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Brief Report

Do as I do, not as I say: Actions speak louder than words in preschoolers learning from others

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ABSTRACT

To date, no research has examined children's imitative abilities in the context of learning self-regulatory strategies from adults—especially when there is a conflict between communicative intent and later behavior. A sample of 84 4- and 5-year-olds performed a delay-of-gratification task after observing an adult perform the same task. Across four between-participants conditions, the model either did or did not state her intention to complete the task (positive vs. negative communication), modeled self-regulatory strategies, and then either did or did not complete the task successfully (positive vs. negative outcome). Children in the positive outcome conditions were more likely to imitate the novel strategies and successfully wait in both familiar and unfamiliar self-regulation tasks irrespective of the model's communicated intent. We discuss implications for practice and interventions.

Introduction

Successful self-regulation of behaviors and emotions is an important developmental milestone (Eisenberg & Morris, 2002) and a powerful predictor of various adaptive competencies across the life span (Moffitt et al., 2011). Although early predispositions such as temperament and gender have been implicated in children's self-regulation abilities, a large body of work has highlighted the importance of social influences (McCabe, Cunnington, & Brooks-Gunn, 2004; Vygotsky, 1978).

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Research suggests that children initially rely on their caregivers to aid in self-regulation before they acquire the cognitive capacities to develop and employ their own strategies (Morris, Silk, Steinberg, Myers, & Robinson, 2007). However, this literature has relied almost exclusively on correlational studies documenting the relation between parental characteristics (e.g., sensitivity, responsiveness) and children's self-regulation (Doan, Fuller-Rowell, & Evans, 2012; Lee, Semple, Rosa, & Miller, 2008; Von Suchodoletz, Trommsdorff, & Heikamp, 2011). A few studies have also looked specifically at strategies that children themselves use to self-regulate, concluding that attention deployment is particularly effective (Sethi, Mischel, Aber, Shoda, & Rodriguez, 2000). Building on this work, other research suggests that strategy-focused direct instruction (thinking happy thoughts) influences children's delay-of-gratification performance (Mischel, Ebbesen, & Zeiss, 1972; Yates, Lippett, & Yates, 1981). Despite the importance of strategy use and evidence that it can be transmitted, virtually no work has explored the teaching of these strategies and mechanisms by which children learn self-regulation from others (Fox & Calkins, 2003). More important, no research so far has systematically examined the extent to which children imitate modeled strategies based on not only adults' verbal information but also their behavior.

Although no experimental research to date has explored children's imitation of adult behavior when learning self-regulatory strategies, a large body of research has highlighted that children's capacity to learn from adults across a variety of domains is what makes humans unique (e.g., Boyd, Richerson, & Henrich, 2011). Yet, the majority of the research on learning from and imitating adults has focused on learning the conventional nature of tools (e.g., Carpenter, Akhtar, & Tomasello, 1998). Here, we asked whether children's imitation patterns are similar when learning from adults about novel *social conventions* such as those used for self-regulation where the causal relation between regulatory behavior and outcome might be challenging to decipher.

On the one hand, the task of learning social conventions might be regarded as similar to tool use because in both cases children can acquire such information from others via adult "testimony" (e.g., Harris & Corriveau, 2011). Children weight information from adults more heavily in situations where the information to be learned is ambiguous (Jaswal, 2010) or is more easily acquired from an adult than through firsthand experience (Harris & Koenig, 2006). This is the case when learning social conventions such as self-regulatory strategies. Delaying gratification, by engaging in certain activities that are not immediately rewarding (e.g., exercise) or inhibiting certain behaviors (e.g., not eating certain foods), confers benefits that are not immediately salient for young children. Moreover, how to regulate one's behaviors and emotions is not directly intuitive. Thus, it is more feasible and efficient to turn to adult informants to acquire self-regulatory strategies.

On the other hand, looking to adults to learn self-regulatory strategies, in particular, can be difficult for young children. This is because adults may provide conflicting verbal and behavioral information. For example, parents may state the importance of not snacking before meals (the communicative intent) but then contradict their verbal intent by snacking before a meal (the behavioral outcome). Under these situations, it is not clear whether young children prioritize an adult's communicative intent or the outcome of the adult's behavior.

Currently, no research has explored children's acquisition of self-regulatory strategies in situations where verbal information and behavioral information conflict. Moreover, whereas tool use might be constrained to a specific tool, conventional knowledge should generalize beyond a particular situational context. That is, children should be able to extend a strategy to a novel situation.

