Video Article

The Modified Temptation Resistance Task: A Paradigm to Elicit Children's Strategic Lie-telling

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Abstract

The protocol for the temptation resistance paradigm was designed to elicit 2- to 8-year-old children's strategic lie-telling behaviors. The reward of transgression was intended to be too tempting to resist, so that children's spontaneous lie-telling behavior in the presence of irreversible evidence due to the transgression could be observed. Conducted in a developmental psychology laboratory behind a one-way mirror and video recorded with a hidden camcorder, the protocol starts with a guessing game where the child is given three trials to guess the identities of hidden objects under an upside down cup. The experimenter gives hints in the first two trials to make sure the child "guess" them correctly. At the beginning of the final trial, the experimenter leaves the room briefly and asks the child not to peek under the cup. If the child could not resist the temptation and peeks, small particles previously filled in the cup would scatter on a grooved surface. Upon the experimenter's return, the child is asked if he/she has peeked. If he/she denies transgression contrary to the presence of the physical evidence, he/she is asked to explain why the particles are on the table. Three responses could be observed in the procedure, including the initial transgression, truth-telling or lie-telling behavior if the child peeked, and the strategic lie-telling behavior in the presence of the physical evidence.

Video Link

The video component of this article can be found at https://www.jove.com/video/57189/

Introduction

The overall goal of this modified temptation resistance protocol is to elicit children's naturalistic lie-telling behaviors in a deliberately designed laboratory setting. Children's lie-telling behavior as an important aspect of their social development has been the focus of research interest for decades. Lie-telling is defined as the intentional delivery of a false statement by one person or group to another person or group[1]. Lying to conceal one's own misdeeds is the most common and the earliest form of deception exhibited by children[2], although it is viewed very negatively by both children and adults[3]. This type of lie serves the interests of the tellers by protecting them from the consequences of their transgressions[4], but it violates trust and breaks rules of communication by contravening the assumption of information equality[5]. Although often viewed as a type of antisocial behavior, lying is an important social skill[6], and its emergence reflects children's flexibility in dealing with complex social situations to ensure their own preservation. Therefore, enlisting children's spontaneous lie-telling behavior in a laboratory setting not only enables studies to investigate the development of children's lie-telling as a social behavior itself in depth, but also allows investigations into the cognitive and social correlates of lie-telling behavior during childhood.

Though children's lie-telling behaviors have attracted research attention for a long time[7], significant progress regarding spontaneous lie-telling was only made possible in recent decades with the development of innovative experimental procedures that create situations prompting children to lie spontaneously[1,4,8,9,10,11]. Earlier studies asked children to "lie" about certain facts[12], which does not reflect the covert nature of lie-telling. Lie-telling is a deceptive behavior where the listener is not supposed to know that the liar is trying to mislead him or her; and the listener should not be able to detect the lies for them to be successful. Thus asking the children to "lie" about facts creates a counterfeit situation which is deviant from children's natural lie-telling scenarios. Similar challenge was also present in earlier observational studies of lie-telling[13], which only captured the "lies" that were debunked by the observer.

Pioneered by Sears, Rau, and Alpert[14], and subsequently by Lewis *et al.*[8], the original temptation resistance paradigm provides method for ecologically valid explorations of children's naturalistic lie-telling behaviors. In this paradigm, children are given the opportunity to commit a transgression, for example, being left alone in room with an attractive toy and instructed not to peek or play with it. Due to the task's high demand on executive function, it is difficult for young children to resist the temptation to peek or play with the toy. As a result, when being asked whether they have peeked or played with the toy, children who have transgressed have an opportunity to lie spontaneously. Thus, the paradigm creates a situation to elicit children's spontaneous lies instead of instructing them to lie. More importantly, it mimics the nature of the most common children lies, which usually aim to conceal wrongdoings[14]. The paradigm was further modified by Polak and Harris[9], in which they compared a permissive condition where children were allowed to play with the toy with a prohibitive condition where children were instructed not to touch the toy. The

contrast between children's reactions in the two conditions highlighted the fact that children had the actual intention to lie rather than forgetting what they did.

