

N-Equality: Inequality Increases With the Number of Allocation Recipients

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We examine the equality preferences of resource allocators, finding that a ubiquitous situational factor—the mere number of recipients (*N*)—shapes the trade-offs these allocators make between their equality concerns and other considerations. Specifically, our studies offer evidence for an *N*-Equality effect: Third-party allocators become less concerned about inequality as the number of recipients increases. A pilot study illustrates the *N*-Equality effect with university faculty salaries, showing that the variance in faculty salaries increases with department size. Study 1 offers experimental evidence that allocators facing a trade-off between equality and the distributive principles of efficiency and equity give less weight to equality as the number of recipients increases, and supplemental experiments replicate the effect with different equality–efficiency trade-offs. Study 2 reveals the *N*-Equality effect in allocators’ choice that requires an equality–equity trade-off between low variance and high variance distributions. Studies 3a–c implicate the contribution of social comparison to the *N*-Equality effect, linking allocators’ preferences to their concerns over social comparison among recipients (Studies 3a and 3c) and showing this concern mediates the *N*-Equality effect (Study 3b). We conclude with implications for inequality research.

Keywords: inequality, third-party decision making, social comparison, distributive justice

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Decision makers—including regulators, business managers, administrators, and even heads of households—whose task is to allocate resources to others (“recipients”) may favor distributing these resources equally for many reasons. For one, allocators may hold normative views according to which fairness or distributive justice require them to treat people equally (Deutsch, 1985). Alternatively, allocators may wish to avoid the social strain created by inequality (Bagarozzi, 1982; Mannix et al., 1995; Prentice & Crosby, 1987), because they think recipients will judge the fairness of what they receive based on social comparisons with other recipients (Greenberg et al., 2007; Hegtvedt, 2006). Allocators may also favor equality due to pragmatic considerations, since equal allocations are simple to implement (Debusschere & van Avermaet, 1984; Harris & Joyce, 1980) and easy to explain, predict, and justify (Messick, 1993, 1995; Messick & Schell, 1992; Schwinger, 1980).

Despite these normative, social, and pragmatic reasons for which allocators may favor equal distributions, equality routinely stands in tension with other allocation principles, requiring allocators to weigh competing distributive considerations. For instance, considerations of efficiency—that is, of maximizing the overall social benefits of an allocation (e.g., Deutsch, 1975)—will come in tension with equality when more efficient allocations entail greater inequality (Matania & Yaniv, 2007; Mitchell et al., 1993). Similarly, the principle of equity that often drives distributive behavior (Mikula, 1980; Schwinger, 1980; Walster et al., 1978) calls for rewarding people in proportion to their contributions or merit and follows individuals’ expectations of proportionality between inputs and outputs in social relationships (Adams, 1965). Yet, when recipients provide differing inputs (e.g., effort or productivity) or possess different degrees of merit (such as ability or relevant performance), allocators cannot fully satisfy both equity and equality (Bagarozzi, 1982; Debusschere & van Avermaet, 1984; Harris & Joyce, 1980; Mannix et al., 1995; Prentice & Crosby, 1987).

We examine this common tension between equality and other allocation considerations to demonstrate that a mere change in the number of recipients (*N*) can shape allocators’ equality preferences. Specifically, we offer evidence for an *N*-Equality effect, where allocators facing competing distributive considerations tolerate greater inequality when distributing resources among *many* recipients than when facing *few* recipients. Our findings further suggest that the *N*-Equality effect is associated with social comparison concerns (e.g., Bazerman et al., 1992; Moyal et al., 2020). That is, allocators are more concerned about social comparison—and therefore about inequality—among a few recipients than among many recipients.

Besides revealing a novel phenomenon in the area of distributive justice and third-party decision making (e.g., Fetschenhauer & Huang, 2004; Fişek & Hysom, 2008; Gordon-Hecker et al., 2021; Griffith et al., 1993; Johansson, 2005; Lewinsohn-Zamir et al., 2016; Messick &

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Schell, 1992; Mikula, 1980; Miller & Komorita, 1995; Ritov & Zamir, 2014), we also advance our understanding of social comparison's role in shaping resource allocations (e.g., Moyal et al., 2020; Moyal & Ritov, 2020) by showing that people's concern for the social comparison among others depends on their numerosity. Hence, before turning to our studies, we briefly review key research on social comparison and distributive justice, as well as the research on the impact of N —the number of comparison targets—on social comparison.

