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Children's Use of Frequency Information for Trait Categorization and Behavioral Prediction

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Two experiments examined young children's use of behavioral frequency information to make behavioral predictions and global personality attributions. In Experiment 1, participants heard about an actor who behaved positively or negatively toward 1 or several recipients. Generally, children did not differentiate their judgments of the actor on the basis of the amount of information provided. In Experiment 2, the actor behaved positively or negatively toward a single recipient once or repeatedly. Participants were more likely to make appropriate predictions and attributions after exposure to multiple target behaviors and with increasing age. Overall, children's performance was influenced by age-related positivity and negativity biases. These findings indicate that frequency information is important for personality judgments but that its use is affected by contextual complexity and information-processing biases.

Keywords: behavioral frequency, personality trait understanding, valence effects, young children, social cognition

Personality traits are stable, internal characteristics that enable us to summarize, predict, and explain behavior (Yuill, 1993). For this reason, people routinely form trait judgments about others and make trait-based behavioral explanations and predictions (e.g., Erdley & Dweck, 1993; Heyman & Gelman, 1998). For example, if Jimmy repeatedly teases other children, takes their belongings, and is physically aggressive on the playground, his classmates may label his behavior as "mean." Jimmy's classmates can also use this trait label to predict that he will behave negatively in the future and to decide that they should avoid him. Finally, if asked why Jimmy taunts other children, his classmates may reason that he is simply a mean person.

The way in which children reason about personality has important implications for many aspects of psychosocial functioning, including self-esteem (e.g., Benenson & Dweck, 1986; Heyman & Dweck, 1998), stereotyping (e.g., Erdley & Dweck, 1993), and peer relations (e.g., Mendelson, Aboud, & Lanthier, 1994). Examination of the links between these areas and personality understanding may have clinically relevant applications. For example, children who believe that personality is stable rather than malleable may be more likely to react negatively to failure, which may have a negative impact on self-esteem and the ability to function productively (see Dweck & Leggett, 1988).

There is a large body of research on personality understanding in middle to late childhood. In one line of work, researchers have focused on children's descriptions of personality (e.g., Livesley & Bromley, 1973; Peevers & Secord, 1973; Yuill, 1992). Generally, the findings in this area indicate that children begin to use trait terms spontaneously at 7 or 8 years of age (e.g., Craig & Boyle, 1979; Livesley & Bromley, 1973). With increasing age, the trait terms used by children become increasingly differentiated (Livesley & Bromley, 1973), less egocentric (Peevers & Secord, 1973), and more psychologically than behaviorally oriented (Barenboim, 1981; Newman, 1991). A second line of research has demonstrated that young children are adept at using personality trait information to make various inferences about an individual (e.g., Heyman & Gelman, 1999, 2000). In a third line of research, children's use of behavioral information to make trait inferences about an individual or to predict the individual's future behavior has been examined (e.g., Cain, Heyman, & Walker, 1997; Dozier, 1991; Ferguson, van Roozendaal, & Rule, 1986; Heller & Berndt, 1981; Kalish, 2002; Rholes & Ruble, 1984). Although the results are mixed, the findings suggest that only in late childhood do children come to think of traits as stable, enduring characteristics of people (e.g., Ferguson et al., 1986; Rholes & Ruble, 1984).

Early Personality Understanding

Although there is an abundance of research on children's knowledge about personality in middle to late childhood, less is known

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about personality understanding in the preschool years. There are compelling reasons to believe that a basic understanding of personality emerges early. It is well established that preschoolers exhibit sophisticated categorization abilities (e.g., Gelman & Markman, 1986, 1987; Gelman & O'Reilly, 1988; Heyman & Gelman, 2000; Keil, 1989), and these abilities are relevant to personality understanding. Specifically, traits can be construed as social categories that comprise different properties (e.g., behaviors or mental states; see Heyman & Gelman, 1999, 2000). Thus, it is reasonable to expect preschoolers to make personality attributions about an individual when given trait-relevant information.

Research by Heyman and Gelman (1999, 2000) supports the notion that preschoolers have a basic appreciation of personality traits. These authors found that 3- and 4-year-olds used trait information to make novel inductive inferences about an individual. For example, participants predicted that a child would enjoy a particular game on the basis of her personality (e.g., shyness) rather than her physical appearance (Heyman & Gelman, 2000). Other research (Heyman & Gelman, 1999) revealed that even 4-year-olds use trait labels to make inferences about emotional states (e.g., reporting that a nice child would be upset if his or her behavior resulted in a negative outcome for another child).

Despite the apparently precocious abilities described above, children often perform poorly on tasks of personality understanding. Indeed, the findings of Heyman and Gelman (1999, 2000) are somewhat at odds with those of previous studies indicating that children do not show a solid understanding of personality until middle to late childhood (e.g., Alvarez, Ruble, & Bolger, 2001; Heller & Berndt, 1981; Newman, 1991; Rholes & Ruble, 1984). For example, Rholes and Ruble (1984) reported that 9- and 10-year-olds, but not 5- and 6-year-olds, treated personality as a stable predictor of behavior. Heller and Berndt (1981) found that young children were unable to differentiate between an actor who behaved generously (i.e., by sharing) and a control actor about whom they were given virtually no information (i.e., only age and gender). Given these and other discrepant findings, additional research is needed to examine the factors implicated in early personality understanding.

Role of Frequency Information in Trait Categorization

One explanation for the generally poor performance of children on tasks of personality understanding is that children require a substantial amount of behavioral information to engage in trait categorization (e.g., Buss & Craik, 1985; see White, 1995). In the majority of previous research, participants were given little information (e.g., one or two behavioral exemplars) with which to make personality judgments and behavioral predictions (e.g., Dozier, 1991; Heller & Berndt, 1981; Rholes & Ruble, 1984). Also, this information was provided in a condensed, hypothetical form rather than as an explicit demonstration (e.g., Rholes & Ruble, 1984). It should be noted that the amount of information provided was not a factor in the Heyman and Gelman (1999, 2000) studies because children did not engage in trait categorization per se: They were given a trait label and made inferences about the properties associated with that label. This may explain the discrepancy between these findings and those of other researchers (e.g., Heller & Berndt, 1981; Rholes & Ruble, 1984).

The lack of provision of multiple, concrete behavioral exemplars in previous research may account for children's poor performance on tasks of personality understanding. Indeed, the direct role of frequency information in personality trait categorization has been noted in the personality and social psychology literatures. According to act frequency theory (Buss & Craik, 1983, 1985), there are clear connections between behaviors and personality traits such that traits are construed as categories of behavioral acts (Buss & Craik, 1985). Accordingly, behavioral "evidence" is needed to make a trait attribution. Behaviors that are prototypical of a trait, and that occur over time, will result in a trait attribution. Also, it is well established that adults use attributional cues (attribution theory; see Kelley, 1972, 1973) to make personality and other causal judgments, and frequency is an inherent aspect of these cues (see White, 1995).

At a general level, there is convincing evidence that preschoolers construct *causal maps* that represent their knowledge in many domains and enable them to make predictions and conclusions about causes of events (Gopnik et al., 2004). For example, in one study (Gopnik, Sobel, Schulz, & Glymour, 2001), children were shown a novel "blicket detector" device and told that it would light up and play music only if a blicket was placed on it. Participants as young as 2 years of age categorized unmarked blocks as blickets or nonblickets by depending solely on given patterns of evidence (e.g., Block A was not labeled a blicket because it only made the machine work in the presence of Block B, which was thus deemed the blicket). This ability to make causal inferences on the basis of the detection of covariation information is relevant to the domain of personality understanding (e.g., see Kelley, 1973). For example, if an individual has negative encounters with many people, then it can be assumed that something inherent in that individual (i.e., his or her personality) causes these unpleasant interactions. Because preschoolers exhibit fairly sophisticated causal reasoning abilities, it is reasonable to expect them to pick up on behavioral frequency patterns to make behavioral predictions and personality attributions.

