

## Can Reinforcement Induce Children to Falsely Incriminate Themselves?

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**Abstract** This study examined whether reinforcement can induce children to falsely incriminate themselves. Ninety-nine children in kindergarten through third grade were questioned regarding the staged theft of a toy. Half received reinforcement for self-incriminating responses. Within 4 min reinforced children made 52% false admissions of guilty knowledge concerning the theft, and 30% false admissions of having witnessed it. Corresponding figures for controls were 36 and 10%. Twelve percent of children admitted to participating in the theft, but the effect of reinforcement was only marginally significant. The findings indicate that reinforcement can induce children to falsely implicate themselves in wrongdoing.

**Key words** Children's suggestibility · Verbal reinforcement · Self-incrimination · False confessions

In 1998 the murder of 11-year-old Ryan Harris attracted national attention when police identified two small boys, ages 7 and 8, as her killers (Bach, 1999; Kotlowitz, 1999). Chicago detectives reported that, after admitting knowledge of the crime that only a perpetrator would possess, the boys confessed to killing Harris for her bicycle.

The boys were charged with first-degree murder. However, subsequent laboratory tests detected semen on Harris' body. Medical experts concluded that she had been raped before being killed and that the boys could not have committed the crime. Charges were dropped and a convicted sex offender who matched the semen samples was eventually arrested for the murder.

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Why did the two boys admit to a crime they did not commit? Their lawyers contended that police interviewing tactics were at fault. The two detectives who conducted the interviews reported that they had bought the younger boy a Happy Meal. They began the interview by reminding him that “good boys” tell the truth and asking him if he was a good boy. They then held his hands, told him they were his friends, and questioned him about the murder (Kotlowitz, 1999). In response, the boy made statements which suggested that he had been present when Harris was killed. It is unclear whether the boy admitted to committing the murder. However, the detectives interpreted his admission of being present at the crime as tantamount to a confession.

Could the detectives’ “friendly” techniques have elicited false self-incriminating statements from this boy? Research suggests that they might have. As has long been recognized, reinforcement—including rewards, punishment, and the promise of rewards or punishment—can powerfully shape children’s behavior, including their verbal behavior (e.g., Carter, Bottoms, & Levine, 1996; Ettinger, Crooks, & Stein, 1994; Gilboa & Greenbaum, 1978; Goodman, Bottoms, Schwartz-Kenney, & Rudy, 1991; Tharp & Wetzel, 1969; Zigler & Kanzer, 1962). The use of reinforcement, in combination with other suggestive techniques, has been shown to substantially reduce the accuracy of children’s statements about events they have seen (Finnila, Mahlberg, Santtila, Sandnabba, & Niemi, 2003). Most pertinently, research has shown that by using positive social reinforcement (e.g., praise, approval) and negative feedback (e.g., disapproval), interviewers can quickly induce children to make false accusations of wrongdoing against other people.

Garven, Wood, and Malpass (2000; see also Garven, Wood, Malpass, & Shaw, 1998) reviewed interview transcripts from the McMartin Preschool case, in which children accused their teachers of spiriting them away from school and sexually abusing them (Butler, Fukurai, Dimitrius, & Krooth, 2001; Eberle & Eberle, 1993; Nathan & Snedeker, 1995). Using the same techniques as the McMartin interviewers, these researchers then questioned children ages 4 to 7 about Paco Perez, a man who had briefly visited their classroom.

Garven and her colleagues (2000) found that the McMartin interviewing techniques swiftly induced 35 to 50% of children to make false accusations against Paco. Social reinforcement was shown to be especially potent for eliciting false accusations. Specifically, when praised by the interviewer and urged to “help,” about 50% of children confirmed bizarre accusations (modeled on the McMartin case) that Paco had flown them to a farm in a helicopter, where they had seen animals and rode a horse. About half of children who made false allegations (that is about 25% of all children) continued to affirm their accusations even when challenged. Garven and her colleagues concluded that use of reinforcement by interviewers in the McMartin case may well have induced children to make false allegations.

Because social reinforcement in the form of approval and disapproval can lead children to make false accusations against other people, it is plausible that reinforcement might also induce them to make statements implicating themselves in a crime. Other social and cognitive factors may make children especially susceptible to reinforcement during interrogation (for a review, see Redlich, Silverman, Chen, & Steiner, 2004). Specifically, children may become more suggestible if they are questioned by authority figures such as police (Ceci, Toglia, & Ross, 1987; Loftus, 1979) and if they believe that the interrogators are already knowledgeable about the subject of the interview (Toglia, Ross, Ceci, & Hembrooke, 1992). Furthermore, children generally lack a realistic understanding of the legal system (Carter et al., 1996; Saywitz, Jaenicke, & Camparo, 1990) and thus may not fully recognize the negative implications of making false admissions in a forensic interview to please an adult.