Social Comparison and Distributive Justice

Distributive justice concerns “the comparative allocation of goods and bads to people” (Furby, 1986), so it is unsurprising to find a “widely accepted social scientific dictum that when people judge how fairly they are treated they take into account the manner in which others are treated” (Greenberg et al., 2007). Indeed, comparison information is viewed as central to individuals' assessments of distributive justice (Hegtvedt, 2006). This observation is the foundation of equity theory, which rests on social comparisons of different recipients' reward-to-contribution ratios (Greenberg et al., 2007). Yet social comparisons are similarly indispensable for assessments of the equality of allocations (Baron & Pfeffer, 1994); after all, neither equality nor inequality are meaningful concepts absent comparisons among the outcomes of different recipients (Masters & Smith, 1987).

For its part, social comparison theory offers a robust account of individuals' equality concerns, positing that people satisfy their need for self-evaluation by comparing their outcomes to those of others (Festinger, 1954). Individuals typically dislike upward, unfavorable, comparisons (Festinger, 1954; Johnson, 2012; Tor & Garcia, 2023; Yapple & Yu, 2020)—as when they are allocated fewer resources than other recipients. The closely related relative deprivation literature similarly shows that individuals assess the deservingness and fairness of their outcomes by comparing to others (Smith et al., 2012, 2020; Walker & Smith, 2001). Decision making and social psychological studies further link social comparison with individuals' tolerance for inequality (Bazerman et al., 1992; Blount & Bazerman, 1996; Garcia et al., 2005; Loewenstein et al., 1989; Messick & McClintock, 1968; Messick & Sentis, 1979).

Nevertheless, most allocation studies to date did not directly manipulate social comparison concerns. One scholar noted, for example, that “[a]lthough few dispute the underlying role of ... social comparisons in assessments of justice, little research explicitly studies these processes” (Hegtvedt, 2006, p. 58). In a rare study that did focus on the role of social comparisons from an allocator's perspective, Moyal et al. (2020) found that manipulating the upward (vs. downward) comparison experienced by the allocator vis-à-vis another participant led the allocator later to be less generous to a different individual in an unrelated dictator game (Moyal et al., 2020; see also Moyal & Ritov, 2020).

One large field study by Pfeffer and Langton (1988) also suggests social comparison plays an important role in shaping allocators' equality–equity trade-offs in organizational wage decisions, but did not directly manipulate social comparison. Pfeffer and Langton collected data from over 60,000 faculty respondents in 1,805 academic departments belonging to 303 colleges and universities to examine factors that might be associated with the degree of inequality in employee salaries. They found lower wage inequality when more interpersonal contact and information exchange facilitated social

comparison among faculty (Pfeffer & Langton, 1988), in line with the expected effect of social comparison concerns on the wage decisions of allocators in an organizational setting.

Importantly, these findings also highlight the specific impact of the situational factors of social comparison on allocation decisions. Situational factors are features of the decision environment that affect the extent to which individuals engage in social comparison generally (Garcia & Tor, 2024; Garcia et al., 2013, 2020) and in distributive decisions in particular (Hegtvedt, 2006). The heightening of social comparison concerns in the presence of these situational factors is likely to lead allocators to give greater weight to equality concerns over competing distributive considerations.

The Impact of N as a Situational Factor of Social Comparison

The centrality of social comparison processes to distributive behavior suggests that situational factors that tend to increase social comparison among recipients may be associated with more equal distributions (Baron & Pfeffer, 1994). The present studies demonstrate the causal nature of this relationship by studying the effects of a direct manipulation of the number of comparison targets (N)—a ubiquitous situational factor of social comparison established by research in the closely related area of competitive behavior (Garcia & Tor, 2009; Tor & Garcia, 2010)—on allocator decisions.

