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Recalling experiences of scarcity reduces children's generosity relative to recalling abundance



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ABSTRACT

Does a sense of having less or more than what one needs affect one's generosity? The question of how resource access influences prosocial behavior has received much attention in studies with adults but has produced conflicting findings. To better understand this relationship, we tested whether resource access affects generosity in the developing mind. In our preregistered investigation, we used a narrative recall method to explore how temporary, experimentally evoked states of resource abundance or scarcity affect children's sharing. In this study, 6- to 8-year-old American children ($N = 148$) recalled an experience of scarcity or abundance and then chose how many prizes to share with another child. We found that children in the scarce condition rated themselves as sadder, viewed their resource access as more limited, and shared fewer tokens than children in the abundant condition. Our results indicate that recalling past experiences of resource access creates distinct behavioral consequences for children and suggest that a sense of "having less" may encourage a strategy of resource conservation relative to a sense of "having more," even at a young age.

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Introduction

We live in a world of finite resources. Whether tangible, such as food, or intangible, such as time, we must decide how to allocate our resources amid competing demands. Our level of resource access affects choices such as how much of a resource to keep for ourselves (e.g., eating the last cookie from a box) or share with others (e.g., giving several cookies to a neighbor after baking a large batch). Decisions regarding the acquisition and sharing of resources are crucial to our individual and collective success as humans (Hawley, 1999; Tooby & Cosmides, 1996) and profoundly affect our interactions with others (Hackel & Zaki, 2018).

Resources are rarely equally distributed; particularly amid high wealth inequality, many individuals have a surplus of resources and others have too little (Chancel et al., 2021). This raises the following questions: How does one's level of resource access shape prosocial decision making? How does having more or less than what one needs affect our tendency to share resources? Psychological research on this topic can be divided into two categories. The first explores how sustained resource access affects behavior, and the second explores how temporary or experimentally induced resource access affects behavior.

Research on how sustained resource access affects sharing has produced mixed findings. Much empirical work finds that individuals of higher wealth and/or social status (which are related to, but not synonymous with, resource access) are *less* prosocial than individuals lower in these dimensions. Higher wealth and higher social status have been associated with sharing less, taking more, and elevated greed in adulthood (Amir et al., 2018; Elbæk et al., 2023; Piff et al., 2010, 2012) and in development (Chen et al., 2013; Liu et al., 2019; Miller et al., 2015). However, other theoretical (De Courson & Nettle, 2021) and empirical work has found that individuals higher in wealth and/or social status show *more* prosocial behavior related to resources in samples of adults (Andreoni et al., 2021; Korndörfer et al., 2015; Schmukle et al., 2019; Vanags et al., 2023; Zwirner & Raihani, 2020; see also Vardy & Atkinson, 2019) and children (Bauer et al., 2014; Benenson et al., 2007; Safra et al., 2016). Taken together, this work presents a complicated picture of how resources affect prosocial behavior. Divergent findings in this literature could be attributed to methodology (e.g., self-reported vs. observed behavior) and operationalization of resource access (objective vs subjective measures may be associated with different behaviors; Callan et al., 2017). In addition, social status and wealth are correlated with factors beyond resource access, such as education, neighborhood composition, and childhood wealth, making it difficult to isolate the influence of resource access alone.

The second category of research, on how temporary resource access states affect prosocial behavior, has produced clearer findings. Some studies have tested variance in hunger and satiety levels either via natural hunger fluctuations due to meal timing or asking participants to fast before participating. Because hunger creates a strong sense of resource scarcity in a particular domain, it could result in an increased desire to acquire and conserve edible resources and perhaps resources besides food. As evidence of this, adults in a temporary state of hunger are more likely to take others' resources (Petersen et al., 2014) and less likely to make charitable contributions (Briers et al., 2006) or share resources with anonymous others (Briers et al., 2006; Van Dillen et al., 2021; but see Faber & Häusser, 2022, on null findings) than satiated adults. A study with children yielded similar findings; hungrier children share fewer edible and non-edible resources with anonymous others than less hungry children (Huppert et al., 2020), consistent with scarcity resulting in less sharing than abundance.