In the current study, we explored children's use of two cues when learning self-regulatory strategies from an adult: their reliance on an adult's verbal instruction and their observation of outcomes. Children watched a model demonstrate self-regulatory strategies in a delay-of-gratification task. Crucially, the model's communicative intent and successful completion of the task (successful waiting) varied across children. Across four between-participants conditions, the model either did or did not state the intention of waiting (positive vs. negative communication) and then either did or did not succeed at the task (positive vs. negative outcome). We examined the extent to which children would imitate the strategies when engaging in a similar task and when generalizing the strategies to a novel context.

We hypothesized that children would be more likely to succeed at a delay-of-gratification task and imitate the self-regulatory strategies observed when the model's verbal information and behavioral

information were consistent and positive as opposed to when they were consistent and negative. Of interest was children's strategy imitation after observing conflicting verbal and behavioral information. Some literature suggests that perceptual information—in this case seeing the behavioral outcome in person—is more salient to children than other sources of information, including verbal communication (Bandura & McDonald, 1963; Miller, Hardin, & Montgomery, 2003). By contrast, other research highlights children's sensitivity to a model's intention when determining what to learn (e.g., Harris, 2012; Liu, Vanderbilt, & Heyman, 2013; Meltzoff, 1988). Thus, we also investigated whether verbal information or behavioral information exerted more influence over children's imitation of social conventions and performance on a self-regulatory task.

Finally, we hypothesized that children would be more likely to succeed at a novel self-regulatory task and to generalize strategies when the model's behavioral information and verbal information were consistent and positive. We made no predictions as to children's ability to generalize information from the familiar task to the novel task when verbal information and behavioral information were in conflict.

Method

Participants

A sample of 84 4- and 5-year-old children (48 female) participated. All children participated with the consent of their parents, spoke English as their first language, and were recruited from local preschools. In terms of race/ethnicity, 82.0% were identified by their parents as White, 14.3% as Asian American, 2.4% as African American, and 1.2% as Hispanic. Although information on socioeconomic status was not collected, the preschools serve a predominantly middle-class and upper middle-class population.

Children were randomly assigned to four between-participants conditions (n = 21 per group). The mean age was 55.89 months (SD = 5.77, range = 47–69). No age differences were found across the four conditions, $F(1,83) = 0.314$, $p = .81$.

Materials

A White adult female served as the model. For the delay-of-gratification task, stickers (one small sticker and two larger stickers) served as incentives and a bell was used to notify the experimenter to end the wait. During the novel wait task, a box of toys was used (e.g., toy car, drawing pad, dolls). Two other experimenters (E1 and E2) interacted with the child. E1 sat with the child and narrated the model's actions. E2, blind to the experimental condition, interacted with the child in the familiar delay-of-gratification task and the novel wait task.

Procedure

Observation of model

To begin the task, children watched as an experimenter (E2) explained the delay task to the model, saying, "I have a sticker here. I need to leave for a bit. If you wait until I come back, you can have this sticker *and* this big sticker. Two stickers! If you want to stop waiting, then ring the bell and I will come back right away, but you will only get this one sticker." Next, children watched as the model attempted to complete the task.

In the *Positive Communication–Positive Outcome* condition, the model verbally expressed that she would self-regulate ("I should wait to get more stickers later") and successfully completed the task (successfully waited until the experimenter returned).

In two conditions, the model's verbal information and behavioral information conflicted. In the *Positive Communication–Negative Outcome* condition, the model verbally expressed that she would self-regulate but did not complete the task (rang the bell). By contrast, in the *Negative Communication–Positive Outcome* condition, the model stated that she would not self-regulate

("I shouldn't wait so that I get this sticker now") but then successfully waited until the experimenter returned.

Finally, the *Negative Communication–Negative Outcome* condition was used as a control for reflexive imitation. The model stated that she would not wait and then did not wait (rang the bell).

In all conditions, the adult modeled two self-regulatory strategies (singing a song and pushing away the incentive followed by explicitly looking away from the incentive). After verbally expressing that she would or would not wait, the adult modeled each strategy for 30 s. Children watched the model with E1, who explicitly labeled the strategies used by the model (e.g., "Oh look, she's singing a song. She's singing a song to distract herself. When she's singing a song, she is not thinking about the sticker anymore"). After engaging in the strategies, either the model rang the bell, ending the task, or the experimenter appeared and stated that the model had successfully waited.[1]

Familiar self-regulation task

Next, children were invited to complete the same task by E2. E2 repeated the instructions and left the room for 5 min or until the child rang the bell. During the waiting period, the child was alone in the room and was video-recorded for subsequent coding of imitation of the modeled strategies, the frequency and duration of strategy use, and the task outcome.

