

# Just unlucky?: Children are sensitive to the cause of rejection

Aarthi Popat (aarthi.popat@yale.edu)

Julia Leonard (julia.leonard@yale.edu)

Yale University

Department of Psychology, 100 College Street  
New Haven, CT 06510 USA

## Abstract

Rejection from clubs, teams, or schools is an inevitable part of growing up. Knowing when to quit or persist in the face of rejection is critical for goal pursuit, yet it is unclear how children respond to various sources of rejection. In a pre-registered experiment ( $N = 202$ ), we tested whether 7- and 8-year-old children are sensitive to the *cause* of rejection. Children played a game in order to try out for a selective club and were rejected either based on merit (their performance) or by chance (a spinner). Children who experienced luck-based rejection felt better about their competence and persisted marginally more than those rejected based on merit. Across conditions, girls persisted more than boys, and persistence declined with age. These results suggest that by early elementary school, children are sensitive to the *cause* of their rejection, with implications for how they calibrate effort and pursue goals.

**Keywords:** persistence; rejection; causal reasoning; competence

## Introduction

Rejection is an inevitable feature of childhood. Whether it takes the form of getting cut from the soccer team, not being cast in the play, or not making the debate team, rejection introduces children to the harsh reality that effort does not guarantee success. Children must then decide: is it worth their time and effort to try again, or are they better off quitting? Adaptive goal pursuit requires the ability to reason about rejection and persist *only* when success remains possible. Yet, surprisingly little is known about how children respond to rejection.

Presumably, one key source of information that guides behavior after rejection is the *cause* of the rejection. Consider a child, Sam, who doesn't make the soccer team and is deciding whether to try out again next week. If Sam was rejected because they lacked some skill that is difficult to acquire quickly, it is rational for them to forgo next week's tryouts. If instead spots on the team are determined by a lottery, then it makes sense for Sam to try out again and hope that luck is on their side. Although these decisions may seem intuitive to adults, it is unclear when children begin applying this type of reasoning to rejection. Here, we ask whether 7- and 8-year-old children—who are just starting to experience rejection from clubs and groups (Freeman & Condron, 2011; Dobbs & Neville, 1967)—adaptively respond to different causes of rejection.

In social psychology, rejection has been widely studied as an acute experience of exclusion by a person or group (MacDonald & Leary, 2005; Penhaligon et al., 2009). In general, this research has found that rejection

lowers mood and self-esteem (Boivin et al., 1994; Dill et al., 2004). However, much of the work in this area is either 1) correlational due to the sensitive nature of rejection, 2) centered on rejection by peers, teachers, and parents, and/or 3) focused on older children and adults (Coie & Cillessen, 1993; Downey et al., 1998; Rohner, 2004; Sandstrom & Zakriski, 2004). Furthermore, while peer rejection is associated with changes in academic performance (Arslan, 2016; McDougall et al., 2001), to our knowledge no research has studied children's immediate responses to *performance-based* rejection (i.e., rejection in the achievement domain). The present experiment aims to fill these key gaps in the rejection literature by experimentally manipulating the cause of performance-based rejection in young children.

Although there is little research on performance-based rejection in children, research on how children process failure—a construct closely related to rejection—is extensive. Failure, like rejection, involves falling short of a goal or standard (Höpfner & Keith, 2021; Nichols et al., 1991) and often experiencing negative emotions tied to one's performance (Smiley & Dweck, 1994; Smiley et al., 2010). However, a major distinction between failure and rejection lies in their generative processes. Failure usually means not achieving a goal as result of one's own actions (e.g., a child failed to make the toy light up; Gweon & Schulz, 2011), while rejection usually entails being turned away from a group by a third party for not reaching some externally imposed threshold (e.g., a child was rejected from the soccer team after not making a goal in tryouts or winning the lottery). Given that failure and rejection share basic properties, and that more work in developmental psychology has focused on failure, we draw upon the failure literature to motivate the present inquiry.

Children want to feel good about themselves and their abilities (Gollwitzer et al., 1982; Stipek & DeCotis, 1988), so they usually interpret failure in a way that is consistent with this goal. Specifically, children often default to external attributions for failure (e.g., “the problem is the world”) instead of internal attributions (e.g., “the problem is me”) (Whitley & Frieze, 1985). Blaming external factors—like task difficulty or luck—protects children from seeing failure as a fixed judgment of their worth or potential (Dweck, 1975; Snyder et al., 1976). However, with more evidence, children can make more accurate judgments about the cause of their failure, understanding that they are at fault. For example,

a seminal study by Gweon & Schulz (2011) showed that after failing to activate a toy, 16-month-olds who learned that the toy only works sometimes reached for another toy (cause = “world”). However, if they instead saw evidence that only some people can make the toy work, they were more likely to seek help (cause = “me”). Critically, when children attribute their failure to stable, internal causes—like ability or intelligence—they are more likely to quit and feel worse about themselves (Perry & Hamm, 2017).