The hypothesis that children might be induced by reinforcement to make false statements, including self-incriminating ones, receives additional support from recent studies of adults and adolescents. Several researchers have found that positive feedback (a form of reinforcement)

can induce adult eyewitnesses to make inaccurate statements or report false memories (Wells & Bradfield, 1998, 1999; Zaragoza, Payment, Ackil, Drivdahl, & Beck 2001; see also Wiseman, Jeffreys, Smith, & Nyman, March/April, 1999). Older individuals will sometimes even make false self-accusations in response to social pressure and other influences. For example, in an experiment by Kassin and Kiechel (1996), college students were falsely accused of crashing a computer and causing the loss of important data. When the accusation was made to seem plausible and confirmed by a bogus “witness,” 100% of the students wrongly “confessed” to having crashed the computer. Redlich and Goodman (2003) replicated these results and found that juveniles (ages 12 to 16) were especially likely to make false confessions in response to pressure. Drizin and Colgan (2004) have documented recent legal cases in which adolescents were induced to falsely confess to serious crimes, including murder.

Although children can give accurate reports of their experience if questioned properly (Myers, Saywitz, & Goodman, 1996; Warren & McGough, 1996; Wood & Garven, 2000), they are more vulnerable than adults to suggestive influences (for reviews, see Ceci & Bruck, 1995; Poole & Lamb, 1998). In the present study we hypothesized that relatively mild forms of social reinforcement (i.e. praise and encouragement) could induce children to make false self-incriminating statements. We presented children with a staged crime—the theft of a highly attractive toy from their school—and interviewed them afterward about its disappearance. Our questions were designed to elicit three kinds of self-incriminating false statements: (1) admissions of guilty knowledge concerning the theft, (2) admissions of having witnessed it, and (3) full confessions to having participated in it. We predicted that children who received social reinforcement would be more likely to make each kind of self-incriminating admission than would children in a control condition.

## Method

### Participants

Participants were children ( $N = 99$ , 49 boys, 50 girls) in kindergarten through third grade at two different elementary schools in El Paso, Texas. Children were excluded from the study if they were less than 5 years old or required an interview in Spanish. The participants ranged in age from 5 to 9 years, except for one 10-year-old in the third grade. Twenty-seven of the children were in kindergarten (15 boys, 12 girls), 27 in first grade (13 boys, 14 girls), 21 in second grade (11 boys, 10 girls), and 24 in third grade (10 boys, 14 girls). Informed consent was obtained from a parent or guardian of each child before the interview session, and a donation of \$5 was given to the schools for each child’s participation. The study was approved by the Institutional Review Board of the University of Texas at El Paso and complied with all relevant regulations and laws regarding research with human subjects.

### Procedure

The study took place in each school over a period of three days. On the first day, two graduate students introduced as Gonzo and Tanya visited the children in their individual classrooms. Gonzo, dressed in colorful clothes and an enormous hat, performed magic tricks for the children. Then he and Tanya displayed an attractive toy known as “Brain Warp” in a decorated Plexiglas box.

Four children from the class were invited to the front of the classroom to play with the toy as a team while the other children in the class looked on. After the four children had played

with the toy, it was returned to its box, which was closed with a large brass lock. Gonzo and Tanya promised to return the following day. In the meantime, the toy in its transparent box was displayed in a prominent spot near the school's entrance so that children would be likely to see it whenever they entered or left the school.

On the second day, Gonzo and Tanya again visited the classroom, followed the same procedures as the first day, and promised to return the next day. On the third day, Gonzo and Tanya sadly came to the classroom carrying the Plexiglas box, which was empty. They told the children that someone had taken the toy without asking, and that they needed the children's help to find out what happened to it.

Children were then taken in groups of three to a large nearby room to be questioned. After entering the room, they were separated and randomly assigned to be interviewed individually by one of four female college students whom the children had never met before. All interviews were recorded on both audiotape and videotape. Each interviewer sat on the floor with the child and conducted the questioning in a warm, supportive way, using social support techniques suggested by Carter et al. (1996). After rapport-building, the interviewer said that she wanted to find out what had happened to the toy. She proceeded to explain that she was pretty sure that the toy was taken by some children, who probably just wanted to play with it and bring it back. The interviewer then asked the child a series of questions about the toy and its disappearance. After asking the questions, which took 3 to 4 min, the interviewer thanked the child warmly for helping, and the child was escorted back to the classroom.

All interviews were completed on the third day of the study in each school. After all children had been questioned, Gonzo and Tanya immediately visited their classrooms carrying the toy. They announced that the toy has been found: A friend had borrowed it but forgotten to tell them. The children were thanked again for their help. A week or two later Gonzo and Tanya visited the classroom a final time with the toy, distributed treats, and allowed any children to play with the toy who had not yet had the opportunity.