Another approach to inducing resource access entails prompting participants to recall past experiences with resources (Ellwood-Lowe et al., 2022; Roux et al., 2015; Yang et al., 2023). Participants reflect on times when they were lacking in resources, or were in a worse financial position than others, to invoke an acute sense of scarcity. Contrasting prompts ask for participants to recall generic past events or grocery store visits¹ to invoke neutral resource access, or times when they were in a better financial position than others, to invoke abundance. Importantly, these methods have been used to study how resource access influences prosocial and antisocial choices. Studies using such methods with adults

¹ Although intended as a control condition rather than an abundance manipulation, the grocery store prompt could plausibly invoke a sense of resource abundance via recall of large quantities of food.

have found that, relative to abundance or neutrality, states of scarcity result in lower charitable contributions, lower quantities shared with anonymous others, and higher self-reported likelihood to engage in unethical actions such as theft (Roux et al., 2015; Yang et al., 2023). Methods that experimentally induce resource access have strengths that make them particularly valuable as research tools. For instance, they do not require exchanges of physical resources. Unlike using social class as a proxy for resource access, temporarily inducing states of resource access reduces the influence of factors that covary with enduring resource access (e.g., neighborhood). In addition, whereas one's respective exposure to resource scarcity or abundance likely varies with one's wealth, a sense of having less or more than what one needs at a particular time is felt by people across the economic spectrum (Ellwood-Lowe et al., 2022; Shah et al., 2012).

Our current study used a recall method to evoke "in the moment" resource access to address the question of how this feeling affects generosity. We investigated this topic in development, using a narrative recall approach, for three main reasons. First, children may provide a more direct window into how immediate feelings of resource access affect generosity than adults. In middle childhood, children are just beginning to engage in fair resource sharing with others (McAuliffe, Blake, et al., 2017). They have had less time to develop strong heuristics regarding sharing, and their behavior is relatively flexible, showing influence from sources such as prompts to consider norms (House et al., 2019; McAuliffe, Raihani, et al., 2017). Owing to their developing inhibitory control and emotional regulation abilities, children may be particularly susceptible to short-term influences on their decision making. Considering these reasons together, the effects of how resource access affects sharing may be more clearly shown in children than in adults, with less "noise" from other sources. Second, illustrating factors that lead to variation in children's prosocial behavior, such as the effects of resource access and value, is useful in and of itself, as shown by the large body of research on the Dictator Game in children (e.g., Ibbotson, 2014). Like adults, children experience variation in their resource access, but little existing research has explored how such variation influences children's sharing, with the notable exception of Huppert et al. (2020). Answering this question can inform the design of sharing-enhancing interventions and improve our understanding of children's decision making across contexts at a time in development when children engage in costly sharing. Finally, there is broader importance to finding safe, practical, and minimally invasive methods for evoking states of abundance and scarcity with children (see Kirkland et al., 2020, on mimicking inequality experimentally), which may provide insight into whether effects of such conditions, documented in adults, are true in children. We are aware of no prior developmental studies employing narrative approaches to induce resource access states; we tested the effectiveness of such approaches. Children in middle childhood are capable of episodic memory (Ghetti & Lee, 2011; Wang et al., 2014), a precondition for narrative recall tasks, and prior studies involving children's sharing have used recall tasks as experimental manipulations (Tasimi & Young, 2016), although none have done so for feelings of resource access.

The current study

In this preregistered investigation (https://aspredicted.org/WQV_7PN), we invoked states of resource scarcity or abundance in children. We first asked children to recall past events and rate their resource access and mood at the times in question. Then, we provided them with an endowment of 10 tokens, to be ultimately traded for prizes. We asked them to allocate those tokens between themselves and an absent child and then to rate how strongly they and the "other boy/girl" (gender-matched to the participant) wanted tokens. We predicted that, after recalling scarcity relative to abundance, children would (a) show responsiveness to the experimental manipulation on our validity check questions, rating their resource quantity and mood during the queried time as lower, (b) share fewer prize tokens with the partner, and (c) assign higher value to prize tokens.