It is likely that causal attributions also shape children’s responses to performance-based rejection. After experiencing rejection, children may use the rejection criterion (i.e., *not* winning the lottery or *not* scoring a goal) to hypothesize that their rejection was driven by external causes or internal causes. When children think they were rejected based on external criteria (like luck) versus internal criteria (like merit), they may feel better about their abilities and opt to try out again (Dweck, 1975).

### The Present Study

Here, we ask whether different causes of rejection shape children’s persistence and self-competency beliefs. We focus on 7- and 8-year-old children to determine whether sensitivity to the cause of rejection emerges at the start of formal schooling, when children typically begin to experience rejection (Dobbs & Neville, 1967; Freeman & Condrón, 2011). Moreover, prior work shows that 7- and 8-year-old children understand chance and lottery-based systems (Doan et al., 2018) and flexibly update causal hypotheses in response to data (Goddu et al., 2021). Gender differences in responses to failure also emerge at 7 to 8 years of age (Lohbeck et al., 2017), making this age range an interesting window to study individual differences in persistence and beliefs after rejection.

To explore whether children are sensitive to the cause of their rejection, we randomly assigned children to try out for a club that selects members based on merit or luck. The club’s domain (art or math) was also randomly assigned (with stimuli matched across conditions) to explore whether effects would be robust across superficially different task domains. These domains also allowed us to examine potential gender differences in response to rejection based on stereotypes linking math and brilliance to boys and men (Bian et al., 2017; Chestnut & Markman, 2018), but art to women (Steele & Ambady, 2006).

All children were told that they would try out for a special club by playing four rounds of a “dots task” (an approximate number system task; Halberda & Odic, 2015; Odic et al., 2016) which was framed either as an art or math game. Children received no feedback during the tryout rounds in order to elicit uncertainty about performance. After trying out for the club, children learned about the club’s selection process: Half of the children heard a merit-based selection message (i.e., the best kids are selected for the club), and the other half heard a luck-based selection message (i.e., a spinning wheel determines selection). All children were

subsequently rejected from the club. Then, children were given the option to try again or stop playing and rated how good they thought they were at the dots task. Children could opt to play again up to three times; if they chose to play again, they would try out for the club again, hear the same rejection criterion (merit or luck), get rejected, choose to play again or stop, and rate their own competence. The game ended after three tryout rounds even if children opted to play again.

We expected that children who were rejected due to luck (external cause) would persist more and feel better about their ability compared with children who were rejected via the merit-based rationale (internal cause). Our experiment was pre-registered (link: [tinyurl.com/rejectioncogsci](https://tinyurl.com/rejectioncogsci)).

### Method

**Participants.** Two hundred and two children aged 7 and 8 years old ( $M_{age} = 7.53$  years,  $SD_{age} = 0.50$  years, 102 girls, 100 boys) completed the study asynchronously on ChildrenHelpingScience.com (previously Lookit; Scott & Schulz, 2017). An additional 20 children were excluded for failing the attention check. Our target sample size of 200 was determined using a power analysis based on the persistence measure from pilot data (Cohen’s  $d = 0.54$ ) indicating that we need 50 children per group (luck vs. merit condition) to achieve 0.95 power. To accommodate additional secondary analyses exploring potential gender and domain (art vs. math) interactions, we doubled the sample size. Therefore, we aimed to include 100 children in each condition group (luck, merit), split evenly by domain and divided as evenly as possible by age and gender. In the final sample, 100 children were in the merit condition (51 boys, 49 girls,  $M_{age} = 7.58$  years,  $SD_{age} = 0.50$  years) and 102 children were in the luck condition (49 boys, 53 girls,  $M_{age} = 7.51$  years,  $SD_{age} = 0.50$  years). Two additional children were included as a product of asynchronous, automated data collection.

**Design.** Children were told they would be trying out for a special club (the “art” or “math” club). To try out, children had to complete four rounds of a dots task. In the dots task, children saw one array of yellow dots and one array of blue dots, side by side (see Figure 1). After 1200 milliseconds, a correspondingly colored yellow or blue box occluded each side (i.e., a yellow box occluded the side with yellow dots). Children were asked to click on which side/color had more dots.

We used the dots task for a number of reasons. First, we could easily ensure children were uncertain about their performance by using challenging dot discrimination trials which prior work shows 4- and 5-year-olds get 59% correct (e.g., ratios of 1.13, 0.89, 0.88, 1.14) (Odic, 2018). By using difficult ratios and not providing performance feedback, we could elicit realistic uncertainty in children about their performance. Second, the nature of the dots stimuli afforded different framings to match the study conditions. For half of the children, we were able to frame the task as a “math” task because it required thinking about number, and for the other half of children we could frame the task as an “art” task