### Manipulation and design

The experimental manipulation in this study was the manner in which the children were interviewed. Children were randomly assigned to two experimental conditions, modeled on the experimental manipulations in the reinforcement studies of Garven and her colleagues (1998, 2000).

In the control condition, children were questioned with straightforward suggestive questions (e.g. "Were there *two* kids who took the toy together?" "When the kids took the Brain Warp toy, did the toy make a loud noise?"). In the Reinforcement condition, children were questioned with the same suggestive questions as controls. However, every time that children in the Reinforcement condition said "yes" to a question they received verbal reinforcement from the interviewer ("Thanks!" "Great! You're being a real help."). In addition, children in this condition received mild negative feedback ("Are you sure? I was hoping you could help." "Try harder. I really need you to think hard.") if they said "no" to either of the first two guilty knowledge questions (questions 2 and 3). No further negative feedback was given in the remainder of the interview.

The interview questions for both groups of children fell into five categories. First, the initial question of the interview was a "Filler" question ("Do you remember the Brain Warp toy?") that all children were expected to answer "Yes."

Second, each child was asked 8 "Guilty Knowledge" questions. These questions asked for information that the child would not reasonably possess unless he or she was present when the toy was taken (e.g. "When the kids took the Brain Warp toy, did the toy make a loud noise?" "When the kids took the toy, did the kids open the lock first with a special key?").

Third, each child was asked 2 “Direct Witnessing” questions. These questions asked if the child had directly observed the toy being taken (e.g. “Did you see the kids take the toy?” “Were you there when the kids took the toy?”).

Fourth, the child was asked 3 “Confession” questions. These questions asked if the child personally participated in taking the toy (“Did you help another kid take the toy?” “Did you take the toy?”).

Fifth, interspersed with the other questions, were four “Leading Correct” questions. These questions asked the child for information that the child did in fact possess (“Did the Brain Warp toy have different colors, like red and purple?”). A complete listing of the questions used in the study is provided in Appendix A.

The three categories of misleading questions (i.e. Guilty Knowledge, Direct Witnessing, and Confession) were selected because, as discussed in the Introduction, they were all potentially self-incriminating and therefore relevant to real forensic cases. We hypothesized that by using reinforcement, an interviewer could quickly induce children to admit guilty knowledge and so falsely implicate themselves in the theft of the toy. We also hypothesized that reinforcement would induce some children to falsely admit that they witnessed the wrongdoing first-hand (i.e. direct witnessing), or even that they had participated in the wrongdoing (i.e. confession).

Garven et al. (2000) found that if children were repeatedly reinforced during the course of an interview, they gave more false responses toward the end of the interview than at the beginning. Therefore, to maximize the probability of detecting an effect of reinforcement in the present study, the “easiest” or least incriminating questions (those involving Guilty Knowledge) were asked at the beginning of each interview, and the “hardest” or most incriminating questions (those involving Direct Witnessing or Confession) were asked at the end. Thus the order of questions was not counterbalanced. Instead, question order was the same for all children (see the Appendix). This experimental procedure also paralleled a common practice in police interrogations, in which the interrogator begins with general questions about a crime and then tries to elicit increasingly self-incriminating statements from the suspect, culminating if possible in a full confession.

### Ethical considerations

The interviewing procedures in the present study were generally modeled on those used by Garven et al. (2000). However, whereas Garven et al. focused on children’s accusations of another person, the present study focused on children’s accusations of themselves, an experience that might cause anxiety in some children. To minimize possible distress, three changes in procedure were introduced for ethical reasons.

First, in the Garven et al. (2000) study children were taken from their classrooms for questioning in a neutral manner, without explaining beforehand the purpose of the interview. In contrast, children in the present study were told beforehand as a group that a toy had been stolen and that their help was needed to find it. This change in procedure was introduced so that children would approach the interview in a positive frame of mind and without anxiety. The disadvantage of this change, however, was that *all* children in the present study received encouragement beforehand (i.e., when Tanya and Gonzo asked children to “help”) which could be viewed as a promise of positive reinforcement, although only children in the experimental group received reinforcement during the interviews.

Second, as already described, the interviewers in the present study told children that whoever had taken the toy probably just wanted to play with it and then bring it back. This technique of “minimizing” the guilt of the perpetrators is commonly recommended in police interrogation manuals (Gudjonsson, 2006; Kassin, 1997; Kassin & McNall, 1991). It was introduced into the

present study because it was likely to reduce children's apprehension about the interviews while maintaining ecological validity.

Third, children in the reinforcement condition of the Garven et al. (2000) study were given negative feedback ("Try harder!") each time that they denied wrongdoing by Paco Perez. In contrast, negative feedback was kept to a minimum in the present study. Children in the reinforcement condition were given mild negative feedback only if they said "no" to the first two guilty knowledge questions in the interview. After these initial questions, interviewers gave only positive reinforcement (if children said "yes" to a question) or remained neutral (if a child said "no"). This change in procedure was introduced so that children would not be subjected to extended negative feedback if they (truthfully) denied any knowledge or involvement regarding the theft of the toy.

