



SHORT REPORT

How do generic statements impact performance? Evidence for entity beliefs

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Abstract

Generic statements about the abilities of children's social groups (e.g. 'Girls/Boys are good at this game') negatively impact children's performance – even if the statements are favorable towards children's own social groups. We explored the mechanism by which generic language impairs children's performance. Across three studies, our findings suggest that generic statements influence children's performance by creating an entity belief (i.e. a belief that a fixed ability determines performance). Children who were exposed to a generic statement about their social group's ability performed worse than children in control conditions. This effect hurt children's performance even when the person who made the generic statement was no longer present and a new person not privy to the statement replaced them. However, when children heard a generic statement paired with an effort explanation (i.e. 'Girls/Boys are good at this game because they try really hard when they draw') they performed better than children who heard the generic statement with no explanation (i.e. just 'Girls/Boys are good at this game') and children who heard the generic statement paired with a trait explanation (i.e. 'Girls/Boys are good at this game because they are smart and really good at drawing'). This work uncovers when and how generic statements that refer to the ability of one's social group hinder performance, informing the development of practices to improve student motivation and learning.

Research highlights

- Generic statements about the ability of one's social group hinder children's performance on a novel task.
- Generic statements hinder performance by creating an entity belief.
- Generic statements hinder children's performance even in the absence of the person who made the statement.
- Generic statements lead children to adopt a performance goal (i.e. choosing an easier task) on a subsequent task.
- Generic statements coupled with an effort explanation mitigate the negative effects of generic statements on children's performance.

Introduction

'Giraffes have long necks.' 'Girls like dresses.' Generic statements that refer to entire categories make up 3–4% of the sentences children hear annually (Gelman, Goetz, Sarnecka & Flukes, 2008). Although this may seem like an insignificant amount of exposure, these remarks play a crucial role in shaping children's cognition. Four- and five-year-olds are more likely to seek out information about kinds over specific individuals (Cimpian & Park, 2014; Cimpian & Petro, 2014) and have better memory for generic information, compared to parallel content-specific information (Cimpian & Erickson, 2012a). Further, once learned, generic knowledge is hard to invalidate – even with

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counterexamples (Cimpian, Brandone & Gelman, 2010).

Generic statements lead children to use presented facts to generate causal inferences about deep, stable, and essential properties regarding category members (Brandone, Gelman & Hedglen, 2015; Cimpian and Markman, 2009; Gelman, 2003). Four- and five-year-old children provide deep, conceptual explanations when they are presented with generic statements, compared to when presented with non-generic statements. For example, children who heard the generic statement ‘Snakes have holes in their teeth’ came up with causal explanations like, ‘so they can chew food better’. However, children who heard the non-generic statement, ‘He has holes in his teeth’, were more likely to respond with situational explanation – e.g. ‘a bug came in its room, and it bit his teeth’ (Cimpian & Markman, 2009). Similarly, generic statements linking an ability to social category membership (e.g. ‘Boys are good at math’) lead children to attribute performance outcomes to stable and uncontrollable factors (e.g. ‘because they are smart’). In contrast, non-generic statements (e.g. ‘There is a boy who is really good at math’) lead children to generate explanations referring to situational and controllable factors (e.g. ‘because he practices a lot’; Cimpian & Erickson, 2012b; Cimpian & Markman, 2011).

Unlike generic statements about taxonomic categories, generic statements about the ability of one’s social group can negatively impact children’s performance. Counter-intuitively, generic statements hurt children’s performance even if the statements are framed favorably toward their own social group. Four- to seven-year-old children who heard a generic statement about the ability of their own social group (i.e. ‘Boys/Girls are really good at this game’) performed worse than children who heard a similar non-generic statement (i.e. ‘There is a boy/girl who is really good at this game’) and children who received no information about the game (Cimpian, Mu, & Erickson, 2012). These results raise an important question: *How do positive generic statements about one’s social group negatively affect performance?*

Generic statements and entity beliefs

Generic statements may create entity beliefs (Cimpian *et al.*, 2012). Cimpian *et al.* (2012) have argued that generic statements about ability communicate that the described ability is endowed to all members in the category by their nature, rather than being a product of factors such as effort. Children who possess such entity beliefs think performance is driven by fixed and uncontrollable traits such as innate smartness. Consequently, they are less motivated and perform worse on achieve-

ment tasks than those with incremental beliefs, who think that performance depends on malleable and controllable factors like effort (Mueller & Dweck, 1998).