The Present Research

In the present experiments, we assessed the impact of different amounts and types of behavioral frequency information on children's personality judgments. Three- to 6-year-olds were provided with multiple, explicit behavioral exemplars to determine whether they could make appropriate personality judgments and behavioral predictions. The type of frequency information used here consisted of attributional cues, because it has been established in previous research that these cues are used by older children to make personality judgments (e.g., DiVitto & McArthur, 1978; Ferguson, Olthof, Luiten, & Rule, 1984; Ferguson et al., 1986; Kalish, 2002; Rholes & Ruble, 1984; Schuster, Ruble, & Weinert, 1998). We examined the use of two such cues, *behavioral distinctiveness* (Experiment 1) and *behavioral consistency* (Experiment 2). Behavioral distinctiveness refers to the target behavior of an actor toward one or several recipients, whereas behavioral consistency refers to the target behavior of an actor toward a single recipient once or repeatedly. Thus, frequency (i.e., number of behavioral exemplars) is an inherent feature of these cues and allows for a direct assessment of the impact of this variable on personality categorization. Although attributional cues are typically presented concurrently in the adult literature (i.e., participants are given consistency, distinctiveness, and consensus information all at once), we followed the lead of other researchers who simplified the task for children by presenting the cues separately (e.g., Rholes & Ruble, 1984). Moreover, in previous research (e.g., Rholes & Ruble, 1984), frequency information was presented in a condensed form (e.g., "Sam *always* shares with Sally"). In order to give children a maximal opportunity to benefit from the cues, the information given here was more explicit in that each event was demonstrated.

After the story, participants in both experiments were asked to make behavioral predictions about the actor to determine whether his or her behavior reflected a stable and enduring personality characteristic. Also, participants were required to attribute a trait category of "agreeableness" to the actor. Agreeableness was chosen because of its age-appropriate nature, that is, because it is evident that very young children have in place such a global, evaluative framework for reasoning about other people (see Alvarez et al., 2001). Thus, in these experiments, we assessed children's ability to categorize a character according to an agreeableness trait of niceness or meanness (positive and negative valence information, respectively).

Comparing children's use of distinctiveness and consistency allowed us to gain insight about the emergence of the use of different kinds of frequency information in personality judgments. For adults, distinctiveness is the most powerful attributional cue (e.g., Hortacsu, 1987; McArthur, 1976). This makes intuitive sense given that this cue enables people to assess whether an actor's behavior is stable in the presence of different recipients. In contrast, consistency is less informative because it involves the behavior of an actor toward the same recipient. It is unclear in this latter case whether the actor's behavior would generalize to other people (i.e., there may be something about a specific recipient that causes the actor to behave a certain way). At the same time, young children may find it easier to reason about consistency information because it is less complex (e.g., only two characters are involved). Thus, the present experiments allowed us to determine whether there are developmental differences in the emergence of the use of the two cues.

Experiment 1

In Experiment 1, we examined young children's use of distinctiveness information in making behavioral predictions and trait attributions. Although children's use of distinctiveness has been studied previously (e.g., Dozier, 1991), there has been little systematic research on the use of this information by preschoolers. In a study with older children, Gnepp and Chilamkurti (1988) gave 6-, 8- and 10-year-olds either little information about an actor (i.e., name only) or three examples of the actor's past behavior that reflected a trait (e.g., generosity). All children were more likely to make behavioral and trait inferences after hearing about three instances of behavior toward different people, although the number of these inferences increased with age. Ferguson et al. (1986, Experiment 2) reported that 6-year-olds differentiated between different levels of distinctiveness (e.g., three vs. six aggressive behaviors toward different people) in making personality judgments. However, this study attempted to determine in which situation children were more likely to make a dispositional attribution (e.g., three vs. six times). Thus, only relative differences in trait attribution were assessed. Children may have used a simplistic counting strategy in that the character who performed more behaviors in total was deemed meaner. Heller and Berndt (1981) reported that 5-year-olds did not distinguish between a control actor and an actor who behaved generously to two recipients. This may have been due to the sparse amount of information provided, as young children may require more information than adults to make personality judgments (Aloise, 1993). It should be noted that the study of the impact of different levels of information on children's personality judgments was not the focal point of these experiments and that none of these studies examined children as young as 3 and 4 years of age.

In Experiment 1, participants heard about an actor who engaged in a positive or negative interaction with a single recipient (high distinctiveness) or several recipients (low distinctiveness) and behaved neutrally the rest of the time. Unlike in previous research, children were given either one target piece or five target pieces of information to make their judgments. However, the total number of behaviors seen across conditions was equated by including neutral information in the task (e.g., participants heard about six behaviors in total across the low and high distinctiveness conditions). Only the number of valenced behaviors differed across the low and high distinctiveness conditions. This procedure was followed to discourage children from adopting a rudimentary strategy to judge the story character (i.e., by simply counting the total number of behaviors).

After the story, participants made predictions about the actor's behavior toward a new recipient, as well as trait attributions about the actor. Overall, participants were expected to make more target-consistent predictions and attributions in the low distinctiveness conditions. For example, children should predict that an actor who behaved generously to five recipients (and neutrally to one) would be more likely than an actor who was generous to one recipient (and neutral to five) to exhibit such behavior again. The former actor should also be judged as nicer than the latter actor. This distinctiveness effect was predicted for both behavioral prediction and trait attribution, and we expected that children would perform above chance levels in the low, but not the high, distinctiveness conditions. Finally, the ability to make target-consistent predictions and attributions was expected to improve with age.

Method

Participants

Ninety-six children ranging in age from 3 to 6 years were tested. There were 24 participants at each of the following ages: 3 years (M = 42.7 months, SD = 4.1; 13 boys, 11 girls), 4 years (M = 52.0 months, SD = 3.4; 12 boys, 12 girls), 5 years (M = 64.6 months, SD = 3.1; 11 boys, 13 girls), and 6 years (M = 76.5 months, SD = 3.9; 13 boys, 11 girls). Participants were recruited from day-care centers and schools in a midsized North American city. The majority of participants were Caucasian, although additional demographic information was not available. Testing took place at the child's day-care center or school.

Materials

A number of toy figures were used as story characters. A larger figure of an adult female served as the "teacher." A variety of miniature toys was also employed during storytelling, including a marble, a ball, a comb, blocks, dice, stickers, toy cars, Play-Doh, pencil crayons, candy, fruit, wagons, and a juice bottle. Sessions were audiotaped.

Design and Procedure

Two factors were manipulated: distinctiveness (low or high) and trait valence (positive or negative). The factors were crossed to create four conditions: high distinct positive, low distinct positive, high distinct negative, and low distinct negative (see Table 1). Within each age group, participants were assigned randomly to one of the four conditions (i.e., 6 children per condition per age group).

Participants were tested by a female experimenter. Children were seated at a table across from the experimenter in a quiet room or area of the day-care center or school. The testing session ranged in length from 15 to 20 min. After they were comfortable with the experimenter, all children listened to a story about characters in a day-care center or school. First, they were told the name of the actor and asked pretest questions to ensure that they could identify him or her: "Which one is Billy/Barbara?" Because maximal identification with the story actor was desirable in this situation, children heard about an actor of their own gender (see Heyman & Dweck, 1998). At the beginning of the story, children were told that the characters "are young boys/girls and they go to day care/school just like you do." The experimenter made reference to the teacher and other toys that were arranged to simulate a classroom environment. The procedure then differed according to the condition to which the participant was assigned.

High distinct positive condition. Participants viewed an actor engaging in one positive interaction and five neutral interactions. Thus, this condition was referred to as high positive because the level of distinctiveness is defined by the number of target behaviors that are directed by the actor to the different recipients. The target behavior is highly distinct because it is the only positive event to occur in this condition. Each interaction was directed to a different recipient on a different day. For the positive action, children were told, for example,

> Today at school, during play time, Billy decides to play with his Play-Doh. Billy sees Adam playing with his blocks. He goes over to Adam and asks him if he would like to play with his Play-Doh. Adam is happy about this because he doesn't have Play-Doh to play with. Mrs. Smith comes over to Billy and tells him that he is allowed to share his Play-Doh with other children.