## Results

### Scoring of responses

The dependent variable for this study was the percentage of times the children answered "yes" to a particular type of question (Guilty Knowledge, Direct Witnessing, Confession, Leading Correct). "Yes" was scored when a child agreed either verbally or nonverbally with the main concept of the question. For example, because there were 8 Guilty Knowledge questions, children's Guilty Knowledge scores could range from 0 ("yes" answers to *none* of the Guilty Knowledge questions) to 1.00 ("yes" answers to all 8 of the Guilty Knowledge questions). All ratings were done from videotape so that the child's nonverbal (nodding head for "yes," shaking head for "no") and verbal responses could be evaluated. One rater scored all 99 interviews, and 33 of these 99 were independently rescored by a second rater. Neither rater was aware of the purpose of the study or had participated in the manipulation check. Interrater agreement as measured by a two-way intraclass correlation coefficient was 1.00 for the number of "yes" answers. Thus, scoring of "yes" answers was highly reliable.

### Manipulation check

To confirm that reinforcement had actually been used in the appropriate interviews, audiotapes were scored using a scoring system developed by Wood et al. (1998) that may be obtained upon request from the sixth author of this article. The scoring categories were Positive Consequences (a measure of positive reinforcement by the interviewer) and Negative Consequences (a measure of negative feedback by the interviewer). A primary and secondary scorer who were masked to the experimental condition of participants independently scored all 99 interviews. Interrater agreement as measured by the two-way intraclass correlation coefficient was .99 for Positive Consequences and 1.00 for Negative Consequences. According to the ratings by the primary scorer, Positive Consequences occurred an average of 11.54 times per interview in the Reinforcement condition versus 0.04 in the Control condition,  $t(96) = 24.5, p < .001$ . The corresponding numbers were 1.15 versus 0.00 for Negative Consequences,  $t(96) = 9.53, p < .001$ . These results confirmed that children in the Reinforcement condition received a strong "dose" of reinforcement but children in the control condition did not.

These ratings also showed that children in the Reinforcement condition received positive reinforcement for 97.8% (451/461) of their "yes" responses to interviewers, and negative feedback for 88.7% (55/62) of their "no" responses (negative feedback was given only for questions 2 and 3). Put another way, the correlation ( $\phi$ ) of Positive Consequences with saying "yes" was .932

( $p < .001$ ), and the correlation of Negative Consequences with saying “no” was .813 ( $p < .001$ ). These analyses confirmed that children in the Reinforcement condition were generally administered the intended form of feedback for their “yes” and “no” answers.

Twenty interviews from the reinforcement condition and 20 from the control condition were randomly selected and their length in seconds was measured from videotapes. The mean length of interviews was 209.3 seconds ( $SD = 35.2$ ) in the reinforcement condition and 161.7 s ( $SD = 31.1$ ) in the control condition. The difference of 47.6 seconds was statistically significant,  $t(38) = 4.53$ ,  $p < .001$ , and is accounted for by the extra time (about 3 seconds per question) spent in reinforcing the children.

#### Preliminary analyses

Because interviews took place in two different schools and with four interviewers, preliminary analyses were performed to detect possible differences between schools or among interviewers. Four preliminary 2 (school)  $\times$  2 (condition)  $\times$  4 (grade in school) ANOVAs were performed on the number of times that children gave “Yes” answers to guilty knowledge, direct witnessing, confession, and leading correct questions. Similarly, four preliminary 4 (interviewer)  $\times$  2 (condition)  $\times$  4 (grade in school) ANOVAs were performed with the same dependent variables. No significant main effects or interactions were found for school or interviewer. Consequently the data were collapsed across schools and interviewers for all subsequent analyses.

#### Guilty knowledge

A 2 (reinforcement)  $\times$  4 (grade in school) between-participants ANOVA was performed on the percentage of “yes” answers children gave concerning the 8 Guilty Knowledge questions. The results revealed a significant main effect of Reinforcement,  $F(1, 91) = 8.50$ ,  $p = .004$ , partial  $\eta^2 = .085$ . Specifically, children who were reinforced by the interviewer were significantly more likely to say “yes” to misleading questions that indicated guilty knowledge of the toy theft (mean proportion of “yes” answers = .520,  $SD = .261$ ) than were children in the control condition (mean proportion of “yes” answers = .362,  $SD = .241$ ). Neither the main effect for Grade in School, nor the interaction between Grade in School and Reinforcement, was statistically significant (both  $ps > .15$ ).

