n = 72)	4.3 (2.5)	2.5 (2.5)

Notes: The potential range of each differentiation score is -8 to 8. All scores are significantly different from zero,  $p < .001$ .

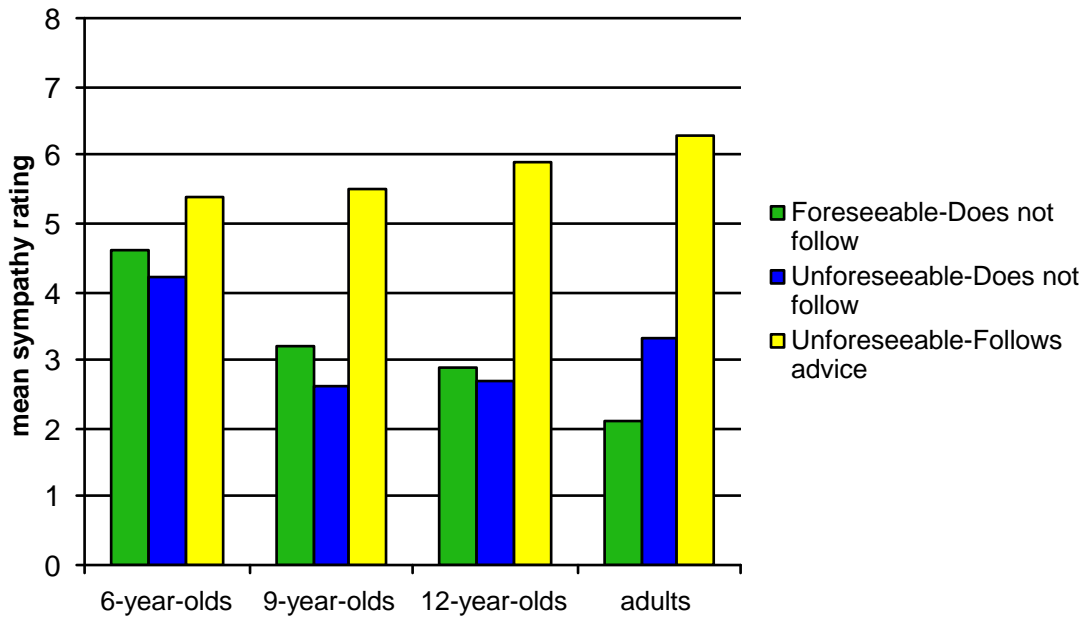


Figure 5. Sympathy ratings (means out of 8) by age group and type of story.

## APPENDIX A

### Stories and Questions Heard by 5- to 12-year-olds

I. *Cassie, Jim* and *Karen* stories are presented with Experiment 1 questions.

#### *Cassie (foreseeable)*

Here's Cassie. Cassie is going away to camp for two weeks. Cassie's mom says, "Here is ten dollars. You can use this money to buy anything you want at camp."

Now Cassie is at camp. Her camp counselor says, "Look, here is a t-shirt you can buy. It has a picture of you and all your friends on it. If you want one, please give me \$10.00 today, so I can order one for you."

Now, Cassie really wants a t-shirt. But she doesn't want to give the counselor her money right away. Cassie asks if she can give her money later. But the counselor says "It's important that you give me the money today. We sometimes have some extra t-shirts, but if you don't pay today I can't promise that you'll get one."

*Comprehension Question:* What did the counselor say kids should do if they want to get a t-shirt? (If no answer to open-ended question: Did she say they should give their money right away or that they could wait and give it later?)

*Inference Question:* What do you think Cassie should do? (If no answer to open-ended question: Should she give her money right away or should she wait and give it late

So, Cassie really wants a t-shirt. But she wants to keep her money too. She thinks, "I do want a t-shirt. But I don't want to give away all my money today. The counselor says that kids sometimes get t-shirts even if they don't pay right away. I'll

just keep my money until the t-shirts arrive and give it to her then.” So Cassie waits until the t-shirts arrive to take her money to the counselor.

*Memory Check:* Did Cassie do what the counselor said she should do to get a t-shirt?

*Feedback:* That’s right/Actually, she did not do what the counselor said she should do.

Cassie waits until the t-shirts arrive to take her money to the counselor. But there are only enough t-shirts for the kids who paid for them right away. Cassie has to go home without a t-shirt.

*Fault Question:* How much was it Cassie’s fault that she didn’t get the t-shirt?

*Sympathy Question:* How much do you feel sorry for Cassie because she didn’t get a t-shirt?

*Cassie (unforeseeable)*

Here’s Cassie. Cassie is going away to camp for two weeks. Cassie’s mom says, “Here is ten dollars. You can use this money to buy anything you want at camp.”

Now Cassie is at camp. Her camp counselor says, “Look, here is a t-shirt you can buy. It has a picture of you and all your friends on it. If you want one, please give me \$10.00 today, so I can order one for you.”

Now, Cassie really wants a t-shirt. But she doesn’t want to give the counselor her money right away. So, Cassie asks if she can give her money later. But the counselor says “It’s important that you give me the money today. We sometimes have some extra t-shirts, but if you don’t pay today I can’t promise that you’ll get one.”

*Comprehension Question:* What did the counselor say kids should do if they want to get a t-shirt? (If no answer to open-ended question: Did she say they should give their money right away or that they could wait and give it later?)

*Inference Question:* What do you think Cassie should do? (If no answer to open-ended question: Should she give her money right away or should she wait and give it later?)

So, Cassie really wants a t-shirt. But she wants to keep her money too. She thinks, “I really do want a t-shirt. The counselor says that I have to give her the money today or there won’t be enough shirts for me to have one. I’ll give her the money right now!” So Cassie gives her counselor the money for the t-shirt.

*Memory Check:* Did Cassie do what the counselor said she should do to get a t-shirt?

*Feedback:* That’s right/Actually, she did do what the counselor said she should do.

But when the t-shirts arrive, there aren’t enough for all the kids who paid for them. Cassie gets her money back, but she has to go home without a t-shirt.

*Fault Question:* How much was it Cassie’s fault that she didn’t get the t-shirt?

*Sympathy Question:* How much do you feel sorry for Cassie because she didn’t get a t-shirt?

### *Jim (foreseeable)*

Here’s Jim. Jim is really good at tumbling. He loves to do somersaults and cartwheels. But he doesn’t like to practice to learn how to do new kinds of tumbling moves. One day Jim’s teacher tells him about a club for kids who are really good at tumbling. In the club kids learn lots of new kinds of tumbling. They also get to meet kids from other schools, and go to tumbling contests.

But only the very best kids can join the club. Jim's teacher shows him three new kinds of tumbling moves to do for the judges. She says that kids who don't know how to do these moves usually don't get picked to be in the club.