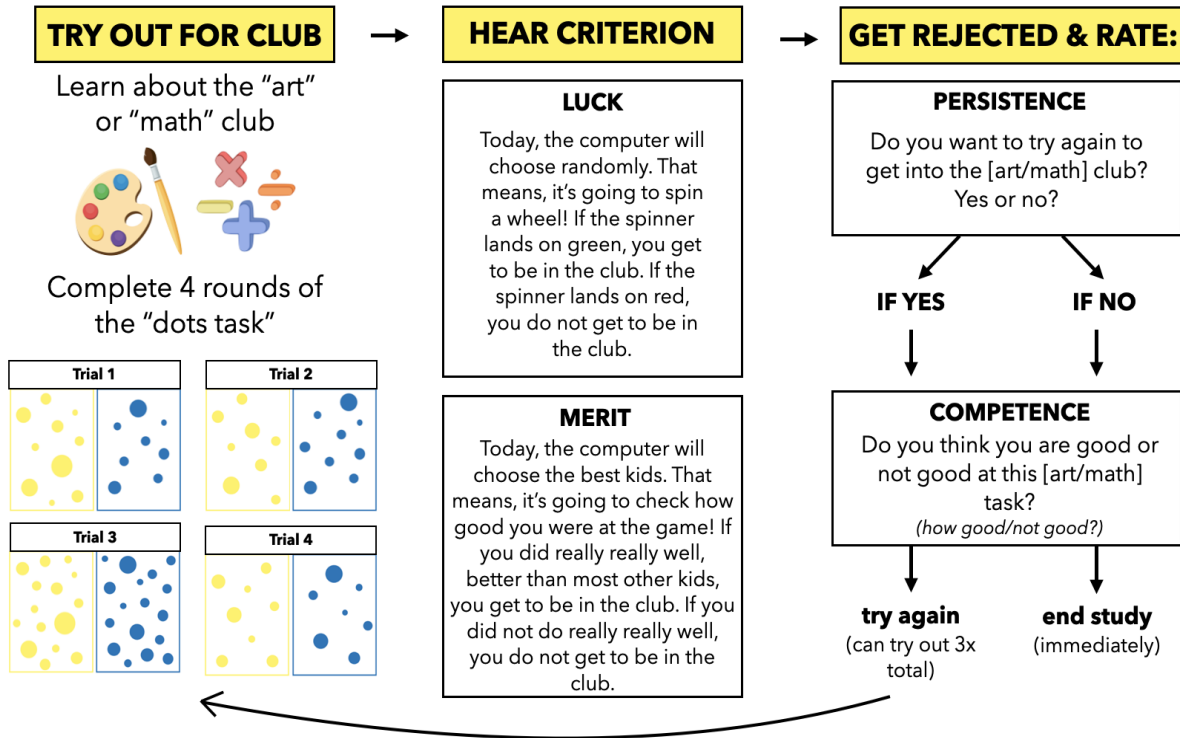


Figure 1: Children learned they would try out for the “art” or “math” club and then tried out once. All children were rejected based on luck-based or merit-based criteria. Children could next choose whether they wanted to play again (persistence) and rated their task self-competency (competence). If they opted to play again, they tried out for the club again (with the dots trials randomized) and this repeated until they maxed out the game (3 total tryout rounds).

because it required thinking about color.

Before trying out for the “art” or “math” club, children received two practice trials with easier ratios (2.2; 4.33), heard corrective feedback, and repeated the trial if necessary. Children did not move onto the first tryout round until they answered both practice trials correctly. Children then tried out for the club by performing four trials of the dots task with harder ratios—without corrective feedback or the opportunity to repeat.

Next, children learned about the club’s selection criterion (merit or luck). In both conditions, they learned that the computer would choose whether or not they were accepted to the club. In the merit condition, children heard a merit-based selection message (“Today, the computer will choose the best kids. That means, it’s going to check how good you were at the game! If you did really really well, better than most other kids, you get to be in the club. If you did not do really really well, you do not get to be in the club”). Children saw a spinning “loading” icon while the “computer” calculated their score. In the luck condition, children heard a luck-based selection message (“Today, the computer will choose randomly. That means, it’s going to spin a wheel! If the spinner lands on green, you get to be in the club. If the spinner lands on red, you do not get to be in the club”). Children then saw a green-and-red spinner, which was rigged

to always land on red. However, children could see that the spinner had two possible outcomes, which in a fair scenario would yield success 50% of the time.

All children across conditions subsequently learned that they were rejected from the club. Children then answered our dependent measures. First, they indicated whether or not they wanted to try out again for the club (persistence measure). Then, children rated their self-competency (competence measure): “Do you think you are good or bad at this [art/math] game?” Based on their response, children specified whether they are a little/medium/really [good/bad] at the game. If children opted to play again, they completed another tryout round (with the dots trials randomized), heard the same rejection criterion, learned they were rejected, and answered the same dependent measures. Children could elect to play again up to three more times and as few as zero more times before moving on to the final check questions. The game ended after the third rejection even if children indicated they would like to try a fourth time.