#### Direct witnessing

A 2 (reinforcement)  $\times$  4 (grade in school) between-participants ANOVA was performed on the percentage of “yes” answers children gave concerning the 2 Direct Witnessing questions. The results revealed significant main effects of both Reinforcement,  $F(1, 91) = 7.24$ ,  $p = .009$ , partial  $\eta^2 = .074$ , and Grade in School,  $F(3, 91) = 5.19$ ,  $p = .002$ , partial  $\eta^2 = .146$ , with no significant interaction ( $p = .360$ ). Specifically, children reinforced by the interviewer were significantly more likely to say “yes” when asked whether they had directly witnessed the toy theft (mean proportion of “yes” answers = .296,  $SD = .432$ ) than were children in the control condition (mean proportion of “yes” answers = .100,  $SD = .247$ ). Furthermore, children in kindergarten were significantly more likely to say “yes” (mean proportion of “yes” answers = .389,  $SD = .446$ ) than were children in second grade (mean proportion of “yes” answers = .095,  $SD = .256$ , Bonferroni corrected  $p = .015$ ) or third grade (mean proportion of “yes” answers = .042,  $SD = .204$ , Bonferroni corrected  $p = .002$ ).

## Confessions

A 2 (reinforcement)  $\times$  4 (grade in school) between-participants ANOVA was performed on the percentage of “yes” answers children gave concerning the 3 Confession Questions. The results revealed a significant main effect of Grade in School,  $F(3, 91) = 3.16, p = .028$ , partial  $\eta^2 = .094$ , and a marginally significant main effect of Reinforcement,  $F(1, 91) = 3.30, p = .073$ , partial  $\eta^2 = .035$ , with no significant interaction ( $p = .168$ ). Specifically, children in kindergarten were significantly more likely to confess that “yes” they had participated in the crime (mean proportion of “yes” answers = .160, SD = .325) than were children in second grade (mean proportion of “yes” answers = .016, SD = .073, Bonferroni corrected  $p = .05$ ) or third grade (mean proportion of “yes” answers = .014, SD = .068, Bonferroni corrected  $p = .04$ ). Furthermore, children reinforced by the interviewer were marginally more likely to say “yes” to Confession questions (mean proportion of “yes” answers = .109, SD = .258) than were children in the control condition (mean proportion of “yes” answers = .027, SD = .113).

Secondary analyses examined Confessions from a different perspective. Each child was assigned a score of “1” if he/she had answered “Yes” to at least one of the Confession questions, and a “0” otherwise. When all children in the experiment were combined, 12.1% answered “Yes” to at least one Confession question. The data were analyzed using chi-square. Consistent with the main analysis, a marginally significant difference was found between children in the reinforcement condition and controls,  $\chi^2(1) = 3.55, p = .059$ . Specifically, 18.4% ( $n = 9$ ) of reinforced children answered “Yes” to at least one Confession question, compared with 6.0% ( $n = 3$ ) of control children. A chi-square analysis by Grade in School yielded non-significant results,  $\chi^2(3) = 5.26, p = .153$ . However, a non-parametric analysis of the same data that treated Grade in School as an ordinal variable yielded statistically significant results, Spearman’s rho =  $-.223, p = .026$ , indicating that older children were less likely to say “Yes” to Confession questions than were younger children.

## Leading correct questions

A 2 (reinforcement)  $\times$  4 (grade in school) between-participants ANOVA was performed on the percentage of “yes” answers children gave concerning the 4 Leading Correct questions. The results revealed a significant main effect of Grade in School,  $F(3, 91) = 3.59, p = .017$ , partial  $\eta^2 = .106$ , with no significant main effect for Reinforcement and no significant interaction. Specifically, children in third grade were significantly more likely to answer Leading Correct questions correctly (mean proportion of “yes” answers = .927, SD = .156) than were children in kindergarten (mean proportion of “yes” answers = .787, SD = .180, Bonferroni corrected  $p = .05$ ) or first grade (mean proportion of “yes” answers = .778, SD = .200, Bonferroni corrected  $p = .03$ ).

## Effect of different types of questions

To determine whether the type of question (Guilty Knowledge, Direct Witnessing, or Confession) exerted a statistically significant effect on children’s responses, a 3 (type of question)  $\times$  2 (reinforcement)  $\times$  4 (grade in school) mixed model ANOVA was performed with the percentage of “yes” answers given by children as the dependent variable. The results revealed a significant main effect for Type of Question, Greenhouse-Geisser  $F(1.68, 152.52) = 78.3, p < .001$ , partial  $\eta^2 = .462$ , and (consistent with analyses already reported) significant main effects for Reinforcement,  $F(1, 91) = 10.92, p = .001$ , partial  $\eta^2 = .107$ , and Grade in School,  $F(3, 91) = 5.03, p = .003$ , partial  $\eta^2 = .142$ , with no significant interactions. Post hoc comparisons for Type of

Question indicated that “yes” answers were significantly more frequent ( $p < .001$ ) for Guilty Knowledge (mean proportion of “yes” answers = .440,  $SD = .262$ ) than for Direct Witnessing questions (mean proportion of “yes” answers = .197,  $SD = .363$ ), and were significantly more frequent for Direct Witnessing questions than for Confession questions (mean proportion of “yes” answers = .067,  $SD = .202$ ).