*Comprehension Question:* What did Jim's teacher say he should do if he wanted to get picked for the club? (If no response to the open-ended question: Did she say he should learn to do the new moves or just keep doing the ones he already knew how to do?)

*Inference Question:* What do you think Jim should do? (If no response to open-ended question: do you think he should learn to do the new moves or just keep doing the ones he already knew how to do?)

Jim really wants to be picked for the club. But the new moves are hard to do. He thinks, "These new moves are hard for me to learn. But I'm really good at somersaults and cartwheels. I'll do somersaults and cartwheels instead. Then I'll be picked to join the club!" So Jim just keeps doing somersaults and cartwheels instead of learning the new moves.

*Memory Check:* Did Jim do what his teacher said he should do?

*Feedback:* That's right/Actually, Jim did not do what his teacher said he should do.

Let's see what happened next. Jim does a somersault and a cartwheel for the judges. But another kid learned to do the new moves, and does them really well. Jim doesn't get picked to join the club.

*Fault Question:* How much was it his fault that he didn't get picked?

*Sympathy Question:* How much do you feel sorry for him because he didn't get picked?



*Jim (unforeseeable)*

Here's Jim. Jim is really good at tumbling. He loves to do somersaults and cartwheels. He practices tumbling everyday so that he will get even better at it.

One day Jim's teacher tells him about a club for kids who are really good at tumbling. In the club kids learn lots of new kinds of tumbling. They also get to meet kids from other schools, and go to tumbling contests.

But only the very best kids can join the club. Jim's teacher shows him three new kinds of tumbling moves to do for the judges. She says that kids who can do these moves usually get picked to be in the club.

*Comprehension Question:* What did Jim's teacher say he should do if he wanted to get picked for the team? (If no response to the open-ended question: Did she say he should learn to do the new moves or just keep doing the ones he already knows?)

*Inference Question:* What do you think Jim should do? (If no response to the open-ended question: Should he learn to do the new moves or just keep doing the ones he already knows?)

Jim really wants to be picked for the club. But the new moves are hard to do. He thinks, "These new moves are hard for me to learn. But somersaults were hard when I first tried to do them. I'll just keep practicing so that I can do these moves. Then I'll be picked to join the club!" So Jim practices really hard until he can do all the new moves.

*Memory Check:* Did Jim do what his teacher said he should do?

*Feedback:* That's right/Actually, Jim did do what his teacher said he should do.

So Jim practices really hard until he can do all the new moves perfectly. On the day of the tryouts Jim does all three of the new moves for the judges. But the judges ask him to do some other moves that he has never seen before. Jim can't do these moves and he doesn't get picked to join the club.

*Fault Question:* How much was it Jim's fault that he didn't get picked?

*Sympathy Question:* How much do you feel sorry for Jim because he didn't get picked?

*Karen (foreseeable)*

Here's Karen. Karen loves to play outdoors in all sorts of weather. But her mother always makes her stay inside when it is raining. Karen thinks it would be fun to play outside in the rain. She thinks it would feel good to get all wet, just like it does when she goes swimming.

One day it starts to rain just as Karen has to leave to go to school. Karen is very happy. She thinks, "Now's my chance to go outside in the rain! I can walk to school in the rain and then I'll be all nice and wet. It will feel like I am swimming." But Karen's sister says, "Karen, go get your raincoat and your boots. If you go outside without them you'll get all wet, and then you'll be cold and uncomfortable all day at school."

*Comprehension Question:* What did Karen's sister say Karen should do? (If no answer to open-ended question: Did she say that Karen should wear her raincoat and boots or that she didn't have to wear them?)

*Inference Question:* What do you think Karen should do? (If no answer to open-ended question: Should Karen wear her raincoat and boots or not wear them?)

So, Karen's sister says that Karen should wear her raincoat and boots so she won't be cold and uncomfortable when she gets to school. But Karen thinks, "I know my sister says I'll be cold and uncomfortable if I don't wear my raincoat and boots, but I think it will be really fun to get wet on the way to school. I bet I won't be uncomfortable at all, no matter how wet I get. I'm not going to wear my raincoat and boots after all." So Karen doesn't put on her raincoat or boots.

*Memory Check:* Did Karen do what her sister said she should do so she wouldn't be cold and uncomfortable?

*Feedback:* That's right/Actually, she did not do what her sister said she should do.

So Karen walks to school in the rain without her raincoat or boots. By the time Karen gets to school she is all wet. She has to wear her wet clothes all day long, and she is cold and very uncomfortable.

*Fault Question:* How much was it Karen's fault that she was cold and uncomfortable at school?

*Sympathy Question:* How much do you feel sorry for Karen because she was cold and uncomfortable at school?

*Karen (unforeseeable)*

Here's Karen. Karen loves to play outdoors in all sorts of weather. But her mother always makes her stay inside when it is raining. Karen thinks it would be fun to play outside in the rain. She thinks it would feel good to get all wet, just like it does when she goes swimming.

One day it starts to rain just as Karen has to leave to go to school. Karen is very happy. She thinks, “Now’s my chance to go outside in the rain! I can walk to school in the rain and then I’ll be all nice and wet.” But Karen’s sister says, “Karen, go get your raincoat and your boots. If you go outside without them you’ll get all wet, and then you’ll be cold and uncomfortable all day at school.”

*Comprehension Question:* What did Karen’s sister say Karen should do so she’s not cold and uncomfortable at school? (If no answer to open-ended question: Did she say that Karen should wear her raincoat and boots or that she didn’t have to wear them?)

*Inference Question:* What do you think Karen should do? (If no answer to open-ended question: Should Karen wear her raincoat and boots or not wear them?)

So, Karen’s sister says that Karen should wear her raincoat and boots so she won’t be cold and uncomfortable when she gets to school. But Karen thinks, “I know my sister says I’ll get wet and be uncomfortable if I don’t wear my raincoat and boots, but I think it will be really fun to get wet on the way to school. If I wear my raincoat and boots I won’t be able to get wet. I’m not going to wear my raincoat and boots after all.” So Karen doesn’t put on her raincoat or boots.

*Memory Check:* Did Karen do what her sister said she should do?

*Feedback:* That’s right/Actually, she did not do what her sister said she should do.

So Karen really wants to walk in the rain and get wet. She does not put on her raincoat or boots. But by the time she leaves the house to walk to school, the rain has stopped. Karen does not get wet or find out what it feels like to play in the rain.

*Fault Question:* How much was it Karen’s fault that she did not get to walk in the rain?

*Sympathy Question:* How much do you feel sorry for Karen because she did not get to walk in the rain?