Either after children quit or after they completed three rounds, children indicated whether they liked math or art tasks better in general. They also completed an attention check question to assess whether they remembered the cause of their rejections (i.e., “How did the computer decide whether or not you got to be in the club? Did it pick at

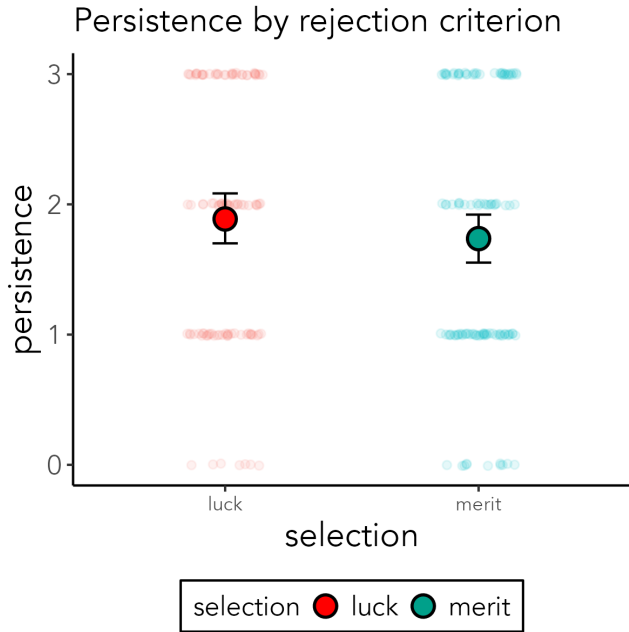


Figure 2: The number of rounds children persisted for (out of 3) in each condition; means are plotted with 95% CI error bars. Smaller points represent persistence for individual children.

random, or did it pick based on how you did?”). Finally, children were debriefed and told that the computer made a mistake with their score; they had scored so well that they made it into the club.

## Results

We pre-registered our main analyses with and without excluding children who failed the attention check. Twenty children failed the attention check ( $N = 15$  in the merit condition,  $N = 5$  in the luck condition). Here, we report results excluding children who failed the attention check ( $N = 202$ ) but note if results differ with the unfiltered sample ( $N = 222$ ).

**Persistence.** Persistence was operationalized as the number of times (out of three) that children agreed to keep playing. As persistence was a count variable with a fixed number of trials, we analyzed it using a generalized linear model with the binomial family and logit link function. We included condition as a predictor variable in the model to determine whether it impacted children’s persistence (probability of playing). The model revealed a marginal, but not significant, effect of condition,  $B = -.30, 95\%CI[-0.63, 0.03], p = .07$ , such that children in the luck-based condition persisted marginally more than children in the merit-based condition (luck:  $M = 0.64, SD = 0.32$ ; merit:  $M = 0.57, SD = 0.34$ ). Specifically, children persisted on average for 2 rounds in the luck condition and 1.75 rounds in the merit condition. The effect of condition is not

significant when we include children who failed the attention check ( $B = -0.21, 95\%CI[-0.52, 0.10], p = .19$ ).

We ran three separate exploratory binomial logistic regressions to test for relationships between persistence and 1) gender, 2) age, and 3) domain, controlling for condition. We found a significant main effect of gender, revealing that girls persisted more than boys,  $B = 0.48, 95\%CI[0.15, 0.82], p = .004$ . There was also a negative main effect of age, showing that older children persisted less than younger children,  $B = -0.43, 95\%CI[-0.77, -0.10], p = .01$ . Finally, we found no effect of task domain on persistence,  $B = 0.23, 95\%CI[-0.10, 0.56], p = .17$ . In three additional exploratory models, we did not find any selection-by-gender, selection-by-age, or selection-by-domain interactions on persistence.

**Competence.** Since we expected children in the luck condition to complete more rounds than those in the merit condition, we planned to analyze competence individually for each round. Specifically, we planned to focus on the first and second competence ratings because our pilot data showed condition differences in attrition only after the second rejection. Here, a linear regression predicting attrition by condition revealed no difference by condition in the number of children who quit after the first rejection ( $N = 16$ ),  $B = -0.04, 95\%CI[-0.12, 0.03], p = .28$ . A linear regression found a marginal, but not significant, difference by condition in children who quit after the second rejection ( $N = 72$ ),  $B = -0.13, 95\%CI[-0.26, 0.01], p = .07$ . Due to generally high levels of attrition after the second round (remaining  $N = 114$  during the third round), we did not analyze group differences in competency ratings in the third round.

Children’s competence self-ratings for each trial ranged from 1 (really not good) to 6 (really good). We used linear regressions to quantify the effect of rejection criterion on competence ratings at each time point (see Figure 3). After the first rejection, a linear regression revealed a significant effect of condition on children’s ( $N = 202$ ) self-competency ratings, with children rating their competence higher in the luck vs. the merit condition,  $B = 0.55, 95\%CI[0.18, 0.91], p = .003$ . This effect was marginal when including children who failed the attention check,  $B = 0.35, 95\%CI[-0.06, 0.77], p = .10$ . Overall, t-tests showed that children in the luck condition ( $M = 5.07, SD = 1.26$ ) and children in the merit condition ( $M = 4.52, SD = 1.37$ ) were optimistic about their competence in the first round, rating their ability significantly above the 3.5 midpoint; luck:  $t(101) = 12.57, p < .001$ , merit:  $t(99) = 7.42, p < .001$ .