This type of positive action scenario was presented once, with the shared item chosen randomly among a number of options (see the *Materials* section). Participants also heard about five neutral actions, for example,

> Today at school, Billy decides to play with his Play-Doh. Billy sees Adam playing on his own with some blocks. Billy takes out his Play-Doh and plays with it on his own and Adam plays on his own. Then, Mrs. Smith comes over and tells everyone that it's time to clean up and go home.

The items used for the neutral scenario were also chosen randomly from the same pool of objects used in the positive scenarios. There were six possible positions in which the positive action could occur, and it was presented in each position an equal number of times across children.

After the story, children were given a question in which they were asked to predict the future behavior of the actor toward a new recipient. For example, they were told,

> Let's pretend it's the next day, and Billy comes to school. Billy has another toy today, and it's a camera. Alan is playing with his blocks. Alan thinks that Billy's toy is neat. What do you think will happen in the story?

Children who did not answer spontaneously were given forced-choice options: "Do you think that Billy will share his toy with Alan or take Alan's toy away?" The forced-choice options were presented in a randomized order. Then, participants were asked an open-ended trait question about the protagonist: "What do you think of Billy? What kind of boy is he?" Children who did not answer spontaneously were given a forced-choice option, "Do you think he's nice, mean, or not nice or mean?" The order of the first two options was randomized and the "not nice or mean" option was always presented last.

Low distinct positive condition. This condition was identical to the high positive condition except that participants viewed an actor engaging in five positive interactions and one neutral interaction. Thus, this condition was referred to as low positive because the target (i.e., positive) event is directed at multiple recipients and is considered to be low in distinctiveness. Each interaction took place with a different recipient on a different day. There were six positions in which the neutral event could occur, and it was presented in each position an equal number of times across children. Dependent measures were identical to those in the high positive condition.

High distinct negative condition. This condition was identical to the high positive condition except that participants viewed an actor engaging in one negative interaction and five neutral interactions. Each interaction was directed to a different recipient on a different day. For the negative interaction, participants were told, for example,

> Today at school, during play time Billy has a snack of juice. Adam has a snack as well, and it's a chocolate bar. Billy goes over to Adam and grabs Adam's chocolate and takes it away from him. Adam is upset because that was his snack and now he has nothing to eat. Mrs. Smith comes over and tells Billy that he shouldn't do that, and not to do it again.

This type of scenario was presented once. Participants also heard about five neutral actions that were identical to those used in the positive conditions. There were six possible positions in which the negative event could occur, and it was presented in each position an equal number of times across children.

After the story, participants were asked a set of prediction and trait questions similar to those in the positive conditions. For the prediction question, children were told,

Table 1
Design Features of Experiments 1 and 2

	Experiment 1		Experiment 2	
Feature	Low distinctiveness	High distinctiveness	Low consistency	High consistency
Number of actors	1	1	1	1
Number of target actions	5	1	1	5
Number of neutral actions	1	5	5	1
Number of recipients	6	6	1	1

Table 2
Characteristics of Best-Fitting Model for the Prediction Question in Experiment 1

Predictor	β	*SE* β	Wald χ^2	*df*	*p*	Odds ratio
Age	0.545	.286	3.64	1	.056	1.725
Valence (0 = negative; 1 = positive)	−1.512	.545	7.710	1	.005	0.220
Distinctiveness	−0.165	.270	0.374	1	.541	0.848
Age × Distinctiveness	−0.670	.288	5.417	1	.020	0.512
Constant	2.036	.469	18.880	1	.000	7.663

> Let's pretend that it's the next day and Billy comes to school and plays with his Play-Doh. He sees Adam with his pencil crayons. Billy thinks that Adam's pencil crayons are neat. What do you think will happen in the story?

If children did not answer spontaneously, they were given a forced-choice option: "Do you think that Billy will take Adam's toy away or do you think that he'll share his toy with Adam?" Children were asked the same trait question as in the positive conditions.

Low distinct negative condition. This condition was identical to the low positive condition except that participants viewed an actor engaging in five negative interactions and one neutral interaction. Each interaction took place with a different recipient on a different day. There were six possible positions in which the neutral event could occur, and it was presented in each position an equal number of times across children. The dependent measures were the same as those in the high negative condition.

Results

Logistic regression analyses were conducted to examine the contribution of the independent variables (age, valence, and distinctiveness) to performance on each of the dependent variables (prediction question and trait question). All quantitative variables were standardized (i.e., converted to *z* scores). Because they were chosen for theoretical reasons (see Menard, 2002), age (in months, continuous variable), distinctiveness (continuous variable),[1] and valence (categorical variable) were first entered as predictors. Additional predictors (e.g., interactions of two or more variables) were added individually to determine whether they contributed significantly to the model. Significance was assessed by a block chi-square test (also known as the chi-square difference test). In this test, the retention of each predictor in a model must lower the variability significantly to justify using a more complex model. The final model that resulted from this procedure was compared with the full model (i.e., all predictors and combinations of interactions) to confirm that it was the best-fitting model. Having all main effects and interactions in the models did not significantly reduce the variance of the models compared with that of the best-fitting model. Potential gender effects were also examined for each model. Because there were no significant effects or interactions involving this variable on either dependent measure, it was excluded from the final models.

Prediction Question

Children were given a score of 1 for selecting a target-consistent response (e.g., if they viewed negative behavior and predicted future negative behavior or if they viewed positive behavior and predicted future positive behavior) regardless of whether they answered the question spontaneously or picked the correct forced-choice option. Answers that were not target consistent were given a score of 0. Thus, children received a dichotomous score of 0 or 1 for their performance on this question. The majority of 6-year-olds (79%) answered the prediction question spontaneously, whereas few of the 3-, 4- and 5-year-olds did so (33%, 29%, and 33%, respectively). Chi-square analyses revealed that the probability of answering this question spontaneously was dependent on age, $\chi^2(3, N = 96) = 16.42$, $p = .001$.

The best-fitting model included age, valence, distinctiveness, and the Age × Distinctiveness interaction as significant predictors of performance on the prediction question.[2] The overall regression model was significant, $\chi^2(4, N = 96) = 15.75$, $p = .003$. The likelihood ratio R^2 (R^2_L; Menard, 2002) is the proportion of variance explained by the model, and it is interpreted in the same way as the ordinary least squares (OLS) R^2. As with the OLS R^2, R^2_L can be used as an index of effect size. The value of R^2_L for the best-fitting model was .140 (medium effect; Cohen, 1988). Table 2 presents the characteristics of the model. There was a significant age effect such that children were more likely to make the target prediction with age ($\beta = .545$, Wald $\chi^2 = 3.64$, $p = .056$). This was qualified by a significant Age × Distinctiveness interaction, ($\beta = -.670$, Wald $\chi^2 = 5.42$, $p = .02$). To examine the nature of the interaction, we conducted additional regression analyses at each level of distinctiveness (low vs. high by age). As shown in Figure 1a, the number of target-consistent predictions increased with age in the high distinct conditions ($\beta = .989$, Wald $\chi^2 = 5.55$, $p = .02$). With increasing age, children were more likely to make a target prediction after seeing only one behavioral exemplar. There were no differences between age groups in target predictions in the low distinct conditions ($\beta = -.108$, Wald $\chi^2 = 0.17$, $p = .733$).

Tests against chance (using the binomial distribution with alpha set at .05) were conducted for each age group. As shown in Figure 1a, responses of the 3- and 6-year-olds were significantly above chance in the low distinct conditions. In addition, the 5- and 6-year-olds performed above chance in the high distinct condi-

[1] Analyses were also conducted using distinctiveness as a categorical variable (low vs. high), and these analyses yielded the same pattern of results.