II. *Sandra, Glenn and Peter* stories are presented with Experiment 2 questions.

*Sandra (foreseeable)*

Here's Sandra. Sandra loves to read. She always goes to the book fair at her school so she can buy new books. She saves her allowance for a long time so she can buy new books at the book fair.

The day before the book fair, Sandra gets a list of all the books that will be sold there. There is one book that she wants a lot, and she has just the right amount of money to buy it. The next day Sandra goes to the book fair. Sandra sees her teacher selling raffle tickets. Sandra's teacher tells Sandra that the person who buys the winning raffle ticket will win a special surprise. But the raffle tickets cost a lot of money. Sandra's teacher says, "If you buy a raffle ticket, you won't have enough money left to buy any books. You should use your money to buy a book instead of buying a raffle ticket."

*Comprehension Question:* What did Sandra's teacher say Sandra should do? (If no answer to open-ended question: Did she say Sandra should buy a raffle ticket or that she should save her money for the book?)

Sandra really wants to buy the book, but she wants to win the special surprise too. She thinks, "I know my teacher says that if I buy a raffle ticket I won't be able to buy a book. But maybe the book won't cost as much as it says in the catalog. I bet I really do have enough money to buy both a raffle ticket and the book."

*Inference Question:* So Sandra thinks she will have enough money to buy both the raffle ticket and the book. What do you think? Is Sandra right about that or is she wrong about that? Why do you think that she is right/wrong?

So Sandra buys a raffle ticket. But when she gets to the stand where they are selling the book she wants, she doesn't have enough money to pay for it. Just then they announce the name of the person with the winning raffle ticket and Sandra doesn't win. She doesn't get either the book or the special surprise.

*Memory Check 1:* Did Sandra do what her teacher said she should do?

*Feedback:* That's right/Actually, she did not do what her teacher said she should do.

*Memory Check 2:* Did things work out the way that Sandra thought that they were going to?

*Feedback:* That's right/Actually, things did not work out the way that Sandra thought they were going to.

*Belief-oriented Fault Question:* So Sandra thought that she would have enough money for both the raffle ticket and the book, but she was wrong. Was it Sandra's fault that she *thought* the wrong thing? Why was/wasn't that Sandra's fault?

*Outcome-oriented Fault Question:* How much was it Sandra's fault that she didn't get the book she wanted? Why was it (that much) her fault?

*Sympathy Question:* How much do you feel sorry for Sandra because she didn't get the book she wanted? Why do you feel (that much) sorry for her?

*Sandra (unforeseeable)*

Here's Sandra. Sandra loves to read. She always goes to the book fair at her school so she can buy new books. She saves her allowance for a long time so she can buy new books at the book fair.

The day before the book fair, Sandra gets a list of all the books that will be sold there. All the books listed are books she has already read. The next day Sandra goes to the book fair. At the book fair Sandra sees her teacher selling raffle tickets. Sandra's teacher says that the person who buys the winning raffle ticket will win a special surprise. But the raffle tickets cost a lot of money. Sandra's teacher says, "If you buy a raffle ticket, you won't have enough money left to buy any books. You should use your money to buy a book instead of buying a raffle ticket."

*Comprehension Question:* What did Sandra's teacher say Sandra should do? (If no answer to open-ended question: Did she say Sandra should buy a raffle ticket or that she should not buy one?)

Sandra thinks about the books on the list and she thinks about how much fun it would be to win a special surprise. She thinks, "I've already read all the book they are selling and I don't really want to buy any of them. I bet I would like the special surprise a lot more than I would like these books."

*Inference Question:* Sandra thinks that she'd like the special surprise more than she'd like a book. What do you think? Is she right about that or is she wrong about that? Why do you think that she is right/wrong?

So Sandra gives the teacher her money for the raffle ticket instead of buying a book at the book fair. When they call the name of the person with the winning raffle ticket it is Sandra! But it turns out the special surprise is one of the books that she has already read. Most of her money is gone and all she has is book that she doesn't want.

*Memory Check 1:* Did Sandra do what her teacher said she should do?

*Feedback:* That's right/Actually, she did not do what her teacher said she should do.

*Memory Check 2:* Did things work out the way that Sandra thought that they were going to?

*Feedback:* That's right/Actually, things did not work out the way that Sandra thought they were going to.

*Belief-only Fault Question:* So Sandra thought she would like the special surprise more than any of the books at the book fair, but she was wrong. Was it Sandra's fault that she *thought* the wrong thing? Why was/wasn't that Sandra's fault?

*Outcome-oriented Fault Question:* How much was it Sandra's fault that she got a book she didn't want? Why was it (that much) her fault?

*Sympathy Question:* How much do you feel sorry for Sandra because she got a book she didn't want? Why do you feel (that much) sorry for her?

*Glenn (foreseeable)*

Here's Glenn. Glenn has a scooter that he is really proud of. It is Glenn's favorite toy. When Glenn first got the scooter, the saleswoman said, "This is the best scooter we sell. If you take care of it, it will last a really long time. It is important that you always bring it inside and wipe the dirt off the wheels after each time you ride it."



Glenn loves to ride his scooter, but he doesn't always like to do the work to take care of it. One day Glenn rides his scooter through the woods and it gets really dirty. When he gets home, Glenn is very tired. He wants to just go inside and rest and leave the dirty scooter outside.

*Comprehension Question:* What did the saleswoman say Glenn should do? (If no answer to open-ended question: Did she say he should take it inside and wipe the dirt off the wheels as soon as he was finished riding it or that he could leave it outside and not wipe off the wheels?)

Well, Glenn really likes his scooter and he wants it to last for a long time. But he is tired and he really wants to rest, too. Glenn thinks, "I know the saleswoman said I should bring the scooter inside and clean the mud off its wheels every time I ride it. But I'm too tired to do that right now. I think it will be OK if I just leave the scooter outside for a little while. I'm sure nothing bad will happen if I just leave it outside and dirty this one time."

*Inference Question:* So Glenn thinks that nothing bad will happen to the scooter if he leaves it outside and doesn't clean off its wheels. What do you think? Is he wrong about that or is he right about that? Why do you think he is wrong/right about that?

So Glenn leaves his scooter outside and doesn't wipe off the wheels. He forgets all about the scooter and leaves it outside for a week. The next time Glenn wants to ride the scooter, there is all kinds of dirt stuck to the wheels. Even after he cleans the dirt off the wheels don't turn very well. The scooter is ruined.

*Memory Check 1:* Did Glenn do what the saleswoman said he should do?

*Feedback:* That's right/Actually, he did not do what the saleswoman said he should do.

*Memory Check 2:* Did things turn out the way Glenn thought they were going to?