The N -effect research (Garcia & Tor, 2009; Tor & Garcia, 2010) showed that social comparison concerns and the motivation to compete decrease as the number of competitors increases, even when the expected value of winning remains constant. To illustrate, when faced with a speed-based task in which the top 20% of participants would receive a bonus payment, participants who were told they were competing in a pool of 10 competitors finished the task more quickly than their counterparts who were told they were competing in a pool of 100 competitors, without compromising accuracy. This observation was corroborated by numerous additional studies that also showed social comparison mediates the N -effect (Garcia & Tor, 2009). However, because these findings involve a different dependent variable (i.e., competitive motivation) and social comparisons by competitors toward their fellow counterparts, which are more akin to comparisons among recipients than to allocators' concerns, they are only suggestive with respect to the present hypotheses.

Nevertheless, we were able to identify one study that examined the effects of a between-subjects manipulation of N on allocators' decisions involving equality–equity trade-offs and found no main effect for recipient group size (Hysom & Fisek, 2011). However, that study focused on other situational and interpersonal factors and only compared allocations to two different small- N recipient groups (of three vs. five recipients), a comparison that previous N -effect research indicates is highly unlikely to generate a measurable difference in social comparison or its dependent variables.

Hypotheses and Overview

Based on the extant literature indicating that a situational factor such as N (the number of social comparison targets) may affect how allocators trade off equality against competing consideration due to their concerns over social comparison among recipients, we posit the following hypotheses:

Hypothesis 1: Allocators are more likely to tolerate inequality as the number of allocation recipients (N) increases (the “ N -Equality effect”).

Hypothesis 2: As N increases, allocators become less concerned about potential social comparisons among recipients.

We begin with a pilot study that offers a real-world illustration of the N -Equality effect. Study 1 then provides experimental evidence for the N -Equality effect when allocators’ decisions entail simple equality–efficiency trade-offs. Study 2 demonstrates the effect in a choice between a low versus a high variance payoff distribution (pitting equality against equity), while holding constant the total allocation amount (controlling for efficiency). Studies 3a–c implicate the role of social comparison, showing that allocators’ concerns about social comparison among recipients are linked to allocators’ willingness to tolerate inequality (Studies 3a and 3c) and that this mediates the N -Equality effect (Study 3b). All experimental studies were preregistered (see the Methods section), and most required real decisions: Studies 1 and 3a led participants to believe their decisions had real stakes, while Studies 2 and 3b explicitly underscored the real consequences of allocators’ decisions. For transparency, our data and code are available under the “Files” tab (Garcia & Tor, 2025) at https://osf.io/5mcn9/?view_only=7f19e2d147de40029da612d5668c094f.

Pilot Study Real-World Illustration

Before we present our experimental studies, we first seek to summarize an illustration of the N -Equality effect using real-world data¹ (see the Supplemental Material for more details; June, 2011). Examining salary data of tenure-track or tenured faculty across the University of Texas system, we tested the prediction that salary variance would be lower in a department with fewer versus many faculty members. Using a likelihood ratio test, our analyses showed that the N -Equality hypothesis across five quintiles was significantly more likely than the null hypothesis (likelihood ratio test), $\chi^2(4) = 327.31, p < .001$. Further, estimated variances within quintiles varied in an expected upward trend ($Q_1 = 1.135E9, Q_2 = 1.7096E9, Q_3 = 1.7765E9, Q_4 = 2.683E9, Q_5 = 3.2483E9$), consistent with the prediction that, as the N of faculty members in an academic department increases, so does salary variance. Incidentally, a simple correlation between department size (N) and the salary standard deviation was also significant ($r = .459, p < .001$): As department size increases, so does the salary standard deviation. While this illustration offers some ecological validity for the N -Equality effect, we acknowledge the limitation that we cannot control for all possible counter-explanations, and so we proceed to report on a series of controlled experimental tests of our hypotheses.

Study 1: Equality Trade-Offs

Study 1 demonstrates the basic effect by asking third-party decision makers to choose between an equal payoff versus a more efficient and equitable but unequal payoff (that produces a greater aggregate benefit and rewards recipients for their performance). Because we hypothesized that allocators become more willing to tolerate inequality as the number of recipients increases, we predicted that allocators will be more likely to choose a more efficient and equitable but unequal payoff over an equal payoff when the

number of recipients is larger than when it is smaller. The preregistration for this study is available at https://osf.io/p8udy/?view_only=94cb1669161645baa0819b3579d7c634.