The most cited version of the modified temptation resistance paradigm starts with a guessing game[1,10,15]. Children are instructed to guess the identity of a toy by the sound it makes while facing away from the toy. After they get the first two trials correctly, they would be left alone in the room before they have a chance to guess the final one. They are instructed not to turn around to peek. Unlike the first two trials where the sound the toys make match the identities of the toys, the final toy makes a sound that is unrelated to the identity, therefore, it is unlikely to guess what the toy is simply through listening. Upon the experimenter's return, the child is asked what the toy is, and whether he/she has peeked. Follow-up questions would explore children's strategic lie-telling to cover up their transgression[1,9,10,16]. Strategic lie-telling is when the lie-teller takes what the lie recipient knows into consideration and makes a false statement consistent with previous lies in order to cover up misdeeds[4]. In this case, those who falsely deny transgression would be asked to explain how they know the identity of the toy without peeking to test whether they could offer plausible explanations consistent with their initial false denial to avoid being exposed. Studies employing this version of the paradigm suggested that preschool children were hardly able to tell plausible strategic lies consistent with their false denial of transgression[1,9].

In addition to enlisting spontaneous and genuine lie that resembles those in the natural social exchange, the temptation resistance paradigm was further modified to confront children with the physical evidence of transgression to enlist cover-ups of the initial lies. A further modified version of the temptation resistance paradigm was developed by Evans, Xu, and Lee[4] to examine children's strategic lie-telling behaviors in the presence of physical evidence. Different from semantic leakage control, the ability to maintain consistency between lies, strategic lie-telling requires a lie-teller to maintain consistency between a lie and the evidence that is available to the lie recipient, in this case, not only the verbal evidence, but also the physical evidence. In this version, children are asked to guess the identity of a toy hidden in an upside down cup for three times. The experimenter would give clues to ensure all children "guess" correctly in the first two trials. Subsequently, the children are instructed not to peek under the cup in the final trial while the experimenter briefly leaves the room. If they do transgress and peek, the content hidden in the cup would spill and leave physical evidence that is hard for children to clean up. Children are then asked to explain the physical evidence if they deny peeking. The advantage of this version over previous protocols is to reduce cognitive demand imposed by tracking changes in other people's beliefs as a result of the lies[4]. Instead, the presence of physical evidence of transgression functions as a reminder of previous behavior and contrasts directly with children's lies. That way children only need to fake their intentions to make a plausible explanation: the spill was an accident instead of the result of an intentional act. This is especially significant given that the mental state of intention is understood earlier in development than other people's beliefs[17]. Empirical studies using this version of the protocol demonstrate that young children are able to tell strategic lies consistent with the physical evidence of their transgression by 4- or 5-years of age[4].

This paper introduces the modified version of the temptation resistance paradigm used in a recently published study[18] in details with refined procedures and materials. The protocol is suitable for eliciting 2- to 8-year-old children's spontaneous lie-telling behavior. The recommended age range is based on the emergence of lie telling behavior in young children and their mental state understanding development during this period. Children as young as 2-year-old lie, and the level of sophistication of the lies is arguably associated with children's false belief understanding[1,16]. Children pass the first order false belief task between 3- and 5-years of age[19], and pass the second order false belief task around 7- and 8-years of age[20]. The introduced protocol could be potentially used in areas of developmental psychology research related to children's social understanding and social behavior.

Protocol

All methods described here have been approved by The Human Research Ethics Committee (HREC) of The Education University of Hong Kong. Obtain written informed consent from a parent or a guardian for each child.

1. Introduction and Warm-up

1. Introduce the child and the parent to the developmental psychology laboratory. Ensure that the child does not find out the hidden camcorder for video-recording or the adjacent observation room behind the one-way mirror. Let the individual child sit next to the experimenter at a child-sized table.
2. Allow sufficient time for the child to get familiar and comfortable with the environment and the experimenter.
3. Offer 3 attractive gifts for the child to pick the most desirable one. Tell the child the most desirable gift is the reward if he or she wins the following guessing game.
4. Let the parent say, "see you later" to the child. Invite the parent to join an assistant in the adjacent observation room to observe the testing session behind the one-way mirror.