Our predictions regarding how resource access affects sharing were informed by the theoretical arguments that, relative to abundance, conditions of scarcity create stress. They cause individuals to focus on their resources and seek to conserve or augment them rather than part with them, for example, via sharing (Hobfoll, 1989; Huppert et al., 2020; Petersen et al., 2014; Shah et al., 2012; but see O'Donnell et al., 2021). As argued by Maslow (1943), humans in need of resources will prioritize this need over other needs such as social connection. Extending this argument, those who feel lacking in

resources should be motivated to keep their resources rather than share them with others. In contrast, resource abundance should cause one to feel capable of sharing without resource threats. Evidence regarding how resource access affects resource value is less clear, but scarce conditions, relative to abundant conditions, activate neural activity patterns associated with increased resource valuation (Huijsmans et al., 2019). Children aged 5 to 8 years believe that children with more resources of a given type ascribe less value to each unit of that resource and are likelier to share their resources than children with fewer resources (Ahl, Cook, et al., 2023; Ahl & Dunham, 2019); whether such beliefs correspond to actual behavior, particularly when the resource type shared (e.g., tokens) differs from the resources in which one feels scarce or abundant (e.g., resources mentioned in the narrative recall), remains to be seen. We tested whether resource states influence perceived value and children's sharing.

Alternatively, accounts of how resource access affects one's social attention and empathic concern lead to opposing predictions. Conditions of resource abundance relative to scarcity could reduce individuals' consideration of others' needs and lead to a self-oriented focus, which would reduce sharing (Piff & Robinson, 2017). Such arguments have been made regarding how social class differences affect prosocial choices, but their implications for temporary resource access are less clear.

Method

Participants

Our preregistered sample included 148 participants aged 6 to 8 years ($M_{\text{age}} = 89.23$ months, $SD = 10.39$) counterbalanced between *abundant* and *scarce* conditions (50% each) and between boys and girls (50% each). Of 141 participants whose parents responded, 61.0% were White. There were many non-White participants (15.6% Asian, 4.3% Latinx, 2.1% Black, 17.0% biracial). Additional demographic information (e.g., income) is reported in the online [supplementary material](#). Recruitment was done via Facebook advertisements and word-of-mouth, yielding participants across the United States.

We excluded 22 additional participants due to serious interference from a sibling ($n = 1$) or parent ($n = 8$), parentally disclosed developmental disability ($n = 4$), difficulty in following instructions ($n = 2$), prior participation in a related study from our lab ($n = 1$), tester error ($n = 1$), inability to recall a past event ($n = 1$), extreme skepticism ($n = 1$), or comprehension failure on the token training ($n = 3$). All but the latter two categories were preregistered.²

Procedure

Introductory tasks

Written parental consent was obtained before the session began, and verbal child assent was obtained at the start of the session. See the [supplementary material](#) for a sample script and information on prestudy content. All tasks were conducted online via Qualtrics surveys that were displayed over screen shares during live video calls. Key elements of the script were illustrated visually (e.g., images of tokens). We encouraged parents to leave the testing vicinity to reduce the likelihood of parental interference, although many parents chose to stay (48.6% stayed for some or all of the session). Serious interference (e.g., prompting) resulted in exclusion.

Token tasks

Participants were told that they could obtain tokens that would ultimately be traded in for prizes. More tokens resulted in bigger and better prizes, and participants' choices would affect how many tokens they and another child would receive. The "other child" was described as a same-gender peer who wanted tokens but was not present. Participants and the other child were shown via different-colored avatars so that participants could distinguish them (see Ahl, Hannan, et al., 2023).

² We initially viewed "comprehension failure" as a subset of "failure to follow directions" but now view the two as distinct; we had not foreseen "skepticism that the other child is real" but viewed the situation as a compelling reason for exclusion.

All participants expressed wanting tokens themselves and correctly stated that they would receive prizes for tokens and that the other child wanted tokens on their first, second, or third attempt. There was no deception regarding sharing: Shared tokens were passed on to future participants, and token totals influenced the “bonus” amounts added to their [Amazon.com](https://www.amazon.com) gift card prizes.