[2] Note that not all predictors within a best-fitting model may be significant. However, the three main variables in these analyses (age, valence, and distinctiveness) were chosen for theoretical reasons and were thus retained as part of the model regardless of their statistical significance.

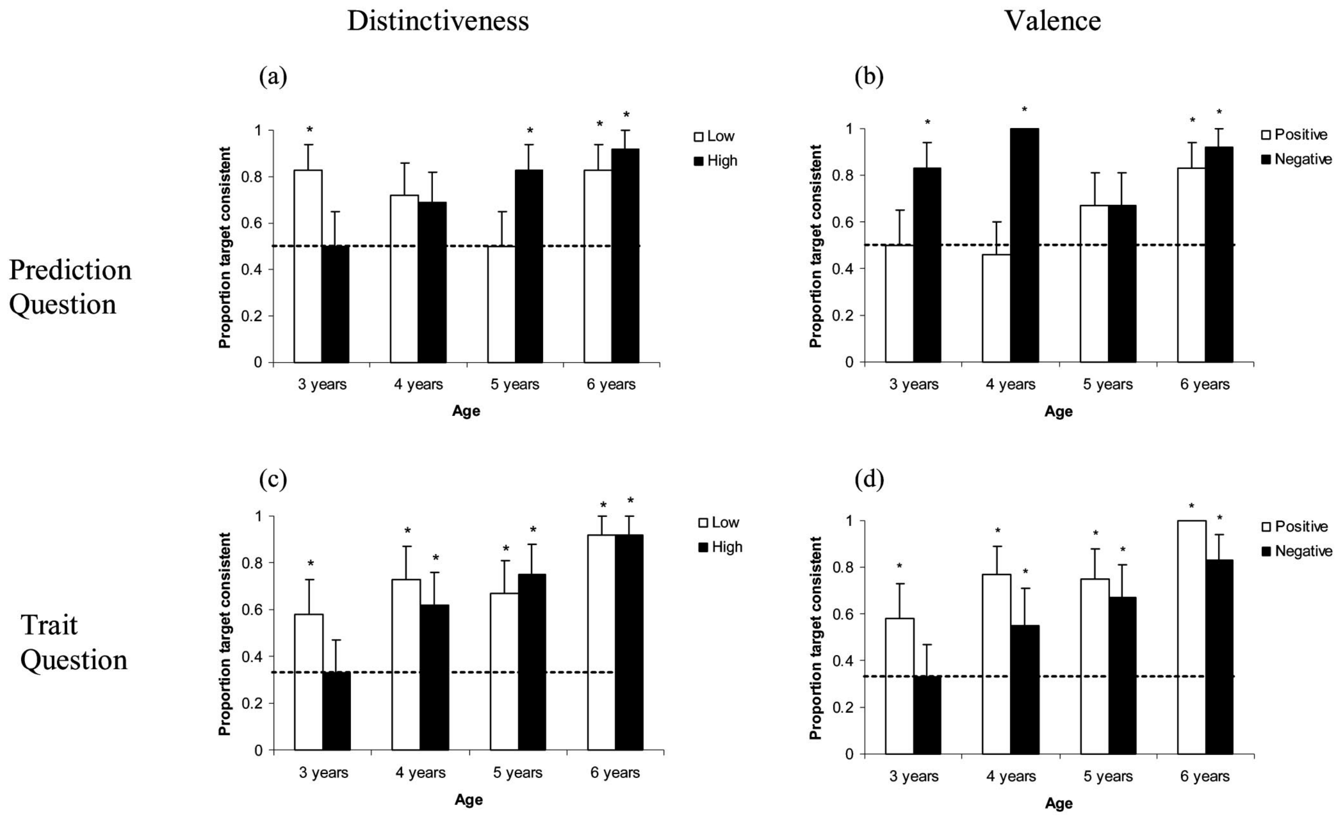

Figure 1. Performance in Experiment 1: (a) proportion of children who selected the target-consistent response on the prediction question as a function of age and level of distinctiveness; (b) proportion of children who selected the target-consistent response on the prediction question as a function of age and valence; (c) proportion of children who selected the target-consistent response on the trait question as a function of age and level of distinctiveness; (d) proportion of children who selected the target-consistent response on the trait question as a function of age and valence. For the sake of clarity, age is presented as a categorical variable; however, all analyses were conducted with age as a continuous variable. Dashed lines represent chance performance (binomial test); asterisks indicate greater than chance performance ($p < .05$).

tions. The valence effect was significant ($\beta = -1.512$, Wald $\chi^2 = 7.71$, $p = .005$). Children who viewed negative behaviors were more likely to make the target-consistent prediction than those who viewed positive behaviors (see Figure 1b). This pattern was pronounced for the 3- and 4-year-olds, who exhibited greater than chance performance only after seeing negative behaviors. There was no significant distinctiveness effect ($\beta = -0.165$, Wald $\chi^2 = 0.374$, $p = .541$). Children were no more likely to make the target-consistent prediction following five target behaviors than one target behavior.

Trait Question

The trait question was scored in the same manner as the prediction question. Children were given a score of 1 for a target-consistent response regardless of whether they mentioned it spontaneously or picked the appropriate forced-choice response. Responses that were not target consistent were given a score of 0. The majority of 5- and 6-year-olds answered this question spontaneously (71% and 54%, respectively), in contrast to the 3- and 4-year-olds (4% and 0%, respectively). Chi-square analyses revealed that the probability of answering this question spontaneously was dependent on age, $\chi^2(3, N = 96) = 21.19$, $p < .01$. The best-fitting model was determined in the same way as that described for the prediction question.

The best-fitting model included age, valence, and distinctiveness (see Table 3). The overall regression model was significant, $\chi^2(4, N = 96) = 17.92$, $p < .01$, $R^2_L = .150$ (medium effect). There was a significant age effect ($\beta = 0.926$, Wald $\chi^2 = 11.28$, $p = .001$). As shown in Figure 1c, the 4-, 5-, and 6-year-olds performed above chance in both the low and high distinct conditions, whereas the 3-year-olds performed above chance only in the low distinct conditions. There was also a significant valence effect ($\beta = 0.965$, Wald $\chi^2 = 3.84$, $p = .050$), indicating that children were more likely to make the target response in the positive than negative conditions. Figure 1d displays the performance on this question as a function of age and valence. There was no significant distinctiveness effect for the trait question ($\beta = 0.195$, Wald $\chi^2 = 0.629$, $p = .428$). Children were no more likely to make a target trait attribution after hearing about five target behaviors than one target behavior.

Table 3
Characteristics of Best-Fitting Model for the Trait Question in Experiment 1

Predictor	β	$SE\ \beta$	Wald χ^2	df	p	Odds ratio
Age	0.926	.276	11.278	1	.001	2.524
Valence (0 = negative; 1 = positive)	0.965	.493	3.837	1	.050	2.625
Distinctiveness	0.195	.246	0.629	1	.428	1.215
Constant	0.482	.332	2.099	1	.147	1.619

Discussion

We examined the impact of different amounts of distinctiveness information on 3- to 6-year-olds' behavioral predictions and global personality attributions. Overall, the findings indicated that children did not use frequency information as expected in this context. Participants did not make more target-consistent predictions or trait attributions after hearing about five target behaviors than after hearing about one target behavior. These results conflict with the adult pattern of findings in which personality attributions are most likely to be made when someone behaves similarly toward many recipients (e.g., Kelley, 1972, 1973).