*Feedback:* That's right/Actually, things did not turn out the way that Glenn thought they were going to.

*Belief-oriented Fault Question:* So Glenn thought that nothing bad would happen to his scooter, but he was wrong. Was it Glenn's fault that he *thought* the wrong thing? Why was/wasn't that his fault?

*Outcome-oriented Fault Question:* How much was it Glenn's fault that his scooter was ruined? Why was it (that much) his fault?

*Sympathy Question:* How much do you feel sorry for Glenn because his scooter was ruined? Why do you feel (that much) sorry for him?

*Glenn (unforeseeable)*

Here's Glenn. Glenn has a scooter that he is really proud of. It is Glenn's favorite toy. When Glenn first got the scooter, the saleswoman said, "This is the best scooter we sell. If you take care of it, it will last a really long time. It is important that you always bring it inside and wipe the dirt off the wheels after each time you ride it."

Glenn loves to ride his scooter, and he always tries to take very good care of it. One day Glenn rides his scooter through the woods and it gets really dirty. When he gets home, Glenn is very tired. He wants to just go inside and rest and leave the dirty scooter outside.

*Comprehension Question:* What did the saleswoman say Glenn should do? (If no answer to open-ended question: Did she say he should take it inside and wipe the dirt

off the wheels as soon as he was finished riding it or that he could leave it outside and not wipe off the wheels?)

Well, Glenn thinks, “I’m really tired and I don’t want to take care of the scooter right now. But the saleswoman said that if I do take care of my scooter it will last a really long time. I think that I should clean off the wheels now and take the scooter inside so that it will last a long time.”

*Inference Question:* So Glenn thinks that if he cleans off the wheels and takes it inside, his scooter will last a long time. What do you think? Is he wrong about that or is he right about that? Why do you think he is wrong/right about that?

OK. Let’s see what happens next. So Glenn takes his scooter inside and wipes off its wheels. He puts it in a safe place in his bedroom until he gets a chance to play with it again. But the next time Glenn tries to ride the scooter the wheels won’t turn properly. The scooter is ruined.

*Memory Check 1:* Did Glenn do what the saleswoman said he should do?

*Feedback:* That’s right/Actually, he did do what the saleswoman said he should do.

*Memory Check 2:* Did things turn out the way Glenn thought they were going to?

*Feedback:* That’s right/Actually, things did not turn out the way that Glenn thought they were going to.

*Belief-oriented Fault Question:* So Glenn thought that his scooter would last a long time, but he was wrong. Was it Glenn’s fault that he *thought* the wrong thing? Why was/wasn’t that his fault?

*Outcome-oriented Fault Question:* How much was it Glenn's fault that his scooter was ruined? Why was it (that much) his fault?

*Sympathy Test Question:* How much do you feel sorry for Glenn because his scooter was ruined? Why do you feel (that much) sorry for him?

*Peter (Foreseeable)*

Here's Peter. Peter has a robotic dog named Skippy. Skippy can wag his tail just like a real dog, and he has eyes that change colors to show whether he is happy or sad. Skippy's eyes are red when he is happy and blue when he is sad. Peter has taught Skippy to do lots of things, but his favorite game is to play catch with Skippy. Peter throws a special ball for Skippy, and Skippy chases it and brings it back to him. Skippy's eyes turn red whenever Peter throws the special ball.

One day Peter sees a report on TV about a problem with robotic dogs like Skippy. The reporter says, "This is a very serious problem. If your robotic dog won't play catch or do tricks, send it back to the factory right away. The factory can put in a new battery that will fix the problem. Your robotic dog will be as good as new. But if you don't send it back right away the factory won't be able to fix the problem. Your robotic dog will be ruined."

The next morning Peter throws the special ball for Skippy, but Skippy won't chase it. Skippy's eyes turn blue and Peter can't get Skippy to do any tricks.

*Comprehension Question:* What did the reporter say you should do if your robotic dog won't play catch or do tricks? (If no response to open-ended question: Did he say you should send it back to the factory or that you didn't need to send it back to the factory?)

Well, Peter remembers what the man on TV said. He is worried that Skippy needs to go back to the factory. But he was planning to take Skippy to school the next day and he doesn't want to send Skippy to the factory. He thinks, "Maybe Skippy doesn't really have to go back to the factory. Maybe Skippy is really just in a bad mood. I bet when I come home from school his eyes will be red just like always. Then he will be OK."

*Inference Question:* So Peter thinks that Skippy doesn't need to go back to the factory for a new battery. What do you think? Is he right about that or is he wrong about that? Why do you think he is right/wrong?

Peter goes off to school and doesn't tell his mom that Skippy needs to go back to the factory. Skippy doesn't get the new battery. When Peter comes home from school Skippy's eyes don't light up at all, and it is too late to send him back to the factory. Skippy is ruined.

*Memory Check 1:* Did Peter do what the reporter said to do?

*Feedback:* That's right/Actually, Peter did not do what the reporter said to do.

*Memory Check 2:* Did things turn out the way that Peter thought they were going to?

*Feedback:* That's right/Actually, things did not turn out the way that Peter thought they were going to.

*Belief-oriented Fault Question:* So Peter thought Skippy didn't need to get a new battery, but he was wrong. Was it Peter's fault that he *thought* the wrong thing? Why was/wasn't that his fault?

*Outcome-oriented Fault Question:* How much was it Peter's fault that Skippy was ruined? Why was it (that much) his fault?

*Sympathy Question:* How much do you feel sorry for Peter because Skippy was ruined? Why do you feel (that much) sorry for him?

*Peter (unforeseeable)*

Here's Peter. Peter has a robotic dog named Skippy. Skippy can wag his tail just like a real dog, and he has eyes that change colors to show whether he is happy or sad. Skippy's eyes are red when he is happy and blue when he is sad. Peter has taught Skippy to do lots of things, but his favorite game is to play catch with Skippy. Peter throws a special ball for Skippy, and Skippy chases it and brings it back to him. Skippy's eyes turn red whenever Peter throws the special ball.

One day Peter sees a report on TV about a problem with robotic dogs like Skippy. The reporter says, "This is a very serious problem. If your robotic dog won't play catch or do tricks, send it back to the factory right away. The factory can put in a new battery that will fix the problem. Your robotic dog will be as good as new. But if you don't send it back right away the factory won't be able to fix the problem. Your robotic dog will be ruined."

The next morning Peter throws the special ball for Skippy, but Skippy won't chase it. Skippy's eyes turn blue and Peter can't get Skippy to do any tricks.

*Comprehension Question:* What did the reporter say you should do if your robotic dog won't play catch or do tricks? (If no response to open-ended question: Did he say you should send it back to the factory or that you didn't need to send it back to the factory?)