Supporting the above idea, Cimpian *et al.* (2012) found that children who heard a generic statement about the ability of their own social group performed worse than children who did not hear the generic statement on a challenging task, although not on an easy task. Given that entity beliefs most strongly relate to performance in challenging situations (Licht & Dweck, 1984), this finding is consistent with an entity belief explanation (see Cimpian *et al.*, 2012, for detailed information).

An alternative hypothesis, however, is that generic statements negatively affect performance by creating pressure to meet the success expectation of an experimenter. Generic statements that link success with children’s own social groups (e.g. ‘Girls are good at this game’ stated to a girl) may indicate that the person making such statements (e.g. the experimenter) expects the girl to succeed based on her membership in the group that was referenced. Past research has shown that when success expectations are delivered explicitly so that individuals are aware that others expect success, the individuals feel pressure to live up to those expectations, which can hinder their performance (Baumeister, Hamilton & Tice, 1985; Cheryan & Bodenhausen, 2000), particularly on challenging (vs. easy) tasks. This is because pressure-induced worries consume cognitive resources that are needed for success on challenging (but not easy) tasks (Beilock, 2008).

To our knowledge, no direct evidence exists regarding how generic statements impact performance. Such evidence is important for (a) elucidating the mechanism by which generic statements relate to performance and for (b) pointing to a possible way to mitigate the negative impact of generic statements. We examined a possible mechanism for how generic statements negatively affect performance.

First, we tested the effects of generic statements in a context where the person who made the generic statement was no longer present (Studies 1, 2). We reasoned that, if a generic statement hurts performance by creating an entity belief that children internalize, then generic statements should hurt children’s performance even when the person who made the statement is no longer present. In other words, the effect of the generic statement should be generalizable across experimenters. In contrast, if the generic statement hurts performance by creating success expectations and performance pressure, it should lower children’s performance when the person who made the statement is present at the time of test more so than in her absence. This is because success

expectations lead to performance decrements especially in the presence of audiences who hold the expectation of success. Failure disappoints not only the performer but also the audience (Baumeister & Steinhilber, 1984; Seta & Hassan, 1980).

We next examined whether exposure to generic statements about a novel drawing game would influence children's motivation on a different task (i.e. choosing an easy vs. a difficult puzzle; Studies 2, 3). Previous findings showed that children who are repeatedly exposed to generic statements about certain abilities produce entity belief explanations for novel domains of activities (Cimpian, Sutherland & Bian, 2011) and children with an entity belief tend to choose an easy task that is likely to yield success over a challenging task that might not yield success (Dweck & Leggett, 1988). Based on this research, if generic statements create or increase entity beliefs, then children who are exposed to generic statements should be more likely to choose an easy task than a hard task on a subsequent, yet different, task. In contrast, if generic statements hurt children's performance by creating a success expectation on the particular task referenced, their motivation on the subsequent task should not be impacted.

Lastly, based on the knowledge we gleaned from Studies 1 and 2, we decoupled the link between generic statements and entity beliefs by providing an effort explanation following the generic statement (Study 3). If generic statements lead children to form the generic statement–entity belief link, then providing a generic statement with an effort belief (e.g. 'Boys are good at this game because they try really hard when they draw') should decouple this link and generic statements should no longer hinder performance.

Study 1

In Study 1, we compared children's performance in generic and non-generic (control) conditions, aiming to replicate the previous finding that generic statements hurt performance (Cimpian *et al.*, 2012). In addition, we manipulated whether the experimenter who made the generic statement was present when children completed the task. If generic statements are detrimental to performance because they lead children to generate a casual inference about deep and stable properties of their social groups (Cimpian & Markman, 2009), rather than because of contextual factors that create a success expectation, then being exposed to generic statements should have a negative effect on performance (even in the absence of the person who made the generic statement

during the test). Children who hear generic statements should perform worse than those who do not, regardless of whether the experimenter who made the generic statement is present.

Participants

Participants included 44 4-year-old children ($M = 4.56$, $SD = 0.27$, range = 4 years, 0 months to 4 years, 11 months). An additional two children were tested but excluded in subsequent analyses for not following instructions.