Our measure of generosity was based on the Dictator Game (Benenson et al., 2007), in which participants would allocate tokens between themselves and another child without the experimenter’s assistance. To familiarize participants with this procedure, participants completed a training task (allocating tokens between cartoon animals) that approximated how choices would be presented later. Participants with chronic difficulties were excluded.

Condition-specific tasks

In the next portion of the study, the script varied depending on condition assignment (scarce or abundant). Prompts and subsequent rating scales were inspired by Roux et al. (2015). The tester stated that “sometimes people [don’t have/have more than] enough of something they need” and asked participants to “think of a time when you had [less/more] than enough of something you needed” such as “snacks, candy, books, art supplies, games, or a certain kind of toy or anything else.”³ If participants could not do so, the tester repeated the prompt in various forms up to three times, stopping if the children indicated annoyance or distress. To help participants “re-live” the experience in question, participants were asked to close their eyes and reflect on that time, then say the resource in question and how the experience made them feel. (These questions were posed to focus participants’ attention; responses were not analyzed.)

Participants then completed two 5-point rating scales, administered in counterbalanced order, to yield standardized measures of their recalled experiences. The Quantity Scale queried how much children felt like they had of the resource, ranging from *almost nothing* (1) to *a whole bunch extra* (5). Each item had a corresponding circle on a laterally oriented scale of circles ranging from nearly empty to nearly full. (The scale points did not repeat lexical items from the experimental induction.) The Emotion Scale queried how children felt about the amount they had [*very sad* (1) to *very happy* (5)], with corresponding faces on a laterally oriented scale. We viewed these scales primarily as manipulation checks rather than core dependent measures.

Dictator Game

Participants were given 10 tokens, displayed visually on-screen. They were reminded that the other boy/girl “wasn’t able to do this activity now” and had no tokens. Participants could choose how many tokens to share, ranging from 0 to 10, by saying the number to be given. To allow participants privacy, the tester explained that they would not watch; they would step away while the computer recorded their decision. The tester prompted participants to reflect on their recalled experience again and then turned their own camera off before participants verbally stated their choice.

Post-Dictator Game measures

Participants used a 5-point Token Value Scale to indicate how badly they wanted tokens, ranging from *not at all* (1) to *really, really badly* (5), with the same circles used for the Quantity Scale. Participants then used this scale to indicate how badly the “other kid” wanted tokens. Afterward, participants completed the children’s Reading the Mind in the Eyes task (Baron-Cohen et al., 2001), which was not relevant to this study. (As per our preregistration, the task could be used as a comparison measure for future studies. No analyses were run on it.)

³ “Low stakes” items that could be considered “luxuries” for children were intentionally chosen to minimize the likelihood that recalling such experiences would be upsetting.

Results

Main questions and analytic approach

Our preregistered prediction was that, relative to the abundant condition, participants in the scarce condition would rate themselves as feeling like they had less and as sadder, share fewer tokens (our key prediction), and assign a higher value to tokens. We addressed these questions using linear models conducted with R statistical software (Version 4.2.3; R Core Team, 2023). The main predictor in our models was condition (factor; binary, with abundant as baseline). Additional predictors were age in months (continuous), gender (factor; binary, with boys as baseline), and rating scale order (factor; binary, with Emotion Scale first as baseline). The effects of these covariates, for which we had no predictions, are mentioned when significant. Model comparisons contrast full models, which include all predictors and covariates, with null models excluding condition. Exploratory analyses of the effects of quantity, emotion, and token value ratings on Dictator Game sharing are reported in the [supplementary material](#) and are summarized briefly here.

Manipulation checks: Quantity and emotion ratings

Participants assigned lower quantity ratings in the scarce condition than in the abundant condition, $\beta = -1.89$, $SE = 0.15$, $p < .001$. Our full model provided a superior fit to the data over our null model, $F(1, 143) = 152.19$, $p < .001$. Participants also assigned lower (i.e., sadder) emotion ratings in the scarce condition, $\beta = -1.31$, $SE = 0.15$, $p < .001$, and our full model provided a superior fit to the data, $F(1, 143) = 72.22$, $p < .001$. See [Fig. 1](#).