Well, Peter remembers what the man on TV said. He thinks that Skippy will be ruined if he doesn't send him back to the factory right away. But then he remembers that his friend has a new robotic dog that can do a lot more things than Skippy can. He thinks, "Maybe I can get a new robotic dog that will be even better than Skippy. That's what I really want! I'll use my birthday money to buy a new robotic dog"

*Inference Question:* So Peter thinks that he will get a new robotic dog if he uses his birthday money. What do you think? Is he right about that or is he wrong about that? Why do you think he is right/wrong?

So Peter tells his mother about the problem with Skippy. He gives her his money and asks her to send for a new robotic dog. The next week a big box from the robotic dog factory comes in the mail. Peter thinks it is his new robotic dog, and he is very excited. But when he opens the box it is just Skippy with a new battery. Peter doesn't get a new dog after all.

*Memory Check 1:* Did Peter do what the reporter said to do?

*Feedback:* That's right/Actually, Peter did not do what the reporter said to do.

*Memory Check 2:* Did things turn out the way that Peter thought they were going to?

*Feedback:* That's right/Actually, things did not turn out the way that Peter thought they were going to.

*Belief-oriented Fault Question:* So Peter thought he was going to get a new robotic dog, but he was wrong. Was it Peter's fault that he *thought* the wrong thing? Why was/wasn't that his fault?

*Outcome-oriented Fault Question:* How much was it Peter's fault that he didn't get a new robotic dog? Why was it (that much) his fault?

*Sympathy Question:* How much do you feel sorry for Peter because he didn't get a new robotic dog? Why do you feel (that much) sorry for him?



## APPENDIX B

### Stories and Questions Presented to Adults

I. *Cassie, Jim and Karen* stories are presented with Experiment 1 questions.

#### *Cassie (foreseeable)*

Cassie is at a special summer research program. It is a great honor to be selected for the program, and Cassie is the only student from her university who is participating. Students cannot have outside jobs while they are attending the program, so Cassie's mother gave her a small amount of spending money for the summer.

During the first week of the program, the students posed for a group photo. The director told students that they could order a copy of the photo as a memento of their summer. But the photos had to be ordered by the end of the second week, and had to be paid for in advance.

Cassie is really proud of being part of the program, and she wants to order a photo. But she doesn't want to spend so much of her money so early in the summer. So Cassie asks if she can give her money later. But the director says, "It's important that you pay in advance. The photographer sometimes sends some extra copies, but if you don't order and pay in advance I can't guarantee that you will get a photo."

*Comprehension Question:* What did the director say students should do in order to get a copy of the photo?

*Inference Question:* What do you think Cassie should do?

So, Cassie really wants a copy of the photo. But she wants to hold onto her spending money too. She thinks, "I do want a photo. But I don't want to spend so much

of my money right now. The director says that it's sometimes possible to buy a photo at the end of the summer. I'll hold onto my money for now, and buy the photo later."

Cassie does not order or pay for the photo in advance.

*Memory Check:* Did Cassie do what the director said she should do?

*Feedback:* No, she did not do what the director said she should do.

*Fault Question:* How much was it Cassie's fault that she didn't get a copy of the photo?

Why was it (that much) Cassie's fault?

*Sympathy Question:* How much do you feel sorry for Cassie because she didn't get a copy of the photo? Why do you feel (that much) sorry for her?

*Cassie (unforeseeable)*

Cassie is at a special summer research program. It is a great honor to be selected for the program, and Cassie is the only student from her university who is participating. Students cannot have outside jobs while they are attending the program, so Cassie's mother gave her a small amount of spending money for the summer.

During the first week of the program, the students posed for a group photo. The director told students that they could order a copy of the photo as a memento of their summer. But the photos had to be ordered by the end of the second week, and had to be paid for in advance.

Cassie is really proud of being part of the program, and she wants to order a photo. But she doesn't want to spend so much of her money so early in the summer. So Cassie asks if she can give her money later. But the director says, "It's important that

you pay in advance. The photographer sometimes sends some extra copies, but if you don't order and pay in advance, I can't guarantee that you will get a photo."

*Comprehension Question:* What did the director say students should do in order to get a copy of the photo?

*Inference Question:* What do you think that Cassie should do so that she'll get a copy of the photo?

Cassie really wants a copy of the photo. But she wants to hold onto her spending money, too. She thinks, "I do want a photo. But I don't want to spend so much of my money right now. The director says that if I don't order and pay for the photo now, I probably won't be able to get one. I'll order and pay for the photo right now."

So Cassie orders the photo and gives the director her money for it.

*Memory Check:* Did Cassie do what the director said she should do?

*Feedback:* Yes, she did what the director said she should do.

But when the photos arrive, there are not enough copies for all the students who ordered them. Cassie is given a refund instead of a photo. She has to go home without a photo.

*Fault Question:* How much was it Cassie's fault that she didn't get a copy of the photo?

*Sympathy Question:* How much do you feel sorry for Cassie because she didn't get a copy of the photo?

*Jim (foreseeable)*

Jim is a really good gymnast. He has been taking gymnastics lessons and competing since he was a kid. But Jim doesn't like to practice to learn new gymnastic programs. He likes to keep doing the same things that he is confident he can do well.

When Jim came to the university, he talked to the gymnastics coach about joining the team and competing for a gymnastics scholarship. The university gymnastics team is very competitive. The team competes against other university teams, but members also have opportunities to compete individually at the national and world level.

But only the very best gymnastic team members are offered scholarships. The coach tells Jim that scholarship decisions for first year members are based on results of the first team competition. The coach shows him a challenging new program that will be required at the competition. He says that team members who do not excel in this program usually get low scores at the competition and are not offered scholarships.

*Comprehension Question:* What did the coach say that first year team members must do in order to be offered scholarships?

*Inference Question:* What do you think Jim should do so that he will win a scholarship?

Jim needs to win a scholarship so he can afford to be on the gymnastics team. But the new program is very hard for him to learn. He thinks, "This program is really difficult for me to learn. But I already know how do a very challenging program that should be worth at least as many points as this one. I'll practice that program until I can do it perfectly. Then I'm certain to do well at the competition and win a scholarship!"

So Jim practices the program he already knows instead of learning the new one. On the day of the competition Jim performs the old program perfectly. But another first year gymnast performed the new program just as well as Jim performed the old one, and this gymnast wins the competition. Jim earns a very low score and he does not win a scholarship.

*Memory Check:* Did Jim do what the coach said he should do?

*Feedback:* No, Jim did not do what the coach said he should do.

*Fault Question:* How much was it Jim's fault that he didn't earn a scholarship?