Method

Participants

Two hundred nine participants (96 females, 113 males; average age = 41.1 years) were recruited from Amazon Mechanical Turk via <https://CloudResearch.com>.

Procedure

All participants completed a captcha and then read, “We are determining payoffs for college students in a course-based exercise. On the next page, please provide your opinion on how these payoffs should be allocated.” In a between-participants design, decision makers were asked to make an allocation decision regarding either 4 or 400 payoff recipients: “To allocate among 4 [400] students, which would you recommend?” and the two options were “All 4 [400] students get \$2 each” versus “Pay depending on performance: 1 [100] student(s) gets \$4, 1 [100] student(s) gets \$3, 1 [100] student(s) gets \$2, 1 [100] student(s) gets \$1.”

Participants then responded to questions on the number of recipients per manipulation check as well as control measures on the vividness of the recipients (Marks, 1973) and the ratio bias (i.e., a perceptual effect where 10 out of 100 seems more likely than 1 out of 10; Denes-Raj & Epstein, 1994) and other demographic information.

Results

One participant did not select a choice, and 18 others missed the manipulation check and were thus dropped from the analysis. As predicted, 58.2% of the participants chose the more equal over the less equal allocation in the smaller- N condition, whereas 40.2% preferred the more equal allocation in the larger- N condition ($\chi^2 = 6.114, N = 190, p = .013$). Moreover, a logistic regression shows that this N -Equality effect survives even when controlling for the vividness of the allocation recipients ($B = .759, p = .011$) and regardless of whether they demonstrate the ratio bias ($B = .694, p = .020$). Thus, allocators become more willing to tolerate inequality as the number of recipients increases, even when controlling for the vividness of the allocation recipients as well as tendencies to exhibit the ratio bias.

Additional Evidence

Because Study 1 examined trade-offs between equality and both efficiency and equity considerations, we replicated the basic effect using a similar paradigm in a separate study ($N = 101$) in which allocators made decisions across a series of payoff options. See “Study I. Study of Equality-Efficiency Tradeoffs” in the Supplemental Material. Consistent with our central hypothesis, participants in the *smaller- N condition* chose the equal payoff 24.1% of the time, whereas participants in the *larger- N condition* chose the equal payoff only 8.2% of the time ($\chi^2 = 18.78, p < .001$; generalized estimating equations analysis: $\chi^2 = 4.69, p = .0304$).

¹ We thank Randall Limberg for compiling this real-world pilot data.

We further replicated the basic effect in an allocation of non-monetary benefits. See “Study II. Equality-Efficiency Tradeoffs in Non-Monetary Benefits Study” in the Supplemental Material. Here, the choice was between Option A “Help 5 [30] children in the village get 1 year of schooling” and Option B “Helping 1 [6] child in the village get 3 years of schooling and help 2 [12] other children in the village get 1 year of schooling.” Results showed that 78% of the participants chose the equal option to help all the children in the *smaller-N condition*, compared to only 52% of the participants in the *larger-N condition* ($\chi^2 = 9.99, p = .0016$).

Study 2: Low Versus High Variance Distribution Preferences

Study 2 replicated the basic effect using a paradigm in which both payoff options are unequal but one option—the low variance distribution—is more equal than the other option—a high variance distribution that rewards recipients more strongly for performance. In addition, the total amount allocated is the same under both options, so the allocation decision involved no efficiency trade-off. Instead, this design sought to demonstrate that allocators’ tolerance for inequality increases with N even in the face of a trade-off between equality and equity alone. Moreover, Study 2 also underscored to participants that their choice would potentially have real consequences, determining payoffs to a group of recipients. As previously, we predicted that allocators would tend to choose the low variance payoffs over high variance ones more often when there were only a few versus many payoff recipients. Preregistration is located at https://osf.io/rb6qz/?view_only=b4314e76fe014ab881ca9ae519691f3b.

Method

Participants

A total of 251 participants (169 females, 79 males, two nonbinary, one missing gender; average age = 40.9 years) were recruited from Prolific.