Dictator Game

Participants shared less in the scarce condition than in the abundant condition, $\beta = -0.95$, $SE = 0.34$, $p = .006$. In addition, participants shared more with age, $\beta = 0.05$, $SE = 0.02$, $p = .004$, and girls shared more than boys, $\beta = 0.98$, $SE = 0.34$, $p = .005$. See [Fig. 2](#). Our full model provided a superior fit to the data, $F(1, 143) = 7.86$, $p = .006$.

Token value

For children's self-ratings in the token value task, the effect of condition was marginal in the predicted direction, $\beta = 0.35$, $SE = 0.18$, $p = .06$, with marginally higher values in the scarce condition and no other significant effects. However, because a visual inspection of the data suggested an age by condition interaction, as shown in [Fig. S2](#) of the [supplementary material](#), we ran an exploratory model including the interaction term. (Note that this interaction was not preregistered.) This model revealed a significant effect of condition, $\beta = 3.91$, $SE = 1.57$, $p = .01$, and a significant age by condition interaction, $\beta = -0.04$, $SE = 0.017$, $p = .02$; relative to older children, younger children assigned higher token values in the scarce condition. A model including condition and the age by condition interaction provided a superior fit to the data, $F(2, 140) = 4.52$, $p = .01$. For ratings of others' value, there was no significant effect of condition, $\beta = -0.09$, $SE = 0.16$, $p = .59$. Girls assigned higher ratings than boys, $\beta = 0.35$, $SE = 0.16$, $p = .03$.

Dictator Game and quantity, emotion, and token value ratings

These exploratory analyses are reported in the [supplementary material](#). Children with higher quantity ratings shared more, but this effect was not significant when controlling for condition. Emotion ratings did not predict children's sharing with or without controlling for condition. Token value ratings predicted sharing even when controlling for condition. Children with higher token value ratings shared fewer tokens, and this was especially true in the scarce condition.