*Sympathy Question:* How much do you feel sorry for Jim because he didn't earn a scholarship?

*Jim (unforeseeable)*

Jim is a really good gymnast. He has been taking gymnastics lessons and competing since he was a kid. He is very disciplined and practices everyday to keep improving as a gymnast.

When Jim came to the university, he talked to the gymnastics coach about joining the team and competing for a gymnastics scholarship. The university gymnastics team is very competitive. The team competes against other university teams, but members also have opportunities to compete individually at the national and world level.

But only the very best gymnastic team members are offered scholarships. The coach tells Jim that scholarship decisions for first year members are based on results of the first team competition. The coach shows him a challenging new program

that will be required at the competition. He says that team members who excel in this program will most likely do well at the competition and be offered scholarships.

*Comprehension Question:* What did the coach say that first year team members must do in order to be offered scholarships?

*Inference Question:* What do you think Jim should do so that he will win a scholarship?

Jim needs to win a scholarship so he can afford to be on the gymnastics team. But the new program is very hard for him to learn. He thinks, “This program is really difficult for me to learn. But I’ve learned to do other challenging programs in the past. I’ll just keep practicing until I can do this program. Then I’m certain to do well at the competition and win a scholarship!”

So Jim practices until he can do the new program perfectly. On the day of the competition Jim performs the new program without making any mistakes. But the judges ask him to do an additional program that he hasn’t practiced. Jim does not do well on the additional program and he does not win a scholarship.

*Memory Check:* Did Jim do what the coach said he should do?

*Feedback:* Yes, Jim did what the coach said he should do.

*Fault Question:* How much was it Jim’s fault that he didn’t earn a scholarship?

*Sympathy Question:* How much do you feel sorry for Jim because he didn’t earn a scholarship?

*Karen (foreseeable)*

Karen loves to do things outdoors. She thinks it’s boring to spend a lot of time indoors. But Karen grew up in a desert community where she never had a chance to go

outside in the rain. Karen has always thought that it would feel good to walk in the rain. She imagines that getting wet in the rain would feel good, just like getting wet while swimming feels good.

One day it starts to rain just as Karen has to leave to walk to class. Karen is very happy. She thinks, “Now’s my chance to go outside in the rain! I can walk to class in the rain and then I’ll be all nice and wet. It will feel like I am swimming.” But Karen’s roommate says, “Karen, you can borrow my umbrella and rain jacket. If you go outside without them, you’ll get all wet, and then you’ll be cold and uncomfortable in your classes all day.”

*Comprehension Question:* What did Karen’s roommate say she should do?

*Inference Question:* What do you think Karen should do?

So, Karen’s roommate says that Karen should borrow her umbrella and rain jacket so she won’t be cold and uncomfortable all day. But Karen thinks, “I know my roommate says I’ll be cold and uncomfortable if I don’t wear her rain jacket and use her umbrella, but I think it will be really fun to get wet while walking to class. I bet I won’t be uncomfortable at all, no matter how wet I get. I’m not going to wear her rain jacket or use her umbrella.” So Karen doesn’t wear the rain jacket or take the umbrella.

*Memory Check:* Did Karen do what her roommate said she should do?

*Feedback:* No, she did not do what her roommate said she should do.

Karen walks to class in the rain without anything to keep her dry. By the time Karen gets to class she is all wet. She has to wear her wet clothes through all her classes, and she is cold and very uncomfortable.

*Fault Question:* How much was it Karen's fault that she was cold and uncomfortable in her classes?

*Sympathy Question:* How much do you feel sorry for Karen because she was cold and uncomfortable in her classes?

*Karen (unforeseeable)*

Karen loves to do things outdoors. She thinks it's boring to spend a lot of time indoors. But Karen grew up in a desert community where she never had a chance to go outside in the rain. Karen has always thought that it would feel good to walk in the rain. She imagines that getting wet in the rain would feel good, just like getting wet while swimming feels good.

One day it starts to rain just as Karen has to leave to walk to class. Karen is very happy. She thinks, "Now's my chance to go outside in the rain! I can walk to class in the rain and then I'll be all nice and wet. It will feel like I am swimming." But Karen's roommate says, "Karen, you can borrow my umbrella and rain jacket. If you go outside without them, you'll get all wet, and then you'll be cold and uncomfortable in your classes all day."

*Comprehension Question:* What did Karen's roommate say she should do?

*Inference Question:* What do you think Karen should do?

So, Karen's roommate says that Karen should borrow her umbrella and rain jacket so she won't be cold and uncomfortable all day. But Karen thinks, "I know my roommate says I'll be cold and uncomfortable if I don't wear her rain jacket and use her umbrella, but I think it will be really fun to get wet while walking to class. If I wear her



rain jacket and use her umbrella I won't get wet or find out how it feels to get walk in the rain." So Karen doesn't wear the rain jacket or take the umbrella.

*Memory Check:* Did Karen do what her roommate said she should do?

*Feedback:* No, she did not do what her roommate said she should do.

So Karen really wants to walk in the rain and get wet. She does not borrow her roommate's rain jacket or umbrella. But by the time she leaves the dorm to walk to class, the rain has stopped. Karen does not get wet or find out what it feels like to walk in the rain.

*Fault Question:* How much was it Karen's fault that she did not get to walk in the rain and get wet?

*Sympathy Question:* How much do you feel sorry for Karen because she did not get to walk in the rain and get wet?

II. *Sandra, Glenn and Peter* stories are presented with Experiment 2 questions.

*Sandra (foreseeable)*

Sandra loves to read. She recently joined a discount book club so she can get precisely the books she wants without spending a lot of money. The book club sponsors a book fair every month, and different books are offered on sale each month.

The day before the book fair, Sandra gets a list of all the books that will be on sale there. There is a series of books that she wants a lot, and she has just the right amount of money to buy it as a boxed set. When Sandra gets to the book fair the next day, she sees a friend selling raffle tickets. Sandra's friend says that the person who buys the winning raffle ticket will win a surprise gift package that is worth much more

than the cost of the ticket. Even so, the raffle tickets are expensive. Sandra's friend says, "If you buy a raffle ticket, you won't have enough money left to buy any books. You should use your money to buy that boxed set instead of buying a raffle ticket."

*Comprehension Question:* What did Sandra's friend say that Sandra should do?

Sandra really wants to buy the boxed set, but she wants to win the surprise gift package, too. She thinks, "I know my friend says that if I buy a raffle ticket I won't be able to buy the boxed set. But maybe it's on sale for even less than it said on the list. I bet I really do have enough money to buy both a raffle ticket and the boxed set." So Sandra gives her friend most of her money for the raffle ticket.