Materials and procedure

Adapting the procedure from previous studies (Cimpian *et al.*, 2012; Rhodes & Brickman, 2008), the first experimenter (E1) began by explaining how to play the 'shape game'. Children received a worksheet with shapes and were instructed to draw circles inside those shapes. Children were told that they would get one point for each circle they drew, and that they should draw circles until the experimenter said 'stop'. Children were also told that they needed to draw the circles inside the lines of the shape as quickly and carefully as they could to earn more points. Next, children were randomly assigned to two different conditions: in the generic condition ($n = 22$), children were told a generic statement matched to the participant's gender ('Boys/girls are really good at this game!' to boys/girls, respectively). Children in the control condition ($n = 22$) were given no additional information beyond the explanation of how to play the shape game.

In the presence of E1, all children then completed the shape game (presence round). E1 told children to stop after drawing 12 shapes regardless of the actual time it took them to do so. The time taken by each child to complete the 12 shapes was measured. At this point the experimenter communicated failure to the child by saying, 'That didn't go so well. Twelve is not too many points.' Children were given negative feedback to ensure they perceived the task as challenging, creating the type of situation in which others' success expectations and entity theory are thought to matter the most (Baumeister *et al.*, 1985; Licht & Dweck, 1984). Then, the second experimenter (E2) entered the testing room, saying there was a phone call for E1. E1 left and the child played the second round of the game with E2. During the second round, all children were allowed to complete 16 shapes (absence round). The time it took each child to complete the 16 shapes was recorded. All children were praised for their performance before concluding the experiment.

Results and discussion

Because all participants were stopped at the same point (after 12 and 16 shapes in the presence and absence conditions, respectively), speed in both the original experimenter present and absent rounds served as our dependent variable. Speed was defined as the number of shapes a child would complete in 1 minute, based on the amount of time the child took to complete 12 shapes (round 1, E1 present) and 16 shapes (round 2, E1 absent). For instance, if a child took 30 seconds to complete 12 shapes during the E1 present round, then his/her speed for that round was calculated as 24 shapes per minute.

Replicating previous research, in the E1 present round, children in the generic statement condition ($M = 25.04$ shapes/minute, $SD = 5.80$) performed significantly worse than those in the control condition ($M = 30.77$, $SD = 7.97$), $t(42) = 2.73$, $p < .01$, $d = 0.82$. Importantly, in the E1 absent round, the negative effects of generic statements persisted: children in the generic condition ($M = 30.02$, $SD = 7.20$) performed worse than those in the control condition ($M = 37.44$, $SD = 8.84$), $t(42) = 3.05$, $p < .01$, $d = 0.92$ (see Figure 1). This pattern is most consistent with the hypothesis that generic statements lead to entity beliefs that are detrimental to performance. If, instead, generic statements hurt performance by creating success expectations, these statements should hurt performance more when the person who made the statement is present (vs. absent) at the time of test. They did not.

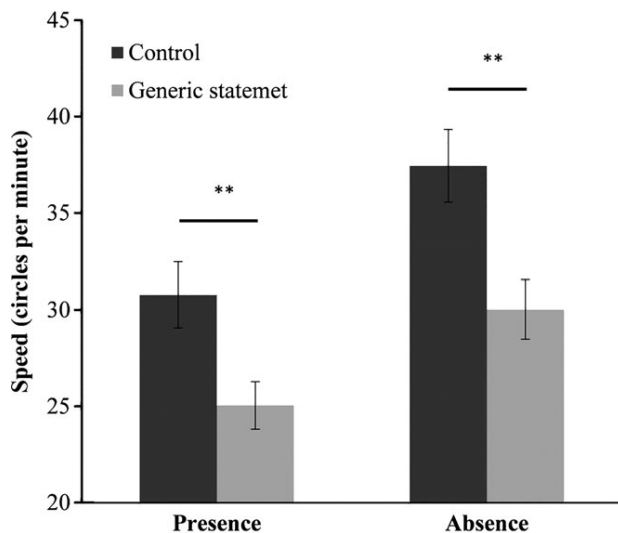


Figure 1 Average speed in Round 1 and Round 2 in Study 1. Error bars represent ± 1 SE. $**p < .01$

Discussion

Study 1 replicates previous research, which reported that generic statements about the ability of one's social group hinder performance in the presence of the experimenter who made the statement. Moreover, our results indicate that the debilitating effects of generic statements persist even when the experimenter who made the statement is not present at the time of test. As this is the first demonstration of the negative effects of generic statements in the absence of the individual who made the statement, we carried out a second study to replicate these findings. In Study 2, we also included a pre-test to ensure no baseline performance differences on the shape game between the experimental and control groups. We also wanted to rule out a possible alternative explanation: children might perform worse after hearing generic statements compared to control participants because any additional information relating social group membership to performance in the game created a detrimental effect (regardless of whether it was a generic statement or not). To address this issue, in Study 2 we included a control condition in which children received information about the activity that was related to social group membership, but in a non-generic way (i.e. 'There is a girl/boy who is good at this game'). Finally, to examine whether exposure to generic statements about the drawing game would influence children's motivation on a different task, we asked children to choose one of two puzzles that varied in difficulty at the end of experiment.