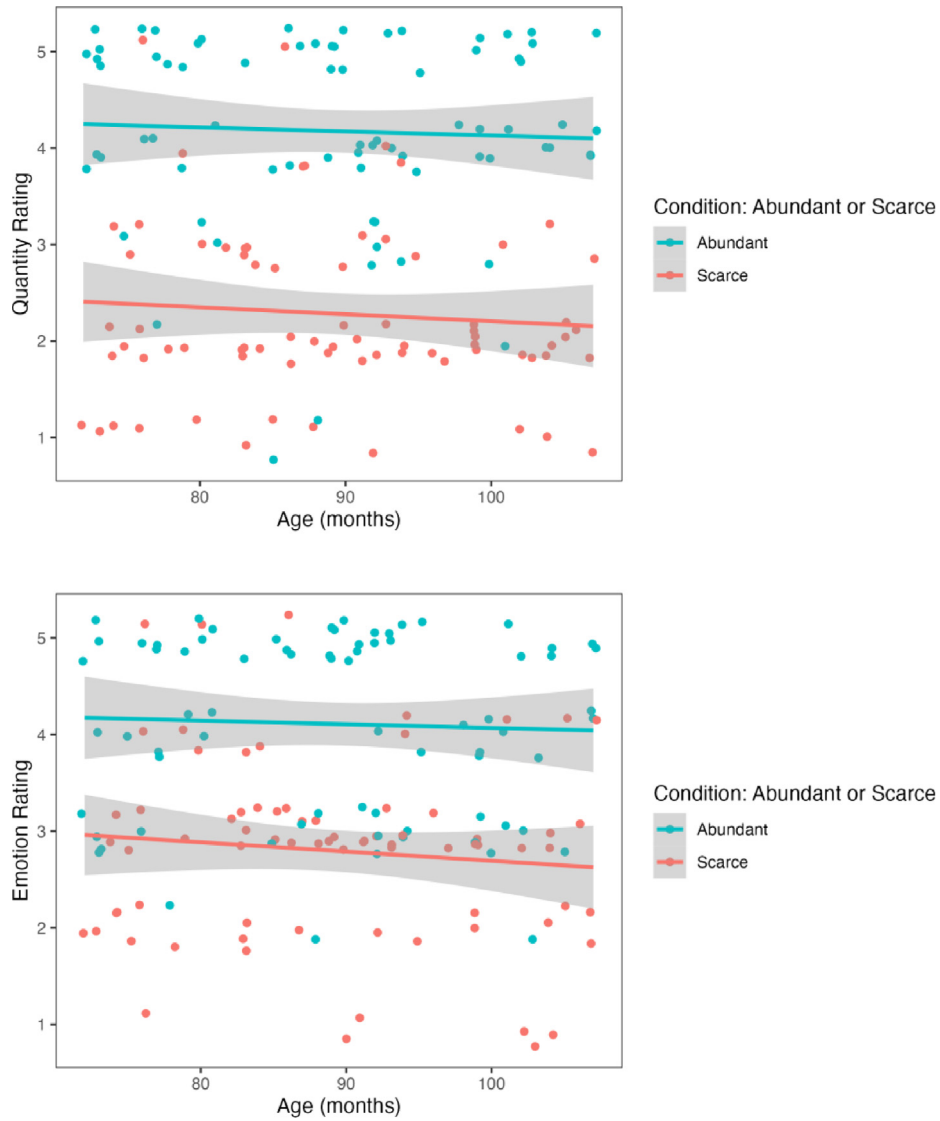


Fig. 1. Children's quantity and emotion ratings by age and condition. Ratings could range from 1 to 5, with higher values indicating feeling more resource abundant (quantity) and more happy (emotion). Shaded regions show 95% confidence bands. Dots are jittered to show individual data points.

Discussion

Our manipulation checks indicated that the recall task induced different states of resource access: Participants rated themselves as having fewer resources and as sadder in the scarce condition, supporting the viability of recall methods for studying how resource states affect children. The quantity rating results were expected in light of the overlap between the scale and the manipulation, but the emotion ratings showed robust condition differences even though the script did not indicate how resource access should make one feel.

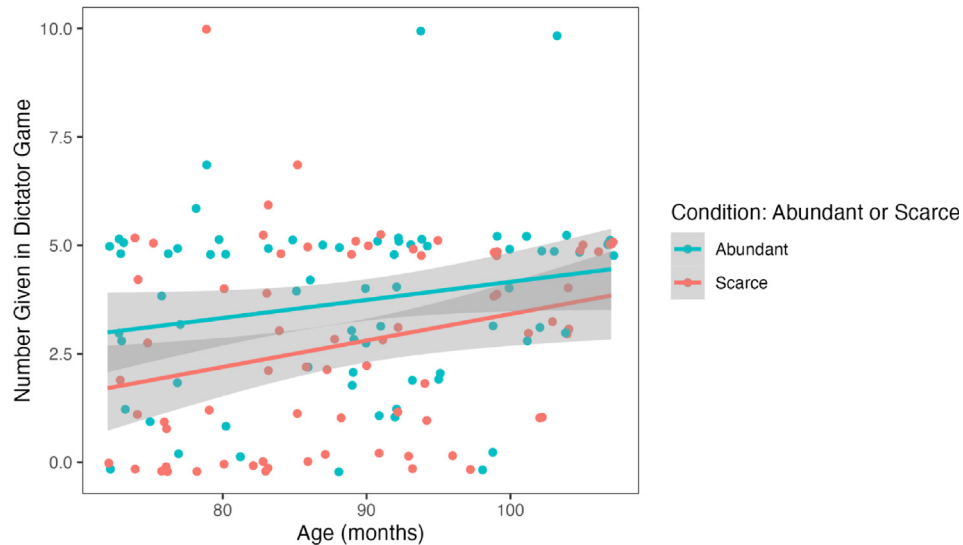


Fig. 2. Tokens shared in the Dictator Game by age and condition. The number shared could range from 0 to 10. Shaded regions show 95% confidence bands. Dots are jittered to show individual data points.