After the second rejection (remaining  $N = 186$ ;  $N = 90$  in merit condition and  $N = 96$  in luck condition), a linear model showed that children in the luck condition rated their competence higher than those in the merit condition,  $B = 0.94, 95\%CI[0.46, 1.42], p < 0.001$ . Exploratory t-tests revealed that children’s self-competency ratings in the luck condition were still significantly higher than the midpoint

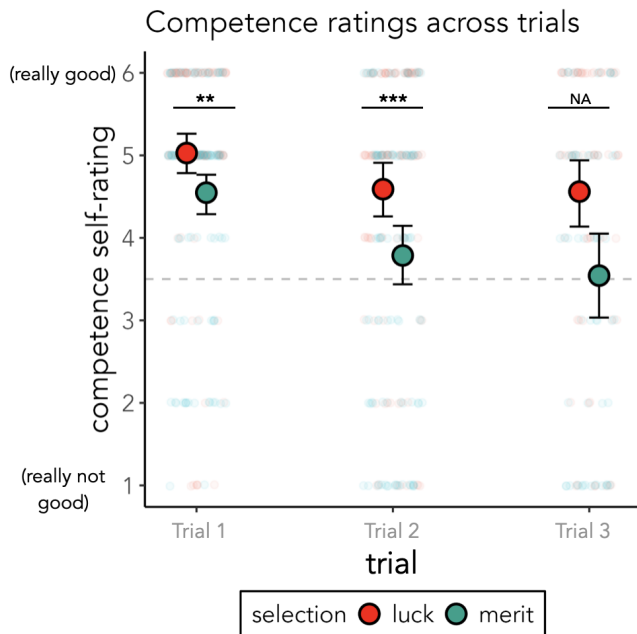


Figure 3: Children’s self-competency ratings across trials by condition; means are plotted with 95% CI error bars. Dashed horizontal line represents the scale midpoint (3.5). Smaller points represent ratings by individual children.

( $M = 4.66, SD = 1.52; t(95) = 7.45, p < .001$ ). However, now, children’s self-competency ratings in the merit condition were not significantly different than the midpoint ( $M = 3.72, SD = 1.79; t(88) = 1.15, p = .25$ ).

Unlike for persistence, exploratory linear models revealed no differences by gender, age, or domain on competency judgments in the first or the second trial, controlling for condition. Gender, age, and domain also did not interact with condition to predict competency judgments after the first or second trial.

**Actual performance.** The maximum score for each tryout round was 4 (1 point for each correct trial out of 4 trials). Children did very well on average: They scored 88% correct in the first round, 87% correct in the second round, and 85% correct in the third round. Since children scored well overall, we did not analyze the relationship between accuracy and persistence or self-competency.

**Task preference.** We ran exploratory analyses on children’s task preferences (for art vs. math), which they indicated after completing the study. An exploratory linear model predicting task preference by domain showed that across conditions, rejection in the math domain led to preferences for art (art = 1, math = 0),  $B = 1.55, 95\%CI[1.00, 2.13], p < .001$ , and vice versa. An exploratory linear model predicting math choices by gender showed that across conditions and domains, girls were less likely to choose math than boys,  $B =$

$-1.79, 95\%CI[-2.46, -1.16], p < .001$ .

## General Discussion

The ability to recognize when to persist and when to pivot in the face of rejection is fundamental to goal pursuit in childhood. However, surprisingly little is known about how children make these decisions. Here, we found that school-age children do not respond equally to all types of rejection. Instead, 7- and 8-year-old children are sensitive to the cause of rejection: They feel better about their abilities and persist marginally longer when rejected based on luck as opposed to merit.

Based on attribution theory (Perry & Hamm, 2017; Whitley & Frieze, 1985), we predicted that children would reason about the cause of their rejection and persist more when rejected based on luck (external criteria) than merit (internal criteria). However, we only found weak support for this hypothesis. Children persisted on average for 1.75/3 rounds in the merit condition and 2/3 rounds in the luck condition. What happened? One explanation is that even though we tried to choose a difficult task and deliberately withheld performance feedback, children performed remarkably well on the dots task (average performance across rounds and conditions = 87%). Thus, children in the merit condition may have correctly inferred that they performed really well and wanted to try again. Ongoing work is exploring whether condition differences in persistence emerge only when the task is harder, eliciting more uncertainty about merit. In the luck condition, children may have chosen to quit after two rounds because, no matter the cause, rejection hurts (Boivin et al., 1994; Dill et al., 2004). Children in the luck condition may have also inferred that their efforts were not worthwhile, as there were no tangible rewards for acceptance to the club to offset the emotional cost of rejection. This interpretation aligns with the idea that children weigh potential costs and benefits when deciding whether to persist (Gatzke-Kopp et al., 2018; Leonard et al., 2021).