#### Gender effects

To explore possible gender effects, a 2 (gender)  $\times$  2 (reinforcement)  $\times$  4 (grade in school) ANOVA was performed for each of the four dependent variables. All main effects and interactions for gender were statistically non-significant except one: Gender exhibited a marginally significant main effect on Guilty Knowledge questions,  $F(1, 83) = 3.77$ ,  $p = .06$ ,  $\eta^2 = .043$ . Specifically, girls were marginally more likely to say “yes” to Guilty Knowledge questions (mean proportion of “yes” answers = .465,  $SD = .261$ ) than were boys (mean proportion of “yes” answers = .415,  $SD = .264$ ). Even when gender was included as an independent variable, Reinforcement still exerted a significant main effect on Guilty Knowledge questions,  $F(1, 83) = 7.32$ ,  $p = .008$ , partial  $\eta^2 = .081$ . Thus the inclusion of gender as an independent variable did not alter the substantive findings reported earlier.

#### Discussion

Four findings of the present study are particularly notable. First, reinforcement by interviewers quickly induced children to make self-incriminating false admissions about an apparent theft. Second, the rate of self-incriminating admissions was surprisingly high even among children who were not reinforced. Third, children were more likely to acknowledge guilty knowledge about the theft or claim that they had witnessed it than to make a full confession. Fourth, self-incriminating admissions were more frequent among younger children than older ones. Each of these findings is discussed in the following sections.

#### Effects of reinforcement

Garven and her colleagues (2000) found that reinforcement by interviewers can quickly induce children to make false accusations against an innocent person. The present study extended this finding and showed that reinforcement can also induce children to make false incriminating admissions against themselves. In interviews whose average length was only 3.5 min, reinforced children made 52% false admissions of guilty knowledge concerning a theft, and 30% false admissions of having witnessed it. Corresponding figures for controls were 36 and 10%. In a marginally significant finding, 18% of reinforced children confessed to participating in the theft, compared with 6% of controls.

These findings are particularly striking because the interviewing procedures were deliberately designed to be mild and minimize children’s stress. As already noted, children in the reinforcement condition received only a small amount of negative feedback (1.15 times per interview), and therefore were responding mainly to positive reinforcement (“Thanks!” “Great! You’re being a real help.”). Observations during interviews and conversations with teachers afterwards indicated that the children generally enjoyed being questioned, even though from a strictly legal viewpoint they had just implicated themselves in an apparent theft.

### Self-incrimination by children in the control condition

The rate of self-incriminating statements was surprisingly high among children in the control group, who made 36% false claims of guilty knowledge and 10% of direct witnessing. A few children in the control condition even gave false confessions. By comparison, the rate of false accusations against Paco Perez among control children in the Garven et al. (2000) study was 12%.

It's highly unlikely that children are more eager to accuse themselves of wrongdoing than to accuse someone else. Rather, the discrepancies between the present findings and those of Garven et al. (2000) are probably due to a difference in experimental procedures. As noted in the Methods section, for ethical reasons the children in the present study were told as a group that a toy had been stolen and that their help was needed to find it. Thus, all children, including controls, received encouragement beforehand (e.g., a request to be "helpful") that might be regarded as a promise of approval or reinforcement, although only children in the experimental group received reinforcement during the interviews. Furthermore, when children learned of the supposed theft, a "group spirit" seemed to emerge, with children shouting out their eagerness to help find the toy.

It seems clear that these children were not starting at the same baseline as the children in the Garven et al. (2000) study. However, this difference may have affected mainly the control children. The rate at which reinforced children assented to guilty knowledge questions in the present study was very close to what would have been predicted based on the findings of Garven et al. In any case, it appears that encouragement or promised reinforcement *before* an interview may influence children's willingness to make false statements, so that reinforcement *during* the interview may be "icing on the cake." This possibility merits more rigorous examination in future studies.

### Differences among guilty knowledge, direct witnessing, and confession questions

Reinforced children in the present study were significantly more likely to claim that they possessed guilty knowledge about the theft (52.0%) or directly witnessed it (29.6%) than to give false confessions (16.0%). The much higher rates for guilty knowledge and direct witnessing can probably be explained by cognitive/developmental factors. Due to their cognitive limitations and lack of experience, many children may have failed to recognize that by making false claims of guilty knowledge or direct witnessing, they were thereby implicating themselves in the theft of the toy. Instead, it seems likely that they viewed these questions in the way that they had been framed by the interviewers, that is, as a chance to "help."