It is interesting that with age, children were more likely to use a single behavioral exemplar to make a target prediction about the actor's future behavior. However, performance on the prediction question differed for the 3- and 4-year-olds compared with the 5- and 6-year-olds. Specifically, behavioral predictions of 5- and 6-year-olds were highly influenced by a single behavioral exemplar, whereas 3-year-olds required five exemplars to make a target-consistent prediction and 4-year-olds performed at chance levels irrespective of the number of exemplars. This was also true for trait attribution, although the pattern was not significant. The three older groups made the target trait attribution both after hearing about one behavior and after hearing about several behaviors. In contrast, 3-year-olds were more likely to do so after being exposed to five exemplars of relevant behavior. These findings suggest that there may be age-related changes in the amount of information required to make personality judgments. In particular, in some situations, children may actually require less information with age to make such judgments.[3] In support of this notion, Aloise (1993) found that adults needed fewer behavioral exemplars to ascribe certain traits (such as politeness) than did 9- and 10-year-olds. Indeed, adults may map the association between traits and trait-consistent behavior more quickly than children simply because they have more world experience (Aloise, 1993).

Valence had a surprisingly profound impact on children's task performance. Moreover, a dissociation emerged between behavioral predictions and trait attributions such that participants made more target predictions after hearing about negative behavior but more trait attributions after hearing about positive behavior. This latter tendency to make positive trait attributions about others is consistent with previous findings of a positivity bias in children's judgments of others (e.g., Newman, 1991). However, the reason for the negativity bias in prediction and for the dissociation between behavioral predictions and trait attributions is unclear and warrants further investigation. For instance, given children's aberrant performance in this experiment, it is possible that the complexity of this context may have contributed to the disjointed valence effects.

Although children required less information with age to make personality judgments, the importance of frequency information in personality judgments cannot be ruled out. It is well established that adults and older children often rely on large quantities of information to make judgments about people (e.g., Buss & Craik, 1985; Dozier, 1991; Ferguson et al., 1986; White, 1995), a fact that renders premature any assumption that frequency is unimportant in younger children's personality judgments. Also, as mentioned previously, there may be developmental differences in children's ability to use different cues appropriately as a function of complexity (Rholes & Ruble, 1984). Perhaps children can take into account frequency information in a less complex setting that involves the relationship between an actor and a single recipient.

Experiment 2

In Experiment 2, we examined whether children are sensitive to frequency information in the more simplistic context of behavioral consistency. Few researchers have assessed children's use of consistency to reason about personality (e.g., Ferguson et al., 1986; Rholes & Ruble, 1984), and none of them examined systematically whether different amounts of information affect behavioral predictions and trait attributions. Rholes and Ruble (1984, Experiment 2) gave participants information about a character's behavior and then indicated whether it was low or high in consistency. In contrast to the 5- and 6-year-olds, children over 9 years of age used the information correctly to predict cross-situational stability of behavior. However, given that it was not the primary purpose of the study, the authors did not indicate precisely how many times the actor behaved a certain way. Thus, children may not have had the opportunity to capitalize on the frequency information provided. As part of their study, Ferguson et al. (1986, Experiment 2) told participants about an actor who engaged in three aggressive behaviors (low consistency) and one who engaged in six aggressive behaviors (high consistency) toward a recipient. In contrast to the findings of Rholes and Ruble (1984, Experiment 2), even 5-year-olds were more likely to predict that the actor in the high consistency condition would behave aggressively and labeled him as more aggressive, although only relative rather than absolute judgments were made.

In Experiment 2, children heard about an actor who behaved positively or negatively to a single recipient once (low consistency) or five times (high consistency). Then, in contrast to Experiment 1, they made behavioral predictions about the actor's behavior toward the same recipient. This enabled an assessment of the degree to which children require stimulus constancy (i.e., same

[3] We thank an anonymous reviewer for this suggestion.

actor and same recipient) to make accurate behavioral predictions. Participants also assigned a trait category to the actor. If children use frequency information appropriately in this context, then they should make more target-consistent predictions and attributions in the high than in the low consistency conditions. For example, children should predict that an actor who behaved generously five times would be more likely to do so again than one who behaved generously only once. The former character should also be judged as nicer than the latter actor. In contrast, if frequency information is simply unimportant (or unnecessary) in early personality judgments, then children should exhibit similar performance across the low and high consistency conditions.

Method

Participants

Ninety-six children ranging in age from 3 to 6 years were tested. None of the children who participated in Experiment 1 took part in Experiment 2. There were 24 participants at each of the following ages: 3 years (M = 43.3 months, SD = 3.1; 13 boys and 11 girls), 4 years (M = 53.1 months, SD = 2.8; 12 boys and 12 girls), 5 years (M = 64.5 months, SD = 4.4; 11 boys and 13 girls), and 6 years (M = 79.9 months, SD = 5.4; 10 boys and 14 girls).[4] Participants were recruited in the same manner as in Experiment 1. The majority of participants were Caucasian, although additional demographic information was not available.

Materials

The materials used were identical to those used in Experiment 1.

Design and Procedure

Two factors were manipulated: trait valence (positive or negative) and consistency (low or high). The factors were crossed to create four conditions: high consistency positive, low consistency positive, high consistency negative, and low consistency negative (see Table 1). In contrast to distinctiveness, consistency refers to the target behavior of an actor toward only one recipient, either once only (low consistency) or five times (high consistency). Within each age group, participants were assigned randomly to one of the four conditions (i.e., 6 children per condition per age group).

High consistency positive condition. Children viewed an actor who performed five positive actions and one neutral action toward a single recipient. The positive and neutral scenarios were identical to those in Experiment 1 except that the behaviors were directed to one recipient rather than multiple recipients. After the story, children were asked prediction and trait questions as in Experiment 1. However, for the prediction question in this experiment, participants were asked to predict the future behavior of the protagonist toward the same recipient. For example, children were told

> Let's pretend that it's the next day, and Billy comes to school. Billy has another toy today, and it's a wagon. Adam is playing with his blocks. Adam thinks that Billy's toy is neat. What do you think will happen in the story?

If children did not answer spontaneously, they were given a forced-choice option: "Do you think that Billy will share his toy with Adam or do you think he'll take Adam's toy away?" Participants were asked the same trait question about the protagonist as in Experiment 1 ("What do you think of Billy? What kind of boy is he?") and were offered the same forced-choice options as those presented in Experiment 1 ("Do you think that he's nice, mean, or not nice or mean?").

Low consistency positive condition. This condition was identical to the high positive condition except that children heard about only one positive action (chosen among those presented in the high positive condition) and five neutral actions (identical to those presented in the high positive condition, with a variety of objects) toward the recipient. The dependent measures were the same as those in the high positive condition.

High consistency negative condition. This condition was identical to the high consistency positive condition except that children heard about five negative actions and a single neutral action toward the recipient. After the story, participants were asked a set of prediction and trait questions similar to those in the positive conditions. For the prediction question, children were told,

> Let's pretend that it's the next day and Billy comes to school and plays with his Play-Doh. He sees Adam with his pencil crayons. Billy thinks that Adam's pencil crayons are neat. What do you think will happen in the story?

If children did not answer spontaneously, they were given a forced-choice option: "Do you think that Billy will take Adam's toy away or do you think that he'll share his toy with Adam?" Finally, children were asked the same trait question that was presented in the positive conditions.

Low consistency negative condition. Children were presented with one negative action (among those presented in the high negative condition) and five neutral actions (identical to those presented in the high negative condition, with a variety of objects) toward one recipient. Each action occurred on a different day. Dependent measures were the same as those in the high negative condition.

Results

As in Experiment 1, logistic regression analyses were conducted to examine the contribution of the independent variables (age, valence, and consistency) to performance on the dependent variables (prediction and trait questions). Once again, there were no significant effects involving gender, and it was excluded from the final models.

Prediction Question

Children's responses were scored in the same way as in Experiment 1. Participants received a score of 1 for a target-consistent response regardless of whether they responded spontaneously or by forced choice. Answers that were not target consistent were given a score of 0. Fifty-four percent of 6-year-olds, 58% of 5-year-olds, 46% of 4-year-olds, and 42% of 3-year-olds answered this question spontaneously. Chi-square analyses revealed that these differences did not depend on age, $\chi^2(3, N = 96) = 1.667$, $p = .644$.