As predicted, children felt worse about their *competence* in the merit condition versus the luck condition. This effect emerged after just one round of rejection. Nevertheless, children in both conditions remained—on average—optimistic about their abilities after the first rejection, rating their competence as “medium good” in the luck condition and between “medium good” and “a little good” in the merit condition. This positive assessment of performance (which matched children’s actual strong performance) may have caused children in both conditions to keep persisting after the first rejection. Indeed, only after two rounds of rejection did children in the merit condition lower their ability ratings to “a little good” while children in the luck condition continued to rate their ability as “medium good”. This aligns with existing research on failure showing that children have a self-serving bias (Marsh, 1986) that weakens only with additional data (Elliott & Dweck, 1988;

Gweon & Schulz, 2011): Only after multiple instances of rejection did children in the merit condition feel worse and begin to quit.

Alongside condition-level effects, we observed individual differences in children's persistence based on age and gender. Exploratory analyses revealed that younger children persisted more than older children across conditions, but did not feel better about their competence. This pattern may reflect a decline in characteristic overoptimism: With age, children begin to understand that effort does not guarantee success, and that wishing for a certain outcome does not mean it will happen (Leonard & Sommerville, 2025).

We also found that girls persisted more than boys across task domains and rejection criteria. This result is surprising as it deviates from existing literature showing that 7- and 8-year-old girls respond more negatively to failure than boys (i.e., they make more internal attributions; Lohbeck et al., 2017). Girls also reported a robust preference for art over math after the study, which is consistent with early-emerging stereotypes associating boys with math and brilliance (Bian et al., 2017; Cvencek et al., 2011). One explanation for this discrepancy is that, starting at 7 years of age, boys believe themselves academically inferior to girls and suffer from stereotype threat on academic tests (Cole, 1997; Hartley, 2013; Hartley & Sutton, 2013). Given that the domains used in this paradigm are also seen in formal schooling (math; art), boys may have been more sensitive to the immediate implications of rejection. Moreover, 7- and 8-year-old girls have been shown to persist longer on tasks even when they have been given an ineffective solution, a phenomenon potentially driven by gender differences in people-pleasing socialization (Radovanovic et al., 2024). It is therefore possible that girls in our task somehow felt they were *supposed* to persist to please their watching parents or the experimenter. These age and gender differences are a rich area for future investigation.

Our study has a number of limitations. First, our sample was limited in its racial and socioeconomic diversity. Not only does this pose limitations on the generalizability of our findings, but we are underpowered to capture other demographic factors that may shape responses to rejection. Next, because rejection is discouraging and we wanted to minimize adverse effects on children, we limited our game to three total rounds. This made it difficult to capture the full impacts of merit- versus luck-based rejection on children's persistence. Finally, while our design utilized a dynamic persistence measure that allowed us to capture real-time behavior after rejection, this confounded our ability to examine competence ratings across trials.

The present study will also benefit from follow-up research to test how social influence affects children's behavior after rejection. Whereas rejection in school and clubs is often a social experience (e.g., Sandstrom & Zakriski, 2004), here rejection was an individualized one: Children were rejected by an "algorithm" in an environment devoid of peers (and,

sometimes, siblings or parents). It is therefore possible that the reputation management component of rejection—i.e., the idea that children might quit prematurely when rejected meritoriously to minimize social repercussions—was not triggered by our paradigm (Heyman, 2020; Rogosch & Newcomb, 1989).

In childhood, rejection is not merely a barrier to overcome but a signal to interpret. However, rejection has been an understudied construct in developmental psychology—likely because it is difficult to manipulate. Our study is the first to show that 7- and 8-year-old children differentially respond to rejection depending on its cause: They feel better about their abilities and persist somewhat more when rejected based on luck versus merit. Ultimately, knowing how children make sense of rejection will help parents, caregivers, and educators nurture resilience—when it is warranted—to encourage long-term success.

### Acknowledgements

We thank Natalie Masetti, Christina Norberg, Mark Sheskin, and ChildrenHelpingScience.com for assistance with stimulus design and data collection. We thank Sam Paskewitz for help with statistical analysis, and members of the Leonard Learning Lab for input and feedback. Finally, we thank the children and families who participated in this study—for their time and their willingness to face rejection head-on.

### References

- Arslan, G. (2016). *Relationship between sense of rejection, academic achievement, academic efficacy, and educational purpose in high school students. egitim ve bilim, 41 (183), 293–304.*
- Bian, L., Leslie, S.-J., & Cimpian, A. (2017, January). Gender stereotypes about intellectual ability emerge early and influence children's interests. *Science, 355(6323), 389–391.* doi: 10.1126/science.aah6524
- Boivin, M., Poulin, F., & Vitaro, F. (1994, July). Depressed mood and peer rejection in childhood. *Development and Psychopathology, 6(3), 483–498.* doi: 10.1017/S0954579400006064
- Chestnut, E. K., & Markman, E. M. (2018). "Girls Are as Good as Boys at Math" Implies That Boys Are Probably Better: A Study of Expressions of Gender Equality. *Cognitive Science, 42(7), 2229–2249.* (eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/cogs.12637>) doi: 10.1111/cogs.12637
- Coie, J. D., & Cillessen, A. H. (1993). Peer rejection: Origins and effects on children's development. *Current directions in psychological science, 2(3), 89–93.*
- Cole, N. S. (1997, May). *The ETS Gender Study: How Females and Males Perform in Educational Settings* (Tech. Rep.). (ERIC Number: ED424337)
- Cvencek, D., Meltzoff, A. N., & Greenwald, A. G. (2011). *Math–Gender Stereotypes in*