Procedure

To underscore the consequences of their decisions, participants first read the following:

We are determining payoff allocations for a group of research participants who completed a trivia quiz task. On the next page, please provide your opinion on how these payoffs should be allocated. We will randomly choose one of the responses and pay accordingly, so the potential impact of your decision is real.

In a between-participants design, participants were then randomly assigned to a condition with either six or 60 payoff recipients:

The bonuses will be based on performance. You are determining which of two bonus distributions we should use. Both distributions are plausible, both entail the same total amount of money, and both have a bonus average of \$3.50. There are 6 [60] participants.

Participants in the 6 [60] condition were asked, “Which distribution do you recommend?” and chose between a “LOW VARIANCE

OPTION: 3 [30] participants get \$3.70, 3 [30] participants get \$3.30” and a “MORE VARIANCE OPTION: 1 [10] participant gets \$4.00, 2 [20] participants get \$3.70, 2 [20] participants get \$3.30, 1 [10] participant gets \$3.00.” Again, both options had a bonus average of \$3.50.

Thereafter, participants responded to the manipulation check about the number of recipients in the group (manipulation check) and questions capturing the ratio bias, the vividness of the imagined recipients, and demographics. (In addition, to fulfill what we explained to our experimental participants, a separate group of participants performed a trivia quiz task, and we randomly selected one of the allocators’ payoff choices and paid these trivia quiz participants accordingly.)

Results

One participant did not select a choice, and 22 others missed the manipulation check and were thus dropped from the analysis. Nevertheless, as predicted, 62.7% of the allocators chose the low variance payoff option in the *smaller-N condition*, whereas only 48.0% preferred it in the *larger-N condition* ($\chi^2 = 4.893, N = 226, p = .027$). Moreover, as in Study 1, a logistic regression shows that this *N-Equality* effect remains significant even when controlling for the vividness of the allocation recipients ($B = .623, p = .024$) and for correct versus incorrect responses to the ratio bias question ($B = .591, p = .030$), thus ruling these out as potential alternative mechanisms underlying the effect.

Study 2 thus demonstrates the *N-Equality* effect in a choice between more equal and less equal allocations based on recipients’ performance, which necessitates a pure equality–equity trade-off without raising efficiency considerations.

Study 3a–c: Probing a Social Comparison Mechanism

To probe our hypothesis regarding the mechanism, we conducted three studies that implicate the role of social comparison. We hypothesized that allocators’ concern about social comparison among recipients affects their choice of payoff options. As the number of payoff recipients increases, allocators become less concerned about social comparison among the recipients and thus more willing to choose the more unequal payoff. Study 3a links the basic effect to allocators’ concern about social comparison among the recipients; Study 3b shows that allocators’ concern about social comparison among the recipients mediates the *N-Equality* effect; finally, Study 3c shows that this concern decreases monotonically as the number of payoff recipients increases.

Study 3a: The Role of Social Comparison

Study 3a linked allocators’ concerns about social comparison among recipients. We predicted that allocators will be more concerned about social comparison among few recipients than among many recipients and that this tendency will mirror their preferences for more equal allocations over less equal allocations. See preregistration at https://osf.io/7upma/?view_only=01e37f9911ab42029dfc9e172fa71f0e.

Method

Participants

One hundred twenty individuals (83 females, 37 males; average age = 40.6 years) were recruited from Prolific to participate in an online study.

Procedure

In a within-subjects design, allocators made decisions regarding “payoff allocations for college students in a course-based exercise” by responding to two randomly presented, iterative questions: “If we were to allocate among [4] [400] students, which would you recommend?” The two options were identical to those used in Study 1.

On the next page, participants were asked to respond on a Likert scale to three questions adapted from items on the Social Comparison Orientation Scale (Gibbons & Buunk, 1999) twice—for both the smaller-*N* and the larger-*N* conditions (randomly presented). The items were as follows: (1) “To what extent do you think that students might try to ‘one-up’ each other, show that they are in a better position than another?”; (2) “To what extent are you concerned that the students might compare bonuses to one another?”; and (3) “To what extent do you want to avoid creating a situation that leads students to compare themselves to one another?” (1 = *a great deal*, 2 = *a lot*, 3 = *a moderate amount*, 4 = *a little*, 5 = *none at all*). Participants then answered a manipulation check on the number of recipients and other demographic questions.