*Inference Question:* So Sandra thinks she will have enough money to buy both the raffle ticket and the boxed set. What do you think? Is Sandra right about that or is she wrong about that? Why do you think she's right/wrong about that?

So Sandra buys a raffle ticket. But when she gets to the stand where they are selling the boxed set that she wants, she doesn't have enough money to pay for it. Just then they announce the name of the person with the winning raffle ticket and Sandra doesn't win. She doesn't get either the boxed set or the surprise gift package.

*Memory Check 1:* Did Sandra do what her friend said she should do?

*Feedback:* No, she did not do what her friend said she should do.

*Memory Check 2:* Did things work out the way Sandra thought they were going to?

*Feedback:* No, things did not work out the way Sandra thought they were going to.

*Belief-oriented Fault Question:* So Sandra thought that she would have enough money for both the raffle ticket and the boxed set, but she was wrong. Was it Sandra's fault that she *thought* the wrong thing? Why was/wasn't it her fault?

*Outcome-oriented Fault Question:* How much was it Sandra's fault that she didn't get the boxed set? Why was it (that much) Sandra's fault?

*Sympathy Question:* How much do you feel sorry for Sandra because she didn't get the boxed set? Why do you feel (that much) sorry for her?

*Sandra (unforeseeable)*

Sandra loves to read. She recently joined a discount book club so she can get precisely the books she wants without spending a lot of money. The book club sponsors a book fair every month, and different books are offered on sale each month.

The day before the book fair, Sandra gets a list of all the books that will be on sale there. All the books on the list are books that Sandra has already read. When Sandra gets to the book fair the next day, she sees a friend selling raffle tickets. Sandra's friend says that the person who buys the winning raffle ticket will win a surprise gift package that is worth much more than the cost of the ticket. Even so, the raffle tickets are expensive. Sandra's friend says, "If you buy a raffle ticket, you won't have enough money left to buy any books. You should use your money to buy some of the sale books instead of buying a raffle ticket."

*Comprehension Question:* What did Sandra's friend say that Sandra should do?

Sandra thinks about the books that are listed as on sale, and she thinks about how much fun it would be to win the surprise gift package. She thinks, "I've already

read all the book that are on sale and I don't really want to buy any of them. I bet I would like the surprise gift package a lot more than I would like these books." So Sandra gives her friend most of her money for the raffle ticket.

*Inference Question:* So Sandra thinks she would like the surprise gift package more than she would like any of the books. What do you think? Is Sandra right about that or is she wrong about that? Why do you think she's right/wrong about that?

So Sandra buys a raffle ticket instead of using her money to buy books on sale. When they call the name of the person with the winning raffle ticket, it is Sandra! But it turns out the surprise gift package includes all of the books that were on sale. Most of her money is gone and all she has is boxful of books that she doesn't want.

*Memory Check 1:* Did Sandra do what her friend said she should do?

*Feedback:* No, she did not do what her friend said she should do.

*Memory Check 2:* Did things work out the way Sandra thought they were going to?

*Feedback:* No, things did not work out the way Sandra thought they were going to.

*Belief-oriented Fault Question:* So Sandra thought that she would like the surprise gift package more than she would like any of the books, but she was wrong. Was it Sandra's fault that she *thought* the wrong thing? Why was/wasn't it her fault?

*Outcome-oriented Fault Question:* How much was it Sandra's fault that she got a boxful of books that she didn't want? Why was it (that much) Sandra's fault?

*Sympathy Question:* How much do you feel sorry for Sandra because she got a boxful of books that she didn't want? Why do you feel (that much) sorry for her?

*Glenn (foreseeable)*

Glenn has a scooter that he is really proud of. He bought it to help him get around campus and around town. When Glenn first got the scooter, the saleswoman said, “This is the best scooter we sell. If you take care of it, it will last a really long time. However, it is important that you wipe the dirt off the wheels after each time you ride it, and that you store it inside.”

Glenn loves to ride his scooter, but he doesn’t always like to do the work to take care of it. One day Glenn rides his scooter through a muddy field and it gets really dirty. When he gets home, Glenn is very tired. He wants to just go inside and rest and leave the dirty scooter outside.

*Comprehension Question:* What did the saleswoman say Glenn should do so his scooter would last a long time?

Well, Glenn really likes his scooter and he wants it to last for a long time. But he is tired and he really wants to rest, too. Glenn thinks, “I know the saleswoman said I should bring the scooter inside and clean the mud off its wheels every time I ride it. But I’m too tired to do that right now. I think it will be OK if I just leave the scooter outside for a little while. I’m sure nothing bad will happen if I just leave it outside and dirty this one time.”

*Inference Question:* So Glenn thinks that nothing bad will happen to the scooter if he leaves it outside and doesn’t clean off its wheels. What do you think? Is he wrong about that or is he right about that? Why do you think he’s right/wrong about that?

So Glenn leaves his scooter outside and doesn't wipe off the wheels. He forgets all about the scooter and leaves it outside for a week. The next time Glenn wants to ride the scooter, there is all kinds of dirt stuck to the wheels. Even after he cleans off the dirt, the wheels don't turn very well. The scooter is ruined.

*Memory Check 1:* Did Glenn do what the saleswoman said he should do?

*Feedback:* No, Glenn did not do what the saleswoman said he should do.

*Memory Check 2:* Did things work out the way Glenn thought they were going to?

*Feedback:* No, things did not work out the way he thought they were going to.

*Belief-oriented Fault Question:* So Glenn thought that nothing bad would happen to his scooter, but he was wrong. Was it Glenn's fault that he *thought* the wrong thing? Why was/wasn't it Glenn's fault?

*Outcome-oriented Fault Question:* How much was it Glenn's fault that his scooter was ruined? Why was it (that much) his fault?

*Sympathy Question:* How much do you feel sorry for Glenn because his scooter was ruined? Why do you feel (that much) sorry for him?

*Glenn (unforeseeable)*

Glenn has a scooter that he is really proud of. He bought it to help him get around campus and around town. When Glenn first got the scooter, the saleswoman said, "This is the best scooter we sell. If you take care of it, it will last a really long time. However, it is important that you wipe the dirt off the wheels after each time you ride it, and that you store it inside."

Glenn loves to ride his scooter, and he always tries to take very good care of it. One day Glenn rides his scooter through a muddy field and it gets really dirty. When he gets home, Glenn is very tired. He wants to just go inside and rest and leave the dirty scooter outside.

*Comprehension Question:* What did the saleswoman say Glenn should do so his scooter would last a long time?