- Elementary School Children Cvencek - 2011 - Child Development - Wiley Online Library*. Retrieved 2025-02-02, from [https://srcd.onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-8624.2010.01529.x?casa\\_token=h4snJpf4iaEAAAAA%3A12I4GUegex6a0meU0fXMZgpG8WBnwy8U07AVfRyhnUBioIgmNwPBB1NtTf0agQIRDsInD.C.Geary.D.B.Berch.&K.M.Koepke](https://srcd.onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-8624.2010.01529.x?casa_token=h4snJpf4iaEAAAAA%3A12I4GUegex6a0meU0fXMZgpG8WBnwy8U07AVfRyhnUBioIgmNwPBB1NtTf0agQIRDsInD.C.Geary.D.B.Berch.&K.M.Koepke)
- Dill, E. J., Vernberg, E. M., Fonagy, P., Twemlow, S. W., & Gamm, B. K. (2004, April). Negative Affect in Victimized Children: The Roles of Social Withdrawal, Peer Rejection, and Attitudes Toward Bullying. *Journal of Abnormal Child Psychology*, 32(2), 159–173. doi: 10.1023/B:JACP.0000019768.31348.81
- Doan, T., Friedman, O., & Denison, S. (2018). Beyond belief: The probability-based notion of surprise in children. *Emotion*, 18(8), 1163–1173. (Place: US Publisher: American Psychological Association) doi: 10.1037/emo0000394
- Dobbs, V., & Neville, D. (1967, July). The Effect of Nonpromotion on the Achievement of Groups Matched from Retained First Graders and Promoted Second Graders. *The Journal of Educational Research*. (Publisher: Routledge)
- Downey, G., Freitas, A. L., Michaelis, B., & Khouri, H. (1998). The Self-Fulfilling Prophecy in Close Relationships: Rejection Sensitivity and Rejection by Romantic Partners.
- Dweck, C. S. (1975, April). The role of expectations and attributions in the alleviation of learned helplessness. *Journal of Personality and Social Psychology*, 31(4), 674–685. doi: 10.1037/h0077149
- Elliott, E. S., & Dweck, C. S. (1988). Goals: an approach to motivation and achievement. *Journal of personality and social psychology*, 54(1), 5.
- Freeman, K. J., & Condrón, D. J. (2011, December). Schmoozing in Elementary School: The Importance of Social Capital to First Graders. *Sociological Perspectives*, 54(4), 521–546. (Publisher: SAGE Publications Inc) doi: 10.1525/sop.2011.54.4.521
- Gatzke-Kopp, L. M., Ram, N., Lydon-Staley, D. M., & DuPuis, D. (2018). Children's sensitivity to cost and reward in decision making across distinct domains of probability, effort, and delay. *Journal of behavioral decision making*, 31(1), 12–24.
- Goddu, M. K., Sullivan, J. N., & Walker, C. M. (2021). Toddlers learn and flexibly apply multiple possibilities. *Child Development*, 92(6), 2244–2251. (eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/cdev.13668>) doi: 10.1111/cdev.13668
- Gollwitzer, P. M., Earle, W. B., & Stephan, W. G. (1982). Affect as a determinant of egotism: Residual excitation and performance attributions. *Journal of Personality and Social Psychology*, 43(4), 702.
- Gweon, H., & Schulz, L. (2011, June). 16-Month-Olds Rationally Infer Causes of Failed Actions. *Science*, 332(6037), 1524–1524. doi: 10.1126/science.1204493
- Halberda, J., & Odic, D. (2015, January). Chapter 12 - The Precision and Internal Confidence of Our Approximate Number Thoughts. In D. C. Geary, D. B. Berch, & K. M. Koepke (Eds.), *Mathematical Cognition and Learning* (Vol. 1, pp. 305–333). Elsevier. doi: 10.1016/B978-0-12-420133-0.00012-0
- Hartley, B. L. (2013). *Why boys will be boys: stereotype threat and boys' academic underachievement* (Unpublished doctoral dissertation). University of Kent.
- Hartley, B. L., & Sutton, R. M. (2013). A stereotype threat account of boys' academic underachievement. *Child development*, 84(5), 1716–1733.
- Heyman, G. D. (2020). Praise and the development of reputation management. In *Psychological perspectives on praise* (pp. 111–118). Routledge.
- Höpfner, J., & Keith, N. (2021, September). Goal Missed, Self Hit: Goal-Setting, Goal-Failure, and Their Affective, Motivational, and Behavioral Consequences. *Frontiers in Psychology*, 12. (Publisher: Frontiers) doi: 10.3389/fpsyg.2021.704790
- Leonard, J. A., Duckworth, A. L., Schulz, L. E., & Mackey, A. P. (2021). Leveraging cognitive science to foster children's persistence. *Trends in Cognitive Sciences*, 25(8), 642–644.
- Leonard, J. A., & Sommerville, J. A. (2025, January). A unified account of why optimism declines in childhood. *Nature Reviews Psychology*, 4(1), 35–48. (Publisher: Nature Publishing Group) doi: 10.1038/s44159-024-00384-z
- Lohbeck, A., Grube, D., & Moschner, B. (2017, April). Academic self-concept and causal attributions for success and failure amongst elementary school children. *International Journal of Early Years Education*, 25(2), 190–203. (Publisher: Routledge eprint: <https://doi.org/10.1080/09669760.2017.1301806>) doi: 10.1080/09669760.2017.1301806
- MacDonald, G., & Leary, M. R. (2005, March). Why Does Social Exclusion Hurt? The Relationship Between Social and Physical Pain. *Psychological Bulletin*, 131(2), 202–223. doi: 10.1037/0033-2909.131.2.202
- Marsh, H. W. (1986). Self-serving effect (bias?) in academic attributions: Its relation to academic achievement and self-concept. *Journal of Educational Psychology*, 78(3), 190–200. (Place: US Publisher: American Psychological Association) doi: 10.1037/0022-0663.78.3.190
- McDougall, P., Hymel, S., Vaillancourt, T., & Mercer, L. (2001). The consequences of childhood peer rejection. In *Interpersonal rejection* (pp. 213–247). New York, NY, US: Oxford University Press.
- Nichols, A. L., Whelan, J. P., & Meyers, A. W. (1991). The effects of children's goal structures and performance