Novel self-regulation task

Following the familiar self-regulation task, children were taken to a different area of the room by E2 to complete a modified version of the Challenging Wait Task (Carmichael-Olson, Greenberg, & Slough, 1985). Children were shown a box of engaging toys and told to wait until the experimenter returned before playing with the toys. The task ended after 5 min or when a participant touched one of the toys. As in the familiar self-regulation task, strategy imitation and task completion were video-recorded and coded.

Video coding

To determine children's strategy imitation and completion of the task, the second author (G.M.), blind to the experimental condition of the child, coded all videos. A second coder coded 20% of videos. Inter-rater reliability was high (94% agreement, Cohen's $\kappa = .85$). Disagreements were resolved through discussion.

Results

Preliminary analyses indicated no significant association between gender and strategy use, $\chi^2(1, 84) = 0.12$, $p = .73$, or task completion, $\chi^2(1, 84) = 0.44$, $p = .51$, and no significant age differences (4-year-olds vs. 5-year-olds) in strategy use, $\chi^2(1, 84) = 0.06$, $p = .81$, or task completion, $\chi^2(1, 84) = 3.52$, $p = .06$. Thus, these variables were not included in subsequent analyses.

Strategy imitation in the familiar self-regulation task

Children received 1 point for each imitated strategy (max = 2). Table 1 displays children's total strategy imitation (out of 2) across each of the four conditions. Inspection of this table indicates a similar pattern of imitation for children in the two Negative Outcome conditions, with most children not engaging in either strategy. By contrast, roughly half of the children in the two Positive Outcome conditions imitated at least one strategy.

To explore this difference in strategy imitation, we conducted a 2 (Communication: positive vs. negative) × 2 (Outcome: positive vs. negative) analysis of variance (ANOVA) on the number of

[1] To ensure that children could recall both the verbal information and behavioral information from the model, in a pilot study 16 children (M_{age} = 5 years 1 month, SD = 9 months) observed the model in one of four conditions and were asked about the model's communicative intent and behavioral outcome (successful or unsuccessful waiting). All children successfully recalled the model's communicative intent, and 94% of children recalled the model's behavioral outcome, suggesting that children were encoding both verbal and behavioral information.

Table 1
Number of strategies (max = 2) participants imitated across conditions.

Condition	Total strategy imitation			
	0	1	2	N
Positive communication–Positive outcome	11 (57.9%)	7 (33.3%)	3 (14.3%)	21
Positive communication–Negative outcome	19 (90.5%)	2 (9.5%)	0	21
Negative communication–Positive outcome	10 (47.6%)	6 (28.6%)	5 (23.8%)	21
Negative communication–Negative outcome	16 (76.2%)	4 (19.0%)	1 (4.8%)	21

strategies imitated. This analysis revealed a main effect of outcome, $F(1,80) = 12.71$, $p < .001$, $\eta_p^2 = .14$. The main effect of communication, $F(1,80) = 1.41$, $p = .24$, was not significant, nor was the interaction between communication and outcome significant, $F(1,80) = 0.03$, $p = .89$. Nonparametric analyses confirmed this result; children were more likely to imitate the strategy after viewing a positive outcome as opposed to a negative outcome, Mann–Whitney $U = 570.5$, $z = -3.35$, $p < .001$. By contrast, children were no more likely to imitate the strategies after hearing positive or negative verbal communication ($U = 785$, $p = .30$).

We also coded for the number of times each participant used the two novel strategies. Fig. 1 displays the mean frequency of strategy use for each of the conditions (range = 0–5 strategies). Inspection of this figure indicates that participants in the two Positive Outcome conditions had the highest means. To explore this difference, we conducted a 2 (Communication: positive vs. negative) × 2 (Outcome: positive vs. negative) ANOVA on the total number of times the strategies were used. This analysis revealed a main effect of outcome, $F(1,80) = 12.11$, $p < .001$, $\eta_p^2 = .13$. The main effect of communication, $F(1,80) = 1.05$, $p = .31$, was not significant, nor was the interaction between communication and outcome significant, $F(1,80) = 0.04$, $p = .84$.

Familiar self-regulation task completion

Table 2 shows the proportion of children who successfully waited during the familiar task by condition. Inspection of this table indicates that approximately 75% of the children in the Positive Outcome conditions successfully completed the task. By contrast, only roughly 50% of the children in the Negative Outcome conditions completed the task.