In contrast, the confession questions were obviously accusatory. In fact, a few children who had calmly answered the earlier questions became visibly stern when asked the confession questions. (A few seconds later, these children were thanked warmly for their help and left the interview in good spirits.) Thus it seems likely that the relatively low rate of false confessions reflected cognitive factors: To the degree that children understood the possible negative implications for themselves, they became less willing to make false statements.

The order of questioning was not counterbalanced in the present study. That is, in all interviews the guilty knowledge questions came first, the direct witnessing questions second, and the confession questions last. However, the different response rates observed for the three types of questions probably cannot be explained by order effects. As noted in the Methods section, Garven et al. (2000) found that as questioning proceeded, reinforced children became *more* likely to make false accusations. Thus, the *lower* rate of false confessions at the end of the present interviews was actually in the opposite direction from any expected order effects. On

the other hand, because the order of questions was not varied, there remains doubt whether the results observed in the present study would be found if the order of questions were changed, with the most serious questions (Direct Witnessing or Confession) asked first, and the less serious questions (Guilty Knowledge) asked afterward. Future research can explore whether changes in order influence the size of the effect.

#### Age differences

Garven and her colleagues (2000) found that children's age was unrelated to the effects of reinforcement on false allegations. Similarly, analyses in the present study found that children's grade level was not significantly related to the effects of reinforcement for guilty knowledge questions. However, striking age effects were observed for direct witnessing and confession questions. Specifically, younger children (kindergarten and first grade) were substantially more likely than older ones (second and third grade) to say that they had seen the theft of the toy or participated in taking it.

It is not unusual to find age differences in suggestibility research (Ceci & Bruck, 1995; Poole & Lamb, 1998; Warren & McGough, 1996). However, the pattern of results in the present study seems to invite two possible explanations. The first is purely cognitive. As already noted, children became less likely to make false statements during the course of the interview, as the questions became more obviously self-incriminating. It seems likely that older children recognized the possible negative implications of their statements more quickly than the younger children did. Thus, the high confession rate among the younger children might reflect a cognitive failure to understand the full implications of what they were saying.

However, this cognitive explanation fails to account for another finding of the study: Without reinforcement, the false confession rate for both kindergarteners (mean proportion = .051) and third graders (mean proportion = .000) was very low. Thus, it appears that kindergarteners—at least in the non-reinforced condition—were cognitively able to recognize the blatant negative implications of the confession questions.

A second explanation seems to account more fully for the findings. Perhaps the crucial difference between the younger and older children lay in their different abilities to forego immediate positive consequences (i.e. praise and approval from an interviewer) in order to avoid more remote negative consequences (i.e. punishment for a theft). Developmental research indicates that older children are more likely than younger children to forego immediate gratification in order to achieve long-term goals (Mischel, Shoda, & Rodriguez, 1989). Future research, using larger samples of children, may explore whether this explanation helps to account for some aspects of child suggestibility.

#### Theoretical implications

Gudjonsson (2006) has identified six theoretical models of the psychology of interrogation, self-incriminating admissions, and confessions. Of these six, Hilgendorf and Irving's (1981) model of decision-making by suspects during the interrogative process is probably most relevant to the present study. Hilgendorf and Irving theorized that when suspects are interrogated, they consider the different courses of action open to them, weigh their relative perceived value or "subjective utility," and choose the course of action that maximizes net utility.

Applying the Hilgendorf and Irving (1981) model to the present study, we can hypothesize that children who received reinforcement weighed the negative utility of possible self-incrimination against the positive utility of receiving praise and approval from the interviewer. For guilty knowledge and direct witnessing questions, relatively few children may have recognized that

false admissions could have serious negative consequences. Therefore the false admission rate in response to these questions was relatively high. For confession questions, however, the children probably recognized the potential negative consequences of a false admission. Therefore the false admission rate in response to confession question rates was relatively low.

Following this line of thought further, we can hypothesize that children do not fully recognize the potential negative consequences associated with false admissions of guilty knowledge and direct witnessing. As noted in the prior discussion of “Age Differences,” even kindergarten children appear to recognize the potential negative consequences of a false confession. However, they may lack the life experience or cognitive ability to appreciate how admissions of guilty knowledge or of witnessing a crime can also constitute a form of self-incrimination and so lead to extremely negative consequences. In fact, the same might be true of many juveniles and adults. That is, some juveniles and adults, like the children in this study, may also underestimate the negative outcomes associated with false admissions of guilty knowledge and direct witnessing. If so, the Hilgendorf and Irving (1981) model would predict that such individuals, like children, will be substantially more willing to make false admissions of guilty knowledge or direct witnessing than to make false confessions.