2. The Guessing Game

1. Prepare three sets of hidden objects in opaque upside-down cups placed on grooved plates in advance, and keep them out of the child's sight. Hide a single toy in the first two sets, such as a toy car and a ping-pong ball. Fill the third cup with some rice and position it upside down on the grooved plate. Handle the rice cup with care to prevent accidental spill.
2. Invite the child to play a guessing game with the experimenter: "Let's play a guessing game." Present a cup positioned upside down on a grooved plate. Tell the child: "There is an object hidden in the cup. You need to guess what it is correctly for three consecutive trials to win this game."
3. For first two trials, give relevant clues for the child to "guess" correctly, for example, "What is the vehicle that runs on the road?" for the toy car, or "What is the thing you can play with a ping-pong paddle?" for the ping-pong ball. Congratulate the child on two consecutive wins.
4. On the final trial, present the cup with the hidden rice. Push the child's most desirable gift in front of the child and say: "Now, we are going to play the last round of the guessing game. If you guess this one correctly, you will get this gift which you like the most; but you won't get it if you guess it wrong."
5. Ensure that an assistant knock on the door of the laboratory at this exact instant, and ask the experimenter to exit the room for a moment.

6. Tell the child: "Do not lift the cup to peek. I'll be right back." Then leave the room.

3. The Transgression

NOTE: The rice in the third cup would scatter on the plate if the child lifts the cup. The textured grooves on the plate makes it impossible for children to remove the spilled rice completely, leaving physical evidence of the transgression.

1. Observe the child's behavior behind the one-way mirror. If the child peeks, record the time duration between the moment the experimenter leaves the room and the moment the child starts to peek.
2. Return to the room after 3 min if the child does not peek, or 1 min after the child starts to peek.

4. The Lie-telling Behavior

1. Ask the child: "While I was gone, did you lift the cup to see what is inside?", and wait for the child to respond.
    1. If the child has not peeked, ask the child to guess what is inside the cup and reveal the content of the cup, then proceed to step 6.
    2. If the child has peeked and admits the transgression, tell the child, "It was hard not to peek, wasn't it?" and proceed to step 6.
    3. If the child has peeked and lies about peeking, that is, he/she answers "No" despite the obvious physical evidence of transgression, look at the spilled rice and say: "How come the rice is outside the cup?", and then turn to the child and ask: "Are you sure you didn't lift the cup to see what was inside?", and wait for the child to respond.

5. The Strategic Lie-telling

1. If the child confesses that he or she peeked, tell the child, "It was hard not to peek, wasn't it?" and proceed to step 6.
2. If the child continues to deny having peeked after the previous steps, ask the follow-up question: "So how did the rice get out of the cup?", and wait for the child to respond.

6. Debriefing

1. Debrief the child. Tell the child that this is just a game, and it is normal for children to peek or lie in this game because it is very tempting. Give each child the promised gift at the end of the session regardless of his/her response in the temptation resistance task.
2. Debrief the parents. Inform the parents that the protocol is specifically designed to elicit peeking and lying behavior in children, and around half of the children peek or lie. Explain to the parents that these behaviors reflect sophisticated cognitive development and social conduct, and they are not regarded as specifically negative or naughty in this context.

7. Data Processing and Coding

Note: Interrater reliability needs to be established for all mentioned coding of the responses.

1. Transcribe video-recorded children's verbal responses verbatim for coding.
2. Ensure that two independent coders code at least 20% of all the observations for establishing interrater reliability.
3. For the coding of strategic lies, watch the video recordings of the observations and read the transcripts of children's responses to identify the involvement of intentions.
4. Resolve discrepancies between the two independent coders through discussion.
    NOTE: Children who did not lift the cup are coded as *non-peekers*, including those who simply touched the cup; children who lifted the cup are considered *peekers*. The *peekers* are further coded as *truth tellers* (those who admitted peeking) and *liars* (those who denied peeking). The liars' explanations for the scattered rice are further coded into strategic lies and non-strategic lies. Strategic lies are plausible and refer to intention (*e.g.*, "I just touched the cup, but the rice came out"). Non-strategic lies lack credibility and include unconvincing explanations (*e.g.* "The rice came out by itself"), silent responses, and the response of "I don't know." Children are further categorized into four groups based on the level of transgression and lie: *non-peekers, truth tellers, non-strategic liars,* and *strategic liars*.