Study 2

Participants

Participants included 46 4-year-old children ($M = 4.47$, $SD = 0.30$, range = 4 years, 0 months to 4 years, 11 months). None of these children had participated in Study 1. An additional child was tested but excluded in subsequent analyses for not following instructions.

Procedure

Study 2 employed a similar procedure to Study 1, with a few important changes. In Study 2, at the beginning of the experiment, children played the first round of the game (pre-test) with E1, in which all children received negative feedback about their performance, but no other information about the game. This provided a baseline measure of performance across conditions. After completing the first round and receiving negative feedback, children were randomly assigned to either hear a generic

statement ('Girls/boys are really good at this game'; $n = 24$) or a non-generic statement ('There is a girl/boy good who is good at this game'; $n = 22$). Then, E1 left the room and participants played the second round with E2; the E1 absent condition served as a post-test measure across conditions. Finally, a puzzle choice task was added to the end of the study. When the second, absence round of the shape game was complete, E1 returned, and asked the child to pick between two puzzles¹ saying 'Which one would you rather work on?' One was a 12-piece puzzle (easy) and the other was a 20-piece puzzle (hard). All children were praised for their puzzle choices and performance before concluding the experiment.

Results and discussion

Performance

As in Study 1, speed served as a dependent variable. At pre-test, children in the generic ($M = 26.45$, $SD = 9.27$) and non-generic ($M = 26.16$, $SD = 9.07$) conditions did not differ in their speed, $t(44) = -0.11$, $p > .90$. To explore performance differences at post-test, we subtracted the pre-test speed from the post-test speed to create an improvement score for each participant (the higher the value, the more speed improved from pre- to post-test). As expected, children differed in their rate of improvement by condition: children in the non-generic condition ($M = 5.84$, $SD = 5.25$) improved marginally more than those in the generic condition ($M = 3.03$, $SD = 5.01$), $t(44) = 1.86$, $p = .07$, $d = 0.39$ (Table 1).

Puzzle choice

Next, we examined the prediction that exposure to generic statements would lead children to prefer an easier subsequent task. A chi-square analysis (0 = 12 pieces, 1 = 20 pieces) showed that puzzle choice differed by generic statement conditions, $\chi^2(1) = 7.62$, $p < .01$. Children who heard a generic statement were more likely to choose the easy puzzle (12 pieces) compared to those who heard a non-generic statement. Among children who heard the generic statement, 87.5% (21 out of 24) chose the easy over the hard puzzle, while only 50% of children (11 out of 22) who heard the non-generic statement did so.

¹ The puzzles were identical in all dimensions (image, color, and overall size), except for difficulty (i.e. number of puzzle pieces). To avoid any value judgment in words 'easy' or 'hard', E1 did not mention any words related to difficulty of the two puzzles (e.g. easy, hard, 12 pieces, 20 pieces).

Table 1 Mean speed on pre-test/post-test and speed improvement in Study 2

	Pre-test	Post-test	Improvement
Generic	26.45 (9.27)	29.47 (10.04)	3.02 (5.01)
Non-generic	26.16 (9.07)	32.00 (10.07)	5.84 (5.25)

Note: Standard deviations are given in parentheses.

Discussion

Study 2 showed that generic statements lowered children's performance on a drawing game even when the person who made the statement was no longer present. Moreover, children who heard generic statements were more likely to choose an easy subsequent task (a task that did not involve the original drawing game) compared to children who did not hear generic statements, even though the non-generic statement also referred to social group membership.

Study 3

In Study 3, we leveraged our findings regarding the entity belief mechanism from Studies 1 and 2 to test a potential way to mitigate the effects of generic statements on performance. If generic statements create entity beliefs as a default, then decoupling the link between the generic statement and entity beliefs by providing an effort explanation along with the generic statement should eliminate the debilitating effect of generic statements. To test this hypothesis, we compared children's performance across three conditions that included generic statements either with (1) no explanation, (2) a trait explanation, or (3) an effort explanation.