As shown in Table 4, the best-fitting model included age, valence, consistency, and the Age × Valence interaction as significant predictors of performance on the prediction question. The overall regression model was significant, $\chi^2(4, N = 96) = 13.78$, $p = .008$, $R^2_L = .117$ (small effect). The consistency effect was significant such that children who heard about five target behaviors were more likely to make the target-consistent prediction than were those who heard about one target behavior ($\beta = 0.611$, Wald

[4] The precise ages in months for 3 children (one 4-year-old, one 5-year-old, and one 6-year-old) were unknown, and we followed the standard practice of assigning them the mean for their age group.

Table 4
Characteristics of Best-Fitting Model for the Prediction Question in Experiment 2

Predictor	β	$SE\ \beta$	Wald χ^2	df	p	Odds ratio
Age	−0.201	.340	0.348	1	.555	.818
Valence (0 = negative; 1 = positive)	−0.601	.486	1.529	1	.216	.548
Consistency	0.611	.252	5.869	1	.015	1.843
Age × Valence	1.056	.507	4.342	1	.037	2.876
Constant	1.262	.364	12.012	1	.001	3.531

$\chi^2 = 5.87$, $p = .015$). As shown in Figure 2a, the responses of 3- and 4-year-olds did not differ significantly from chance in the low or high consistency conditions. In contrast, 5- and 6-year-olds scored significantly above chance in the high, but not the low, consistency conditions. There was no significant valence effect ($\beta = -0.601$, Wald $\chi^2 = 1.53$, $p = .216$). Children's predictions did not differ on the basis of viewing positive or negative behaviors. However, the Age × Valence interaction was significant ($\beta = 1.056$, Wald $\chi^2 = 4.34$, $p = .037$). To examine this further, we conducted additional regression analyses for each level of valence (positive vs. negative) as a function of age. With increasing age, children were more likely to make the target prediction when hearing about positive behavior ($\beta = 0.753$, Wald $\chi^2 = 4.51$, $p = .03$). In contrast, there were no significant age-related changes in target predictions for negative behavior ($\beta = -0.176$, Wald $\chi^2 = 0.284$, $p = .594$). Four- and 5-year-olds performed significantly above chance in the negative valence conditions. In contrast, the 6-year-olds performed above chance in the positive valence conditions. Figure 2b shows the proportion of children who chose the target response as a function of valence. Finally, the

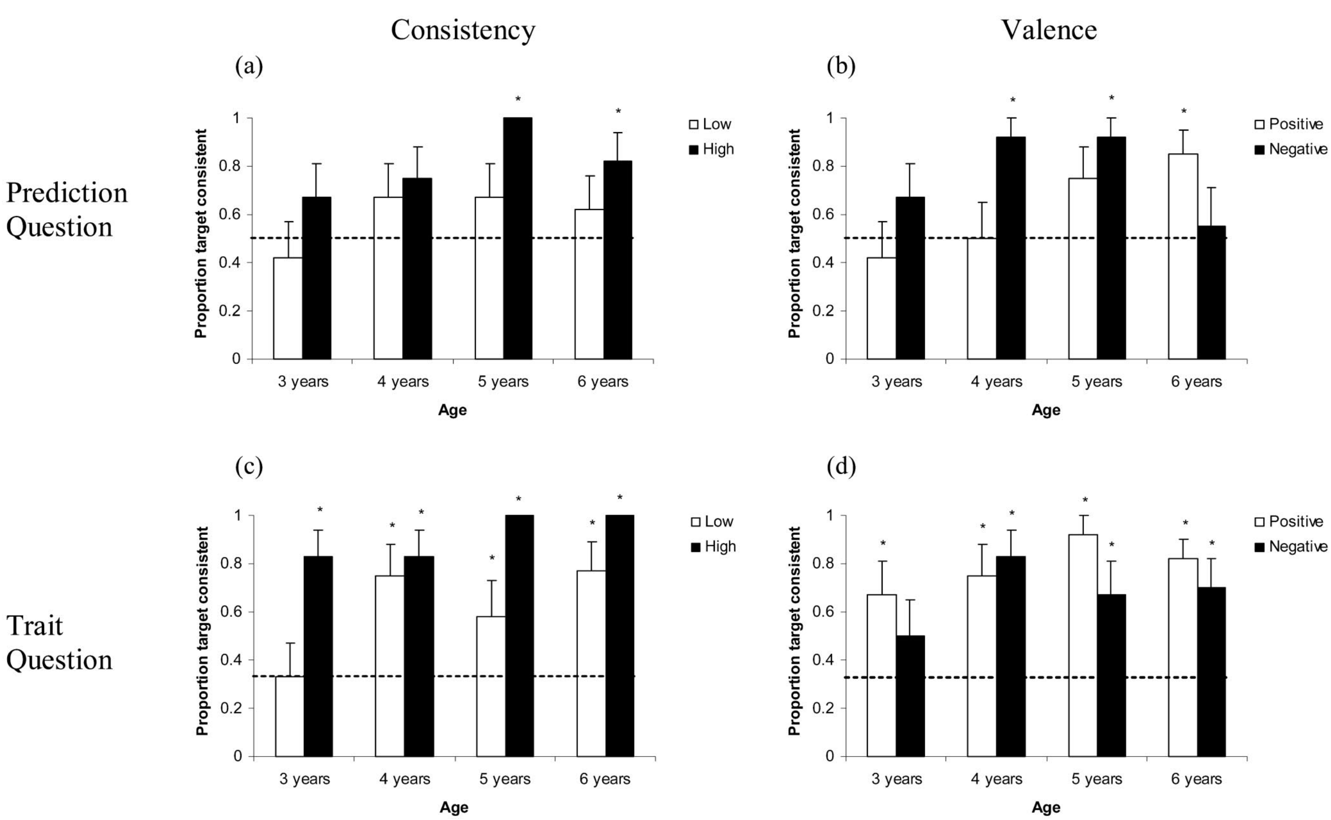

Figure 2. Performance in Experiment 2: (a) proportion of children who selected the target-consistent response on the prediction question as a function of age and level of consistency; (b) proportion of children who selected the target-consistent response on the prediction question as a function of age and valence; (c) proportion of children who selected the target-consistent response on the trait question as a function of age and level of consistency; (d) proportion of children who selected the target-consistent response on the trait question as a function of age and valence. For the sake of clarity, age is presented as a categorical variable; however, all analyses were conducted with age as a continuous variable. Dashed lines represent chance performance (binomial test); asterisks indicate greater than chance performance ($p < .05$).

age effect was not significant for this measure ($\beta = -0.201$, Wald $\chi^2 = 0.348$, $p = .555$).

Trait Question

The trait question was scored in the same way as the prediction question. Children were given a score of 1 for a target-consistent response regardless of whether they mentioned it spontaneously or picked the correct forced-choice option. Answers that were not target consistent were given a score of 0. The majority of 6-year-olds (58%) answered this question spontaneously, in contrast to 29% of 5-year-olds, 50% of 4-year-olds, and 21% of 3-year-olds. Chi-square analyses revealed that the differences were associated with age, $\chi^2(3, N = 96) = 8.912$, $p = .03$.

As shown in Table 5, the best-fitting model included age, valence, consistency, and the Valence × Consistency interaction. The overall regression model was significant, $\chi^2(4, N = 96) = 25.35$, $p < .01$, $R^2_L = .240$ (medium effect). There was also a significant age effect ($\beta = 0.668$, Wald $\chi^2 = 4.75$, $p = .029$). A significant consistency effect was obtained such that participants were more likely to make a target attribution after hearing about five target behaviors than after hearing about one target behavior ($\beta = 1.797$, Wald $\chi^2 = 9.99$, $p = .002$). As shown in Figure 2c, all age groups responded significantly above chance in the high consistency conditions. The 4-, 5-, and 6-year-olds' responses were also significantly greater than chance in the low consistency conditions. There was no significant valence effect ($\beta = 0.150$, Wald $\chi^2 = 0.049$, $p = .825$). Children's attributions did not differ as a function of hearing about positive or negative behavior (see Figure 2d). However, as shown in Figure 3, there was a significant Consistency × Valence interaction ($\beta = -1.392$, Wald $\chi^2 = 4.05$, $p = .044$). To assess the nature of the interaction, we conducted additional regression analyses at each level of valence (positive and negative). Participants' attributions of positivity were similar regardless of hearing about five instances or one instance of positive behavior ($\beta = 0.348$, Wald $\chi^2 = 0.801$, $p = .371$). In contrast, participants who heard about five negative behaviors were more likely to make a negative attribution than were those who heard about one negative behavior ($\beta = 1.71$, Wald $\chi^2 = 9.46$, $p = .002$).