Representative Results

The above method was implemented by Wang *et al.*[18]. Participants were 93 typically developing children from local kindergartens in Hong Kong (47 boys; age range 39.24 to 81.48 months, mean (M) age = 59.76 months, standard deviation (SD) = 9.84 months). The participants were divided into two groups using an age cutoff of 60 months. The younger group was composed of 46 children younger than 5 years (22 boys; M = 51.60 months, SD = 6.12 months), and the older group was composed of 47 children older than 5 years (25 boys; M = 67.7 months, SD = 4.90 months).

Two trained coders coded all of the children's lies and explanations. The inter-rater agreement for lie-telling behavior was 1.00, and that for the level of lies was 0.87. Discrepancies were resolved through discussion.

The percentages and fractions of children who peeked, lied, and told strategic lies across the two age groups are presented in **Table 1**, adapted from Wang et al.[18]. Approximately half of the children (46.2% of the 93 children) peeked under the cup in the experimenter's absence. A chi-square test of independence indicated that peeking behavior was not affected by age, X^2(1, N = 93) = 2.64, p = .15, ø = .17, odds ratio (OR) = 1.96, 95% confidence interval (CI) = 0.87 - 4.41. On average, the peekers started to peek around half a minute after the experimenter left the room (M = 32.17 s, SD = 41.48), with more than half of them starting to peek within 10 s of the experimenter's departure (53.1% out of 43 children).

The majority of the peekers (69.8% of the 43 children who peeked) lied about their transgression; of these children, 4 (all of whom were older than 5-year-old) confessed when confronted with the evidence, whereas the rest attempted to cover up their lies. The older children were more likely to lie than the younger children, X^2(1, N = 93) = 3.52, p = .04, ø = .19, OR = 2.28, 95% CI = 0.96 - 5.46. The percentages of the younger 5-year-old group and older than 5-year-old group who lied about peeking were 58.8% (out of 17 who peeked) and 76.9 (out of 26 who peeked), respectively. More children in the older group (n = 6) than in the younger group (n = 1) came up with a plausible explanation for the spilled rice.

Children's responses in the temptation resistance task can be represented by four mutually exclusive categories: (1) *non-peeker:* those who did not peek; (2) *truth teller:* those who peeked and then admitted later; (3) *non-strategic liar:* those who peeked and then denied but failed to provide a reasonable explanation; and (4) *strategic liar:* those who peeked, denied, and provided a strategic explanation. Modified from Wang et al.[18], **Figure 1** presents the number of children in each level of transgression category.
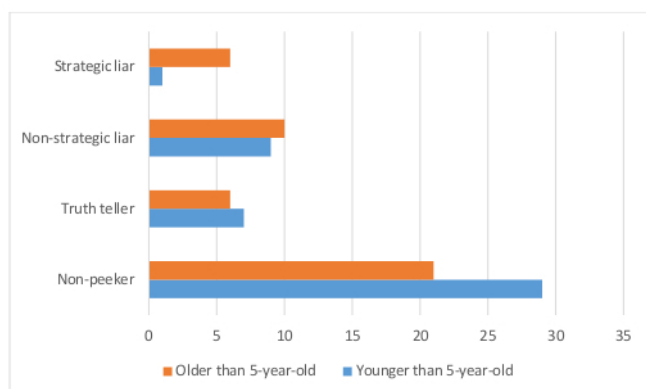

Figure 1: Number of children in each level of transgression category by age group. A bar chart of number of children in the each level of the four transgression category, (1) *non-peeker;* (2) *truth teller;* (3) *non-strategic liar;* and (4) *strategic liar* across age groups. This figure has been modified with permission from Wang et al.[18].

Measure	Total	Younger than 5 (n = 46)	Older than 5 (n = 47)
Peeking % (fraction)	46.2 (43/93)	37 (17/46)	55.3 (26/47)
Lying % (fraction)	69.8 (30/43)	58.8 (10/17)	76.9 (20/26)
Strategic lying % (fraction)	26.9 (7/26)	10 (1/10)	37.5 (6/16)
Note. Four older than 5-year-old children who initially lied confessed when confronted with the evidence, hence only the remaining 26 children attempted to cover up their lies.			