To explore the relation between successfully waiting and model observation condition, we conducted a logistic regression with task completion as the dependent variable and outcome (positive vs. negative), communication (positive vs. negative), and their interaction term as predictors. The final model included only the effect of outcome ($B = 0.97$, $SE = 0.48$, $\chi^2 = 4.32$, $p = .0385$, -2 log likelihood [$-2LL$] = 103.95, pseudo-$R^2 = .05$). On average, the odds of successfully waiting during the familiar task were 2.64 times more likely if children observed a model exhibit positive behavior as opposed to negative behavior.

A logistic regression was conducted to explore the relation between successful waiting and strategy imitation. Results indicated that strategy imitation was a significant predictor of task completion ($B = 1.35$, $SE = 0.61$ $\chi^2 = 5.87$, $p = .026$, $-2LL = 102.40$, pseudo-$R^2 = .07$). On average, the odds of successfully waiting during the familiar task were 3.86 times more likely if the child imitated at least one of the strategies.

Extension of learned strategies and successfully waiting during the novel task

Lastly, we explored children's extension of self-regulatory strategies to a novel situation. Overall, only 7% of participants used a learned strategy during the novel task—and all of these participants were in the two Positive Outcome conditions (3 children in the Positive Communication–Positive Outcome condition and 3 children in the Negative Communication–Positive Outcome condition). Nonparametric analyses confirmed that children in the Positive Outcome conditions were more likely

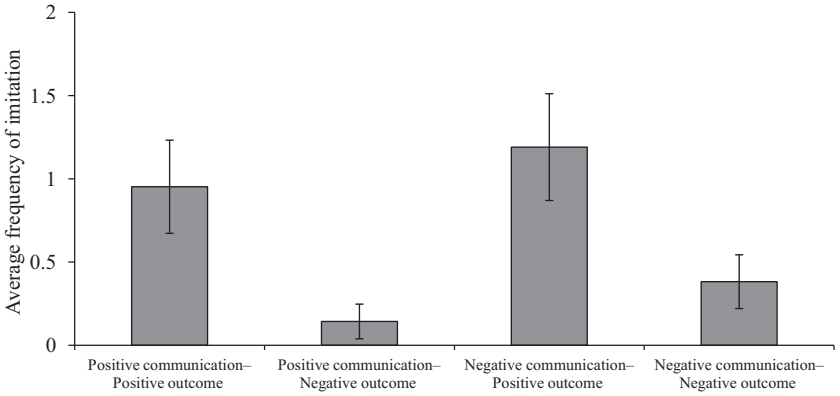

Fig. 1. Average numbers of times (and standard errors) participants used either of the two strategies during the task by condition (max = 2).

Table 2
Number of children who successfully waited during the familiar task across conditions.

Condition	Completion of task		
	Rang bell	Waited	*N*
Positive communication–Positive outcome	5	16 (76.2%)	21
Positive communication–Negative outcome	9	12 (57.1%)	21
Negative communication–Positive outcome	5	16 (76.2%)	21
Negative communication–negative outcome	10	11 (52.4%)	21

than children in the Negative Outcome conditions to extend the strategies to the novel task, $\chi^2(1, 83) = 6.63$, $p < .01$.

Furthermore, children who had used at least one strategy during the familiar task were more likely to extend the strategies to the novel task ($B = 1.74$, $SE = 0.90$, $\chi^2 = 3.98$, $p = .05$, $-2LL = 39.09$, pseudo-$R^2 = .05$). On average, the odds of using a learned strategy during the novel task were 5.7 times more likely if the child had used at least one of the strategies during the familiar task. In addition, children who had successfully waited during the familiar task were significantly more likely to wait during the novel task ($B = 1.07$, $SE = 0.49$, $\chi^2 = 4.69$, $p = .03$, $-2LL = 97.59$, pseudo-$R^2 = .05$). On average, the odds of successfully waiting during the novel task were 2.9 times more likely if the child had successfully waited during the familiar task. Note that these results should be interpreted with caution given the low rate of strategy use in the novel task.

Discussion

In the current study, we investigated how children prioritize a model's communicative intent and behavioral outcome when imitating self-regulatory strategies and successfully completing a self-regulation task. We had hypothesized that children would be more likely to succeed at a delay-of-gratification task and imitate the self-regulatory strategies when verbal and behavioral information provided by the model was consistent and positive, as opposed to when the information was consistent and negative. Of interest was children's strategy acquisition and success at the task when the model's communicative intent and behavior were incongruent. Overall, these data reveal that the model's successful completion of the task was related to children's task completion, imitation, and extension, whereas the model's verbal intent was not. We discuss these findings before addressing implications for educational intervention.