Well, Glenn really likes his scooter and he wants it to last for a long time. But he is tired and he really wants to rest, too. Glenn thinks, “I’m really tired and I don’t want to take care of the scooter right now. But the saleswoman said that if I do take care of my scooter it will last a really long time. I think that I should clean off the wheels now and take the scooter inside so that it will last a long time.”

*Inference Question:* So Glenn thinks that if he cleans off the wheels and takes it inside, his scooter will last a long time. What do you think? Is he wrong about that or is he right about that? Why do you think he’s right/wrong about that?

So Glenn carefully cleans off the wheels of the scooter, and he takes the scooter inside. He puts it in a safe place in his bedroom until he wants to ride it again. But the next time Glenn tries to ride the scooter, the wheels won’t turn properly. The scooter is ruined.

*Memory Check 1:* Did Glenn do what the saleswoman said he should do?

*Feedback:* Yes, Glenn did what the saleswoman said he should do.

*Memory Check 2:* Did things work out the way Glenn thought they were going to?

*Feedback:* No, things did not work out the way he thought they were going to.

*Belief-oriented Fault Question:* So Glenn thought that nothing bad would happen to his scooter, but he was wrong. Was it Glenn's fault that he *thought* the wrong thing? Why was/wasn't it Glenn's fault?

*Outcome-oriented Fault Question:* How much was it Glenn's fault that his scooter was ruined? Why was it (that much) his fault?

*Sympathy Question:* How much do you feel sorry for Glenn because his scooter was ruined? Why do you feel (that much) sorry for him?

*Peter (foreseeable)*

Peter has an AIBO (a robotic dog) named Skippy. Skippy can wag his tail just like a real dog, and his eyes change colors to show whether he is happy or sad. Skippy's eyes are red when he is happy and blue when he is sad.

Peter belongs to an Internet AIBO group. Through the group he has learned how to teach Skippy lots of things. The simplest game that Skippy plays is catch. Peter throws a special ball, and Skippy chases it and brings it back to him. Skippy's eyes turn red whenever Peter throws the special ball.

One day Peter gets an e-mail about a problem with AIBOs of Skippy's model. The e-mail says that there is a serious problem with the memory sticks included with the dogs. The problem first shows up when the dogs no longer play catch or perform other tricks. If the dogs are returned to the factory immediately, a new memory stick will fix the problem. But if the problem isn't addressed right away, it spreads and the dogs are ruined. Peter immediately throws the special ball for Skippy, but Skippy won't chase it. Skippy's eyes turn blue and he won't perform any tricks.



*Comprehension Question:* What did the e-mail say AIBO owners should do if their dogs won't play catch or do tricks?

Well, Peter thinks about the e-mail message. He is worried that Skippy needs to go back to the factory. But he was planning to show Skippy off to his new girlfriend the next day. He thinks, "Maybe Skippy doesn't really have to go back to the factory. Maybe Skippy is really just in a bad mood. I bet when I get back from class his eyes will be red just like always. Then he will be OK."

*Inference Question:* So Peter thinks that Skippy doesn't need to go back to the factory for a new memory stick. What do you think? Is he right about that or is he wrong about that? Why do you think he's right/wrong about that?

Peter goes off to class and doesn't send Skippy back to the factory. Skippy doesn't get the new memory stick. The next day, when Peter is getting ready for his date, he can't get Skippy's eyes to light up at all. It is too late to send Skippy back to the factory. Skippy is ruined.

*Memory Check 1:* Did Peter do what the e-mail said he should do?

*Feedback:* No, Peter did not do what the e-mail said he should do.

*Memory Check 2:* Did things work out the way Peter thought they were going to?

*Feedback:* No, things did not work out the way he thought they were going to.

*Belief-oriented Fault Question:* So Peter thought Skippy didn't need to get a new memory stick, but he was wrong. Was it Peter's fault that he *thought* the wrong thing? Why was/wasn't it Peter's fault?

*Outcome-oriented Fault Question:* How much was it Peter's fault that Skippy was ruined? Why do you think it was (that much) his fault?

*Sympathy Question:* How much do you feel sorry for Peter because Skippy was ruined? Why do you feel (that much) sorry for him?

*Peter (unforeseeable)*

Peter has an AIBO (a robotic dog) named Skippy. Skippy can wag his tail just like a real dog, and his eyes change colors to show whether he is happy or sad. Skippy's eyes are red when he is happy and blue when he is sad.

Peter belongs to an Internet AIBO group. Through the group he has learned how to teach Skippy lots of things. The simplest game that Skippy plays is catch. Peter throws a special ball, and Skippy chases it and brings it back to him. Skippy's eyes turn red whenever Peter throws the special ball.

One day Peter gets an e-mail about a problem with AIBOs of Skippy's model. The e-mail says that there is a serious problem with the memory sticks included with the dogs. The problem first shows up when the dogs no longer play catch or perform other tricks. If the dogs are returned to the factory immediately, a new memory stick will fix the problem. But if the problem isn't addressed right away, it spreads and the dogs are ruined. Peter immediately throws the special ball for Skippy, but Skippy won't chase it. Skippy's eyes turn blue and he won't perform any tricks.

*Comprehension Question:* What did the e-mail say AIBO owners should do if their dogs won't play catch or do tricks?

Well, Peter thinks about the e-mail message. He thinks that Skippy will be ruined if he doesn't send him back to the factory right away. But then he remembers that his friend has a new model of AIBO that can do a lot more things than Skippy can. He thinks, "Maybe I can get a new AIBO that will be even better than Skippy. That's what I really want! I'll send Skippy back to be recycled and order a new AIBO for myself."

*Inference Question:* So Peter thinks that he will get a new AIBO if he orders one. What do you think? Is he right about that or is he wrong about that? Why do you think he's right/wrong about that?

So Peter packs Skippy into box along with an order form and a check for a new AIBO. A week later a big box arrives from the AIBO factory. Peter thinks that it is his new AIBO, and he is very excited. But when he opens the box, it's just Skippy with a new memory stick. Peter's check is still in the box.

*Memory Check 1:* Did Peter do what the e-mail said he should do?

*Feedback:* No, Peter did not do what the e-mail said he should do.

*Memory check 2:* Did things work out the way Peter thought they were going to?

*Feedback:* No, things did not work out the way he thought they were going to.

*Belief-oriented Fault Question:* So Peter thought he was going to get a new AIBO, but he was wrong. Was it Peter's fault that he *thought* the wrong thing? Why was/wasn't it Peter's fault?

*Outcome-oriented Fault Question:* How much was it Peter's fault that he didn't get a new AIBO? Why do you think it was (that much) his fault?

*Sympathy Question:* How much do you feel sorry for Peter because he didn't get a new AIBO? Why do you feel (that much) sorry for him?

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## VITA

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