- feedback on mood, task choice, and task persistence. *Behavior Therapy*, 22(4), 491–503.
- Odic, D. (2018). *Children's intuitive sense of number develops independently of their perception of area, density, length, and time*.
- Odic, D., Lisboa, J. V., Eisinger, R., Olivera, M. G., Maiche, A., & Halberda, J. (2016, January). Approximate number and approximate time discrimination each correlate with school math abilities in young children. *Acta Psychologica*, 163, 17–26. doi: 10.1016/j.actpsy.2015.10.010
- Penhaligon, N. L., Louis, W. R., & Restubog, S. L. D. (2009). Emotional anguish at work: The mediating role of perceived rejection on workgroup mistreatment and affective outcomes. *Journal of Occupational Health Psychology*, 14(1), 34–45. doi: 10.1037/a0013288
- Perry, R. P., & Hamm, J. M. (2017). An attribution perspective on competence and motivation. *Handbook of competence and motivation: Theory and application, 2006*, 61–84.
- Radovanovic, M., Yucer, E., & Sommerville, J. A. (2024). Girls persist more but divest less from ineffective teaching than boys. *Journal of Experimental Psychology: General*, 153(10), 2487–2509. (Place: US Publisher: American Psychological Association) doi: 10.1037/xge0001646
- Rogosch, F. A., & Newcomb, A. F. (1989). Children's perceptions of peer reputations and their social reputations among peers. *Child Development*, 597–610.
- Rohner, R. P. (2004). The Parental "Acceptance-Rejection Syndrome": Universal Correlates of Perceived Rejection. *American Psychologist*, 59(8), 830–840. (Place: US Publisher: American Psychological Association) doi: 10.1037/0003-066X.59.8.830
- Sandstrom, M. J., & Zakriski, A. L. (2004). Understanding the experience of peer rejection. In *Children's peer relations: From development to intervention* (pp. 101–118). Washington, DC, US: American Psychological Association. doi: 10.1037/10653-006
- Scott, K., & Schulz, L. (2017, February). Lookit (Part 1): A New Online Platform for Developmental Research. *Open Mind*, 1(1), 4–14. doi: 10.1162/OPML.a.00002
- Smiley, P. A., Coulson, S. L., Greene, J. K., & Bono, K. L. (2010). Performance concern, contingent self-worth, and responses to repeated achievement failure in second graders. *Social Development*, 19(4), 779–798.
- Smiley, P. A., & Dweck, C. S. (1994). Individual Differences in Achievement Goals among Young Children. *Child Development*, 65(6), 1723–1743. (Publisher: [Wiley, Society for Research in Child Development]) doi: 10.2307/1131290
- Snyder, M. L., Stephan, W. G., & Rosenfield, D. (1976). *Attributional Egotism: New Directions in Attribution Research*.
- Steele, J. R., & Ambady, N. (2006). "math is hard!" the effect of gender priming on women's attitudes. *Journal of Experimental Social Psychology*, 42(4), 428–436.
- Stipek, D. J., & DeCotis, K. M. (1988). Children's understanding of the implications of causal attributions for emotional experiences. *Child development*, 1601–1610.
- Whitley, B. E., & Frieze, I. H. (1985). Children's causal attributions for success and failure in achievement settings: A meta-analysis. *Journal of Educational Psychology*, 77(5), 608.