To our knowledge, this is the first study to compare children's use of an informant's communicative intent with the outcome of the informant's behavior when engaging in imitative behavior. Contrary to some literature highlighting the role of the model's intentions in children's learning (e.g., Liu et al., 2013; Meltzoff, 1988), our data suggest that children weight the outcome of the model's actions greater than the model's intent when deciding to engage in imitation. Indeed, children's strategy imitation (frequency and duration) was related to outcome, with no significant effect of verbal communication, in our analyses.

Why would children ignore a model's communicative intent when imitating novel conventions? First, it is plausible that the type of communication led to enhanced strategy encoding but primed children's background knowledge of strategies, which they may have chosen instead. To explore this possibility, we reviewed the videos for instances of other strategy use (e.g., gaze aversion, self-talk). No differences were found in other strategy use across conditions, $F(3,79) = 0.99$, *ns.* Approximately 90% of participants engaged in some form of alternate strategy during the delay task.

In addition, we reran the logistic regression with alternate strategy use and found that alternate strategy use was not a significant predictor of task completion ($B = 21.98$, $\chi^2 = 0.00$, *ns*). Thus, our data do not support the hypothesis that model communicative intent enhanced children's employment of previously used strategies.

An alternative possibility is that children used the model outcome to reappraise the effectiveness of the strategies they had previously witnessed. On this hypothesis, children equally encode the strategies prior to the model outcome regardless of model communicative intent. After viewing the successful or unsuccessful outcome, children implicitly decide whether or not to place the strategies in memory. This is consistent with recent work showing that children are equally willing to imitate novel tool functions in the presence or absence of pedagogical cues (Schmidt, Rakoczy, & Tomasello, 2010). Note that although our pilot work suggests that children had encoded both communicative intent and behavioral outcome immediately following the model's demonstration, future research should assess children's memory of the model's strategies to determine whether children in the negative outcome condition had indeed forgotten them after completing both the familiar and novel tasks. Future work should also include measures of understanding mental states (theory of mind) and executive functioning because both of these skills develop rapidly across the preschool years (e.g., Frith & Frith, 2005; Zelazo & Müller, 2002) and might affect children's appraisal of the model's communicative intent. That is, although all children might encode the model's self-regulatory strategies, sufficient executive functioning abilities might be necessary for children to be able to implement strategy-related behavior. Similarly, sufficient understanding of mental states might be necessary for children to map the relationship between a model's intentions and the model's subsequent behavior—especially in cases such as our current task where pedagogical cues are not explicit and when intentions and behavior are sometimes in conflict. Moreover, such variability in executive function and theory of mind might also account for the small percentage of children who extended the strategies to a novel task.

Children's successful completion of the task was related to whether or not children had viewed the model successfully completing the task. This finding is consistent with Bandura's (1977) social learning theory as well as some recent empirical work highlighting the role of model behavior in children's learning (Kenward, Karlsson, & Persson, 2010). We anticipate that by modeling both strategies and outcomes, adults can increase the salience of the link between the two for young children.

Moreover, our data suggest that some children learned beyond simple imitation of modeled strategies. A subset of children were able to flexibly extend the strategies to a new context. All of these children were in conditions where they observed a positive outcome. This finding further highlights the relevance of outcome over pedagogical intent for children's implementation of observed strategies. Although children's learning of self-regulatory behaviors was rather fragile—indeed, the majority of children were unable to generalize the strategies across tasks—children were more likely to generalize strategies to a novel task when they had observed a positive outcome. Future research should focus on the reason behind the low rate of transfer in our paradigm. In addition to the role of executive function in mental state understanding in children's ability to generalize, we anticipate that explicitly highlighting the causal relationship between strategy use and successful completion of the task might increase the probability that children would extend the strategies in novel situations.

We suggest that these findings have implications for understanding how children acquire strategies in explicit or indirect teaching contexts where pedagogical intent and behavioral outcome may conflict. For the most part, interventions and everyday parental instruction often include discussion and modeling of effective strategies, but currently less attention is paid to modeling the *outcome* of strategy use. The results of the current study suggest that observation of a successful outcome is crucial when encoding novel conventions and, for some children, when extending those novel conventions to new situations. The efficacy of interventions could be improved not only by teaching children the importance of self-regulation and how to self-regulate via verbal instruction and explanation but also by actively demonstrating that these strategies are indeed effective. In summary, our findings highlight a striking difference between the importance of pedagogical intent and model outcome in children's acquisition and use of novel social conventions, one that we believe provides notable implications for successful instruction.

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