As predicted, children shared fewer resources in the scarce condition, suggesting that recalling past resource access affects current behavior. Our findings on experimentally induced states of resource access align with studies of adults (e.g., Roux et al., 2015) and indicate that feelings of resource access influence children's decision making. Comparative work indicates that such dynamics are not limited to humans; meerkats' decisions to share food with others are influenced by current resource levels, with well-fed meerkats sharing more than meerkats without supplemental feeding (Clutton-Brock et al., 2001). The ability to use one's current resource levels to determine how much to share may be an important survival tool. We note that children's quantity ratings (i.e., perceived resource access during the recalled experience) did not predict sharing above and beyond condition. However, the quantity rating task was intended as a manipulation check rather than a direct measure of the complex cognitions and emotions surrounding resource access, which could require several questions or even elude measurement.

In addition to our predicted results, we also found that girls and older children shared more. Such results were not the focus of our investigation but are consistent with typical findings in past studies (e.g., Ahl, Hannon, et al., 2023; Gummerum et al., 2010). We note that sharing generally increases across childhood (Blake & Rand, 2010), although we had not predicted age effects due to our limited age range.

What explains our main findings? Our favored explanation is that evoking past resource states changed children's overall sense of resource access, desire, and valuation. Evoking scarcity created a sense of lacking resources, a stronger desire to generate and keep new resources, and enhanced the appeal of new resources; evoking abundance had the opposite effects. These mechanisms are speculative but rather consistent with our token value findings that younger children expressed a stronger desire for tokens in the scarce condition. In addition, exploratory analyses (see [supplementary material](#)) indicated that children with higher token value ratings shared fewer tokens in the scarce condition. In addition to affecting children's perceptions of resource value, the experimental manipulation may have increased the weight children assigned to their own needs relative to others' needs. Some theories indicate that experiencing resource scarcity increases the perceived importance of social networks (Piff & Robinson, 2017), but this perception might not extend to anonymous others for children.

The scarce condition evoked sadness relative to the abundant condition; do our findings illustrate specific effects of mood rather than a broader sense of resource access? Although we lack ratings of

children's current mood, their past emotional experience ratings were not significantly associated with their sharing (see [supplementary material](#)). Other studies have found that effects of mood and resource access are dissociable (Briers et al., 2006; Huijsmans et al., 2019; Huppert et al., 2020). Another limitation is that we investigated the effects of scarcity and abundance relative to each other, but whether one condition exerted more influence is unclear. We note that other studies have contrasted abundance and scarcity without a "baseline" (Briers et al., 2006; Huijsmans et al., 2019), and it is difficult to create a "neutral" condition in the current design, which has children consider resource access experiences. Our [supplementary material](#) includes results from a prompt-free Dictator Game, but design differences complicate cross-study comparisons. Finally, how our manipulation would affect children's sharing with familiar others is unknown.

Our findings indicate the viability of experimentally inducing resource states in children. They show that children's resource-sharing decisions are flexible and subject to short-term influences targeting perceived resource access. Do our findings have implications for strongly debated ideas regarding how enduring resource access affects generosity? The dynamics modeled here are distinct from those at play in long-term states of resource wealth; our method is not a stand-in for such states. However, our results suggest that if lower-wealth individuals are more generous, such tendencies might not emerge directly from an immediate feeling of being scarce in resources but rather might emerge from downstream consequences of it (e.g., greater empathic concern for individuals in need). We note that sharing can be judged proportionally relative to one's capacity; choosing to not share when one is lacking in resources can be viewed as self-preserving rather than selfish.

CRedit authorship contribution statement

Richard E. Ahl: Conceptualization, Writing – original draft, Visualization, Investigation, Formal analysis, Methodology. **Dorsa Amir:** Methodology, Writing – review & editing. **Katherine McAuliffe:** Funding acquisition, Writing – review & editing, Formal analysis, Methodology, Visualization, Supervision.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jecp.2024.105914>.

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