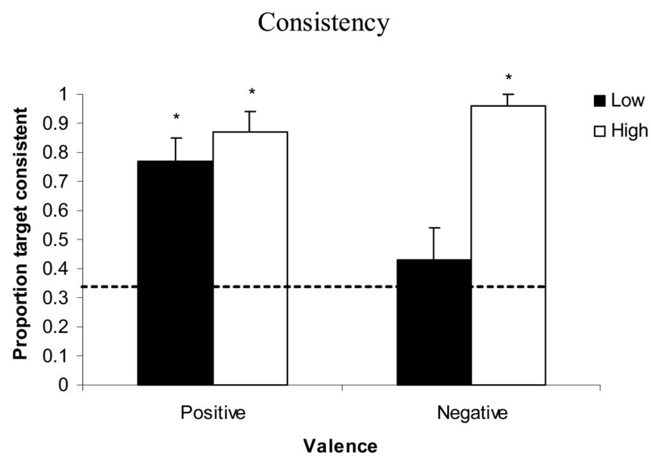

Figure 3. Proportion of children in Experiment 2 who selected the target-consistent response on the trait question as a function of valence and level of consistency.

Discussion

In contrast to Experiment 1, participants differentiated their personality judgments on the basis of the amount of consistency information provided. These results challenge the notion that with age children require less frequency information to reason about personality. Overall, participants who viewed five target behaviors were more likely to predict corresponding behavior than were those who viewed one target behavior. Also, children were more likely to make the target trait attribution when given many behavioral exemplars. These findings emphasize the influence of the amount of information on children's ability to make personality judgments, a variable that has not been investigated systematically in previous research.

As in Experiment 1, there were age-related differences in performance. Three-year-olds were more likely to make the target trait attribution only after hearing about five target behaviors, which suggests that they require large amounts of explicit behavioral frequency information to make trait judgments. In contrast, the 4-, 5-, and 6-year-olds tended to make the target trait attribution irrespective of hearing about one or five target behaviors. Thus, beyond the age of 3 years, children appear to attribute a trait label readily to an actor even in the face of little information. It is important to note, however, that the willingness to label an actor on the basis of a single behavior did not transfer to the prediction question for any of the age groups. Indeed, 3- and 4-year-olds performed at chance levels irrespective of frequency, whereas the 5- and 6-year-olds exhibited greater than chance performance only after exposure to multiple target behaviors. The performance of older children on the prediction question indicates that they used multiple pieces of information to predict cross-situational stability of behavior, and thus they appear to appreciate the actor's behavior as a reflection of a stable and enduring trait. Moreover, the fact that

Table 5
Characteristics of Best-Fitting Model for the Trait Question in Experiment 2

Predictor	β	$SE\ \beta$	Wald χ^2	*df*	*p*	Odds ratio
Age	0.668	.307	4.752	1	.029	1.951
Valence (0 = negative; 1 = positive)	0.150	.679	0.049	1	.825	1.162
Consistency	1.797	.568	9.999	1	.002	6.034
Valence × Consistency	−1.392	.691	4.053	1	.044	0.249
Constant	1.499	.557	7.244	1	.007	4.479

these children made the target prediction only after hearing about multiple behaviors adds further support for the role of frequency information in personality judgments.

Finally, in contrast to Experiment 1, there was no overall valence effect on children's behavioral predictions, and there was no dissociation between behavioral predictions and trait attributions. Participants tended to make a positive trait attribution whether they viewed one or five positive behaviors, yet they were reluctant to attribute a negative trait to the actor unless they had substantial behavioral evidence (i.e., five negative exemplars). This is consistent with the overall positivity bias seen in Experiment 1 and is addressed further in the General Discussion.

General Discussion

The present research is the first to investigate systematically the effect of frequency information on young children's personality judgments. In Experiments 1 and 2, we examined the effect of different quantities of distinctiveness and consistency information, respectively, on children's behavioral predictions and trait attributions. These experiments also allowed for an assessment of developmental differences in the use of these attributional cues as a function of their complexity. The results provide valuable information about the role of frequency in young children's emergent understanding of personality. The findings of Experiment 1 indicate that participants were insensitive to different amounts of distinctiveness information and readily made trait inferences and predictions on the basis of a single behavior. Thus, the number of behavioral exemplars had little effect on children's personality judgments in this context. In contrast, the findings of Experiment 2 revealed that children were indeed sensitive to different amounts of consistency information. The latter finding demonstrates that the provision of multiple behavioral exemplars enables very young children to make appropriate trait attributions and behavioral predictions in situations where they otherwise fail to do so. Across studies, valence had a surprisingly large impact on personality judgments. On the basis of these results, it is clear that reasoning about personality depends on the interaction of at least three factors: the quantity, complexity, and valence of information.

Impact of Quantity and Type of Information on Personality Judgments

Our findings indicate that the quantity of information available has a considerable impact on children's personality judgments. Moreover, these results may explain the discrepancy in previous data regarding young children's ability to make judgments about people. For example, in contrast to the findings of Ferguson et al. (1986), Rholes and Ruble (1984) reported that 5- and 6-year-olds could not make cross-situational behavioral predictions. However, Ferguson et al. (1986) provided more behavioral information (i.e., exemplars) than did Rholes and Ruble (1984), and this may account for the discrepant results across these studies. As shown in Experiment 2, young children require multiple, explicit exemplars to reason about personality, whereas older children and adults may not (see Aloise, 1993).

Although frequency is important for personality judgments, it alone does not account for these findings. Children were given the same number of behavioral exemplars across experiments, but they responded differently depending on the context in which the exemplars occurred. Indeed, in Experiment 1, participants over 3 years of age apparently required very little behavioral information to make trait attributions and behavioral predictions. This finding raises the possibility that with age children actually require less information and instead make snap judgments about people, as adults do in some situations (see Kunda & Thagard, 1996). These judgments can take form via the automatic processing of behavioral information that is concurrently linked with a trait label that is chronically accessible (e.g., see Bargh, 1982; Bargh & Thein, 1985) or via spontaneous formation of an impression, with little awareness of the context (e.g., Winter & Uleman, 1984). For the 4-, 5-, and 6-year-olds, good and bad behaviors to which they are chronically exposed (e.g., on the playground) may automatically evoke trait inferences.

On the basis of these findings, however, it is unlikely that with age preschoolers simply require less information to reason about personality. First, as mentioned previously, older children and adults often require high frequency information to reason about behavior (e.g., Kelley, 1973; White, 1995). Second, if children in the present studies made automatic judgments of niceness or meanness, then the same pattern of results should have been obtained across experiments. In our view, a more parsimonious interpretation of the data is that children require frequency information to make personality judgments but that the appropriate use of it is limited to simplistic contexts (i.e., consistency rather than distinctiveness). In particular, children failed to differentiate their judgments in Experiment 1 not because they required little information but because they could not use distinctiveness appropriately. This interpretation is consistent with the work of Rholes and Ruble (1984), who suggested that the use of consistency emerges prior to the use of distinctiveness information in personality judgments.