Participants

Participants consisted of 63 4-year-old children ($M = 4.45$, $SD = 0.38$, range = 3 years, 11 months to 4 years, 11 months) who had not participated in the prior studies. An additional three children were tested but excluded from the data analyses for not following instructions.

Procedure

One experimenter administered the same drawing task used in Studies 1 and 2. First, children were introduced to the shape game, taught how to play it, played the first round (pre-test), and then encountered negative feedback. Children were then randomly assigned to one

of three conditions, all including generic statements: (1) generic control condition ($n = 21$) wherein children were told, ‘Girls/Boys are good at this game’, (2) trait explanation condition ($n = 21$) wherein children heard, ‘Girls/Boys are good at this game, because they are smart and really good at drawing’, or (3) effort explanation condition ($n = 21$) wherein children heard, ‘Girls/Boys are good at this game, because they try really hard when they draw.’ Then, all participants played the game a second time with the same experimenter (post-test) and were also given the puzzle choice task.

Results and Discussion

Performance

At pre-test, a one-way ANOVA showed that children did not differ in speed by condition, $F(2, 60) = 0.81, p > .40$ ($M_{\text{control}} = 26.49, SD_{\text{control}} = 8.52; M_{\text{trait}} = 25.90, SD_{\text{trait}} = 7.12; M_{\text{effort}} = 23.41, SD_{\text{effort}} = 9.22$). However, children differed in their rate of improvement by condition (speed on post-test–pre-test; Figure 2), $F(2, 60) = 6.88, p < .01, \eta_p^2 = .19$. There was no difference in the improvement between the trait explanation ($M = 3.37, SD = 4.37$) and generic control conditions ($M = 1.46, SD = 5.77$), $t(60) = 1.21, p > .20$. However, children in the effort explanation condition ($M = 7.19, SD = 5.04$) improved significantly more than those in the trait explanation condition, $t(60) = 2.43, p < .05, d = 0.81$, and those in the generic control condition, $t(60) = 3.64, p < .01, d = 1.06$.

Puzzle choice

Two children in the generic control condition and one child in the effort explanation conditions refused to

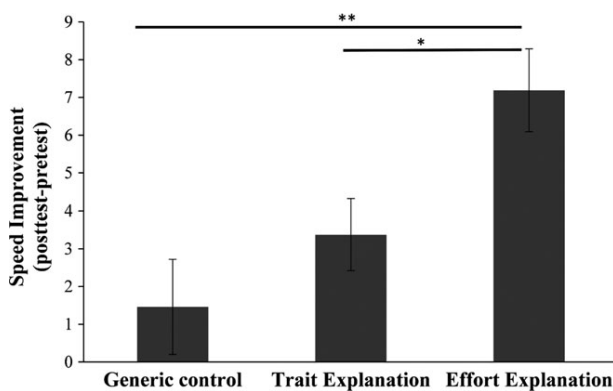


Figure 2 Average speed improvement in Study 3. Error bars represent ± 1 SE. ** $p < .01$, * $p < .05$

choose a puzzle, so we excluded these children from the puzzle analysis. Children differed in their puzzle choice by condition, $\chi^2(2) = 7.95, p < .05$. Specifically, children in the trait explanation and the generic control conditions were not different from each other in their puzzle choice, $\chi^2(1) = 0.13, p > .70$. However, children in these two conditions were more likely to choose an easy puzzle than those in the effort explanation condition, $ps < .05$. Altogether, 85.7% (18 out of 21) of children in the trait explanation condition and 89.5% (17 out of 19) of children in the generic control condition preferred the easy puzzle to the hard puzzle while 55.5% (11 out of 20) of children in the effort explanation condition showed this preference.

Discussion

When generic statements included an effort-based explanation, the negative effects of generic statements were abolished. Effort-based explanations likely moved children away from the default entity beliefs that generic statements typically engender.

General discussion

Previous research suggests that generic statements linking social group and ability on an unfamiliar activity hinder children’s performance (Cimpian *et al.*, 2012). We provide strong evidence that generic statements about one’s social group hinder performance by creating maladaptive entity beliefs and suggest a way to alleviate the negative effects of such category information. Studies 1 and 2 showed that children who heard a generic statement about the ability of his/her social group performed worse than children in the control conditions, even when the experimenter who made the generic statement was no longer present. Further, Study 3 showed that coupling an effort explanation with a generic statement mitigated the negative effects of generic statements about ability on performance.