Another interesting generalization of the model to older groups concerns the perceived utility of interviewer approval. The interviewer’s praise and approval had relatively high positive utility for children in the present study. Does the positive utility of such praise diminish or disappear entirely as the age of the individual being questioned increases? If so, (a) what is the functional value of the expected utility at different ages or developmental levels, (b) does it eventually reach zero or a non-zero asymptotic value, and (c) do some interrogation techniques (e.g., isolation, good cop/bad cop) temporarily enhance this expected utility even among juveniles and adults? These questions have both practical and theoretical interest and deserve exploration in future studies.

#### Practical implications

The present study duplicated several central features of the Ryan Harris case. The children in the study were the same age as the boys charged with Harris’ murder and were questioned about an apparently genuine crime (i.e., theft) with interviewing techniques similar to those reportedly used by Chicago detectives. Using only gentle tactics, we were able to extract self-incriminating admissions from children and even several full confessions in a matter of a few minutes. Our findings suggest that the use of reinforcement in the Harris interviews (e.g., buying the younger boy a Happy Meal, urging him to be a “good boy”) might have had negative effects on the boys’ accuracy. Specifically, the present findings suggest that positive reinforcement might fairly easily have elicited false admissions from the boys that they witnessed or were present at a crime. However, the present findings also suggest that positive reinforcement by itself would have been unlikely to elicit full-scale false confessions from the boys. Of course, in the absence of more detailed information about the Harris interviews and more extensive experimental evidence, these conclusions must remain highly tentative.

#### Limitations of the findings and future directions

The present study had several limitations. First, the experimental intervention consisted primarily of positive reinforcement, but with a mixture of some negative feedback (during questions 2 and 3). Research has shown that the effects of positive reinforcement can sometimes be enhanced if it is combined with mild negative feedback (Whitehurst, 1969). Thus it is unclear whether the intervention in the present study would have had the same effect on children’s responses if only

positive reinforcement had been administered, without any negative feedback. Future studies may examine this issue. However, when forensic interviewers use reinforcement to question children, as in the McMartin Preschool and Ryan Harris cases, they often combine positive and negative feedback together. Thus the mixture of positive and negative feedback in the present study may be more representative of real-life legal situations (i.e., may possess greater external validity) than an intervention of “pure” positive reinforcement.

A second limitation was the “minimization” procedure that was used at the beginning of all interviews in the present study, when children were assured that whoever had taken the toy probably just wanted to play with it and then bring it back. This procedure was added to the study to reduce children’s stress and because similar procedures are commonly employed by police interrogators (Kassin, 1997; Kassin & McNall, 1991; Leo, 2004). However, it is possible that the children might have behaved differently if they had been questioned in a more accusatory manner that emphasized the seriousness of the theft and the culpability of the persons who took the toy.

It is also possible that the information given to children during this minimization procedure provided them with partial answers to some later questions in the interview (e.g., “Did the kids say they were going to bring the toy back later?”). However, a careful post hoc examination of children’s responses to individual questions did not suggest that the information given to children during the minimization procedure affected the overall rates of “yes” answers for particular items (the data for individual questions are available upon request from the sixth author).

Finally, the findings of the present study are limited because only one type of crime—theft—was examined. It is possible that children would have responded differently if they had been questioned regarding a misdeed that was either more serious (e.g., murder) or less serious (e.g., accidental breakage of a toy). Future research may examine whether the present findings generalize to other types of wrongdoing with differing levels of seriousness.

Clearly the present study represents only a first step in exploring the topic of self-incrimination among children. The topic of child and juvenile confessions has received only scant attention from researchers (Redlich et al., 2004) and merits more extensive exploration in the future.

## Appendix

### Questions Used in the Guilty Knowledge Study

1. Do you remember the Brain Warp Toy? (Filler)
2. Were there *two* kids who took the toy together? (Guilty Knowledge)
3. Did the kids say they were going to bring back the toy later? (Guilty Knowledge)
4. Did the Brain Warp toy have different colors, like red and purple? (Leading Correct)
5. When the kids took the Brain Warp toy, did they whisper before they took the toy? (Guilty Knowledge)
6. Did the kids laugh when they took the toy? (Guilty Knowledge)
7. If somebody makes a mistake, does the toy make a loud noise? (Leading Correct)
8. When the kids took the Brain Warp toy, did the toy make a loud noise? (Guilty Knowledge)
9. When the kids took the toy, did they play with it soft? (Guilty Knowledge)
10. Did Gonzo and Tanya keep the toy in a glass box with a lock on the door? (Leading Correct)
11. When the kids took the toy, did the kids open the lock first with a special key? (Guilty Knowledge)
12. When the kids took the toy, did the kids put two shoes inside the box where the toy had been? (Guilty Knowledge)

13. Sometimes does the toy say ‘You’re finished’ in a loud voice? (Leading Correct)
14. Did you see the kids take the toy? (Direct Witnessing)
15. Were you there when the kids took the toy? (Direct Witnessing)
16. Did you help another kid take the toy? (Confession)
17. Were you one of the kids who took the toy? (Confession)
18. Did you take the toy? (Confession)

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