There are at least two reasons why the use of consistency may precede the use of distinctiveness in making personality judgments. First, in the context of consistency, children can rely on stimulus constancy (i.e., same actor and recipient) to make their judgments rather than on personality dispositions per se (Rholes & Ruble, 1984). In contrast, for distinctiveness, they must attend to an actor's behavior toward multiple recipients. There may be a developmental progression in which children first require stimulus constancy and only at a later age are able to reason about the direct role of traits in behavior. Although speculative, these results may underscore limitations in children's causal reasoning abilities in the social realm (see Ferguson et al., 1984). In particular, appropriate use of distinctiveness requires sensitivity to covariation information. Children must reason that the actor is the cause of the outcome in the low distinctiveness conditions because it is the actor's target behavior that is largely constant (whereas the recipients change). In the high distinctiveness conditions, children must resist reaching the same conclusion because the actor's target behavior is directed to only one recipient, rendering it difficult to make a decision about the cause of the behavior (e.g., it could be due to a bad dynamic between the actor and one individual rather than to the actor's personality). These kinds of causal inferences may be too complex for preschoolers, who may have resorted to the adoption of a matching strategy (e.g., judging that the actor is nice or mean on the basis of the outcome of the behavior without taking into account the frequency information; see White, 1995;

Yuill & Pearson, 1998) and hence treated the low and high distinct conditions equally (but see Gopnik et al., 2001, 2004, for evidence of sophisticated causal understanding in preschoolers).

Second, there are greater information-processing demands in the context of distinctiveness information. This may have resulted in a breakdown of performance at different levels. It is well known that young children are captivated by variety in stimuli, which results in an inability to attend selectively to relevant information in an array (e.g., see Miller & Weiss, 1981). The participants in Experiment 1 may have been so highly attuned to the presence of multiple recipients that they failed to notice that the frequency of the target information differed across the low and high distinct conditions (i.e., they failed to distinguish between recipients who received neutral behaviors and those who received target behaviors). In contrast, participants did not have difficulty differentiating between the low and high consistency conditions. Note that the sole difference between the high distinct and low consistency conditions was the presence of multiple recipients in the former condition. Thus, it is clear that this contextual factor had a profound impact on the way in which children treated the same frequency information. Finally, it is possible that children's performance deteriorated because they could not integrate individual pieces of information into a cohesive impression of the actor (see Rholes & Ruble, 1986). That is, participants may not have recognized the relation between the individual "units" of interaction between the actor and each recipient. Indeed, previous research suggests that children experience difficulty integrating variants of a class of information (e.g., Rholes & Ruble, 1986; Sloutsky, 2003; see Smith, 2002.). For example, Rholes and Ruble (1986) reported that children were unable to integrate instances of positive and negative information over several days.

Taken together, these findings indicate that both the quantity and the type of frequency information (i.e., level of complexity) are implicated in young children's ability to reason about personality. Children learn about the characteristics of other people by noticing patterns in their behavior. However, there also appears to be a developmental progression such that the use of consistency emerges prior to the use of distinctiveness information in reasoning about personality. Additional research is needed to determine precisely why children have difficulty processing distinctiveness information appropriately. For example, the salience of the actor's behavior could be increased to assess whether it would enable children to differentiate low and high distinctiveness conditions.

Role of Valence in Personality Judgments

Across experiments, valence had a substantial impact on children's impressions of the actor. Overall, children exhibited a positivity bias in both their personality judgments and behavioral predictions, and this was particularly evident for consistency information. Participants' behavioral predictions became increasingly positive between the ages of 3 and 6 years, and children tended to make positive trait attributions regardless of hearing about one or many positive behaviors. In contrast, they were reluctant to make negative trait attributions after hearing about one negative behavior and only did so after several negative behaviors, thus giving the actor the benefit of the doubt and attributing niceness, but not meanness, on the basis of a single behavior. The findings of a positivity bias are consistent with research indicating that children tend to overattribute favorable characteristics to people (e.g., Drozda-Senkowska, 1990; Heyman & Giles, 2004; Stipek & Daniels, 1990). For example, Stipek and Daniels (1990) found that kindergartners who were given positive information about a classmate (e.g., that he or she was smart) wrongly ascribed other positive qualities to that classmate (e.g., good athletic abilities). The presence of a positivity bias may foster adaptive development. For example, a positive attitude toward peers encourages the formation of friendships and social competence (e.g., Coie, Dodge, & Kupersmidt, 1990; Ladd & Price, 1987).

The positivity bias was notably less prominent for distinctiveness information. As with consistency, children were more likely to make the target trait attribution after seeing positive behaviors, but their behavioral predictions were more sensitive to negative information. Visual inspection of the data seems to indicate that this dissociation was largely driven by the 3- and 4-year-olds. In contrast, by 6 years of age, children's trait attributions and behavioral predictions tended to be compatible. It is unclear why there was a dissociation in valence effects between the predictions and attributions for the younger participants in Experiment 1. One possibility is that unlike adults, young children do not appreciate the correspondence between traits and trait-consistent behavior (see Aloise, 1993). Although the valence effects did not reach significance in Experiment 2, the same pattern of a dissociation between predictions and attributions was seen in the younger children, only to attenuate substantially by the time the children were 6 years of age. Because it was significant only in Experiment 1, another possibility is that the dissociation was an artifact of task complexity, although it is unclear how exactly this might have been the case. Neither of these options explains why negative information may be highly salient to preschoolers in some contexts. It is possible that young children possess a global negativity bias (see Nelson, 1980) that decreases with age but that they are reluctant to label another person negatively, thus creating the dissociation between predictions and attributions. However, this seems unlikely given that the current findings, as well as previous research, point to an overall positivity bias in personality judgments (see Heyman & Giles, 2004). Clearly, additional research will be required to address these preliminary findings of valence effects on early personality understanding.

Limitations, Future Directions, and Conclusion

This research provides a springboard for future inquiry into children's understanding of personality. First, it is important to examine the degree to which children can integrate different types of behavioral exemplars to form a trait category. Our findings suggest that fairly minor variations in exemplars (i.e., different recipients) have a profound influence on personality judgments, and the ability to integrate different exemplars may increase as a function of trait type and age. Second, the valence effects obtained here warrant further study, as the presence of biases at this very early age has implications in a number of arenas, such as stereotyping and peer relations. In particular, it is unclear under what circumstances children are likely to exhibit positivity or negativity biases. It is important to examine children's treatment of valence information as a function of both information type and task setting as well as to determine what children believe about the link between traits and behaviors. Future research on the influence of valence in personality understanding has the additional challenge of controlling for potential effects of prototypicality, which refers to the degree to which a given behavior is representative of a trait (see Mervis & Rosch, 1981). In our research, it was unclear whether sharing and taking are equally prototypical of the traits "nice" and "mean," respectively. Thus, the overall positivity bias obtained here may be due to prototypicality rather than to a positivity bias per se.

Third, it is crucial to provide children with plausible response options from which to choose in tasks of personality understanding. Many children in these studies required a forced-choice option for the prediction question, and they may have been constrained by the absence of a neutral option. In particular, children in the low frequency conditions (i.e., high distinctiveness and low consistency) could not choose the most frequent behavior (neutral), because it was not presented. Thus, they may have been biased to choose the target response (because it was familiar) or the alternate response (because it was novel). This is unlikely to have happened here given that (a) there was little evidence of systematic group biases in these conditions (children tended to respond at chance levels) and (b) it is unlikely that children would exhibit opposing biases across experiments, as would be the case here given that children tended to make the target-consistent response in the high distinctiveness, but not the low consistency, conditions. Nonetheless, this is an important issue that needs to be addressed in the future to obtain an accurate picture of how children conceptualize people.

In sum, the present research adds to a growing body of literature on impression formation at an early age. In particular, our findings draw attention to the important and complex role of frequency information in young children's personality attributions and behavioral predictions. Additional research is needed on the interaction of different factors including frequency, mental states such as emotions, desires, and intentions (see Kalish, 2002; Yuill & Pearson, 1998), task complexity, and information-processing biases to determine how these influence in concert the child's theory of personality.

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