Table 1: Percentages and fractions of children who peeked, lied, and told strategic lies. Percentages and fractions of children who peeked, lied, and told strategic lies in total and across age groups. This table has been modified with permission from Wang et al.[18].

Discussion

The protocol detailed in this article allows researchers to investigate children's spontaneous lie-telling behaviors in an experimental setting. It provides the children an opportunity not only to tell primary lies about their misdeeds, but also to tell more sophisticated strategic lies when confronted with evidence to cover up their misdeeds.

Some of the considerations in adapting and implementing this protocol relate to the procedure and item selection. Researchers could choose to skip step 4.1 for that this step already presents children the apparent conflict between their own claims and the physical evidence. Consequently, including this step might mask some children's ability to tell strategic lies. The procedure of asking each child to rate the desirability of a set of gifts was meant to take individual child's preference into consideration in order to engage children in the subsequent procedures. Pilot testing might be necessary to determine the appropriate gift items considering participants' gender, age, family economic status, and culture. In addition to rice used in the current protocol, any small particles that are easy to spill but difficult to clean up once stuck into the grooves of the plate should be suitable for the third trial of the guessing game. The setup of the last trial of the guessing game needs to be prepared in advance and handled with caution to avoid accidental spillage, which would ruin the procedure.

This procedure was adapted from Evans et al.[4], but with nuanced differences. In Evens et al., the experimenter gave differentiated responses upon return. When the child did not peek and there was no physical evidence, the experimenter simply asked whether the child had peeked or not. When there was evidence, the experimenter commented on the evidence first, then asked the question. In this case, children's answer to the question contains two steps of processing: 1. Do I want to lie or not? 2. Will my lie be effective considering she already noticed the evidence? In the current protocol, the experimenter asked all children the same question when she/he first came back into the room: did you peek while

I was gone? Then for these who peeked and with physical evidence, the experimenter commented on the evidence and then asked the child again. This change allows the children to process the two steps in separate questions. In the current sample, four older than 5-year-old children confessed that they initially lied after being confronted with evidence. They realized that it was impossible to convince the experimenter due to the physical evidence when they were asked for the second time whether they peeked. The current protocol produces a more accurate number of children willing to lie in the face of evidence.

With the well thought through materials, the current protocol maximizes the sample size usable for analysis. In a previous version of this protocol, of the 106 children who lied, one in five (n = 21) cleaned up the evidence of their transgression[4]. In the current protocol, it was impossible for children to return the rice and cup to their original position without leaving any evidence. In order to do so, one needs to clean the grooves of the plate using a hard bristle brush, put the rice back into the cup, cover the cup with the plate, and turn the cup upside down swiftly while pressing the plate toward the cup. Pilot testing showed that no child could eliminate the evidence of transgression so that the data from all those who peeked could be used for analysis.

Another change in the current protocol is the coding of the strategic lies. Instead of using a 3-level categorical coding for the strategic lies (0, implausible; 1, plausible but not likely to occur, *e.g.*, "other children came in and did it"; and 2, intentional) [4], this protocol adopts a dichotomous coding of plausible and intentional strategic lie (*e.g.*, "I just touched the cup, but the rice came out") *vs.* non-strategic lie that lacks credibility (*e.g.*, "The rice came out by itself", or "I don't know."), because the qualitative feature that differentiates the levels of lie is whether it involves intention or not. This coding enables categorization of children according to the level of transgressions and lies: *non-peekers, truth tellers, non-strategic liars,* and *strategic liars.*

The temptation resistance paradigm offers observable behavioral indicators that are reported to associate with other developmental achievements and social factors. For example, children's transgression is associated with their inhibitory control[6]; lie-telling behavior may relate to children's theory of mind understanding[6] or parental mind-mindedness[18]; and the strategic lie-telling behavior involving covering up the initial lies may associate again with children's theory of mind understanding and inhibitory control ability[4]. With proper adjustments, the protocol is highly versatile and can be applied to a wide range of academic and applied context.

More than half of the participants in the current sample did not peek, which means the researcher has to recruit a relatively larger sample in order to enlist enough peeking and lying behavior for the desired power. More sensitive materials and procedures are needed to entice children to peek under the cup.

Disclosures

The authors have nothing to disclose.

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