The results of Studies 2 and 3 also reveal that hearing generic statements has an enduring impact beyond the task at hand. In Study 2, participants who heard generic language selected easier puzzles than children who heard non-generic language. In Study 3, children who heard a generic statement coupled with a trait explanation or no explanation at all were more likely to pick an easier puzzle compared to children who heard a generic statement that included an effort explanation. This finding indicates that the statements that children hear about their performance on a particular task not only

impact the task at hand, but subsequent tasks they choose to engage in as well. Our findings are consistent with previous research suggesting that children who were repeatedly exposed to generic statements tended to believe that fixed abilities are needed for most activities, even the ones that they never encountered in the past (Cimpian *et al.*, 2011).

In addition, our findings elucidate a possible mechanism for how stereotypes lower individuals' performance. Numerous studies have shown that in the presence of a negative performance stereotype about one's social group, one's performance can suffer due to a fear of confirming that negative stereotype – stereotype threat (Shih, Pittinsky & Ambady, 1999; Steele & Aronson, 1995). Interestingly, such performance decrements not only occur for negative stereotypes, but also when positive stereotypes about a group's ability are highlighted. When individuals are at risk of not confirming their social group's positive stereotypes, especially when positive ability stereotypes are explicitly stated, their performance can suffer (Cheryan & Bodenhausen, 2000; Cimpian *et al.*, 2012). Our results indicate that stereotypes may hinder performance regardless of valence, by setting up an entity belief.

An important question still remains: why do generic statements foster entity beliefs that are applied widely even when generic statements do not convey 'deep' properties? One possibility is that generic statements refer to a general pattern of an entire social category and people tend to make sense of such patterns by relating them to the inherent qualities of the referenced category rather than non-inherent factors. The inherence heuristic is 'an implicit cognitive process that leads people to explain observed patterns predominantly in terms of the inherent features of their constituents' (Cimpian & Salomon, 2014, p. 461) because such heuristic processes are highly accessible without much mental effort in constructing explanations. Put simply, constructing explanations based on inherent features of objects seems easier than constructing complex explanations based on external causes.

Our study plays an important role in understanding the mechanism by which generic language impacts performance. However, there are several limitations. First, we used one type of drawing task and one type of puzzle task. Although the drawing and puzzle tasks were fairly different, they could both be conceived as 'spatial' tasks. Whether generic statements given during the drawing task would extend to more unrelated tasks (e.g. reading speed, vocabulary) is unknown. Second, the current work focused specifically on 4-year-old children. Past literature has consistently shown that by age four, children make different causal attributions based on

generic vs. nongeneric statements (Cimpian & Cadena, 2010; Cimpian & Markman, 2009, 2011). To our knowledge, the youngest age group tested to show the 'generics–essential trait' link is 4 years old; thus, further investigation is required to examine whether 2- or 3-year-old children make such causal inference. When considering older children, because 'generics–essential trait' association strengthens as children age (Cimpian & Cadena, 2010; Cimpian & Erickson, 2012b), it seems likely that our effects will hold for children older than 4. Future studies should test the generality of our findings by expanding the age range investigated and the types of tasks used.

In addition, we do not know whether hearing a generic statement coupled with an effort explanation in Study 3 actually eliminated the debilitating effects of typical generic statements (i.e. those that do not have an explanation) about ability or just reduced the negative effects of such statements. Future work might test whether an effort explanation eliminates or just reduces the entity beliefs by including a non-generic wording condition ('There is a boy who is good at this game'). Adding a non-generic effort condition ('There is a boy who is good at this game because he tries really hard') will help us understand whether the effort statement is effective because it mitigates entity beliefs or merely because it emphasizes effort.

In sum, the current investigation adds to the existing developmental literature by elucidating the mechanism by which generic statements negatively influence children's motivation and achievement. Specifically, we show that when exposed to generic statements about the ability of one's social group, children as young as 4 years of age tend to infer that task performance depends on fixed traits, and that this is true regardless of whether the person who made the statement is present when task performance is assessed. In other words, preschool children are not only able to pick up on subtle linguistic cues, but are also able to map such linguistic cues to underlying causes, and this mapping endures even with a change in experimenter. To conclude, these findings shed light on why generic statements hinder children's performance and how such detrimental effects can be negated, harnessing a simple yet powerful way to facilitate children's motivation and learning.

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