Results

All participants passed the manipulation check, and as predicted, 58.8% of decision makers preferred the more equal allocation over the less equal allocation in the smaller-*N* condition, compared to 40.0% of the decision makers in the large-*N* condition ($\chi^2 = 8.47$, $N = 239$, $p = .005$). We also applied a generalized estimating equations analysis, which takes into account the correlated choices within participants, that similarly showed a significant pattern ($\chi^2 = 17.61$, $p < .0001$). Next, we averaged the three items that captured allocators’ concern about social comparison among the recipients into a single composite variable (Cronbach’s $\alpha = .752$) and tested the prediction that this concern would be greater in the smaller-*N* than in the larger-*N* condition. As predicted, a within-participants repeated-measures analysis of variance revealed that allocators reported having significantly greater concerns about potential social comparison issues in the smaller-*N* condition ($M = 2.55$, $SD = 1.02$) than in the larger-*N* condition ($M = 2.85$, $SD = 0.88$), $F(1, 119) = 13.45$, $p < .001$.

Finally, we connected these findings by correlating the difference scores between the choice ratings (smaller-*N* choice minus larger-*N* choice, where negative values reflect the *N-Equality* choice pattern of a more equal distribution in the smaller-*N* and a concomitantly less equal distribution in the larger-*N* condition) and the social comparison ratings (smaller-*N* social comparison minus larger-*N* social comparison, where more negative values reflect more social comparison concerns in the smaller-*N* than in the larger-*N* condition). The correlation between the choice difference scores and the social comparison difference scores is highly significant ($r = .299$, $p < .001$), in line with our prediction. Similar results are obtained in a linear regression model where the choice difference scores are the predictor variable and the social comparison difference scores are

the dependent variable ($B = .602$, $p < .001$). Thus, the pattern of payoff preferences is linked to the pattern of decision makers’ concern about social comparison among the recipients.

Study 3b: Social Comparison Mediation

While Study 3a implicated the role of social comparison, Study 3b demonstrated that allocators’ concern about social comparison among the recipients mediates the *N-Equality* effect. Study 3b used a modified paradigm of Study 2 and was preregistered (https://osf.io/wsrej/?view_only=a6416239c9ef4952b0648ed61641c34f).

Method

Participants

A total of 303 participants (153 females, 140 males, 10 nonbinary; average age = 37.0 years) were recruited from Prolific.

Procedure

The paradigm resembled Study 2, including the initial page that prefaced the real consequential nature of their decision. On the next page, in a between-design, participants read:

The bonuses will be based on performance. You are determining which of two bonus distributions we should use. Both distributions are plausible, both entail same total amount of money, and both have a bonus average of \$3.50. There are 6 [600] participants. Which distribution do you recommend?

The choice was between a “LOW VARIANCE OPTION: 3 [300] participants get \$3.70; 3 [300] participants get \$3.30” and “MORE VARIANCE OPTION: 1 [100] participant(s) get(s) \$4.00; 2 [200] participants get \$3.70; 2 [200] participants get \$3.30; 1 [100] participant(s) get(s) \$3.00.”

After the prompt, “When deciding which bonuses to choose for the 6 [600] participants,” we asked participants to complete the three-item social comparison measure. Participants then answered the manipulation check and demographic questions. (And, as in Study 2, to fulfill what we explained to our experimental participants, one of the participants’ choices was randomly selected and a separate group of quiz takers was paid accordingly.)

Results

Of the 303 participants, 22 did not pass the manipulation check and were dropped from the analyses. The results were significant and consistent with the hypothesis. Whereas 52.7% of the participants recommended the low variance pay option when there were only a few payoff receipts, only 39.7% preferred the low variance option when there were many payoff recipients ($\chi^2 = 4.728$, $N = 281$, $p = .030$). We next created a single composite measure based on our three-item social comparison measure ($\alpha = .755$) and found participants significantly more concerned about social comparison among the payoff recipients in the smaller-*N* condition ($M = 3.44$, $SD = 1.01$) than in the larger-*N* condition ($M = 3.72$, $SD = 0.96$), $F(1, 279) = 5.46$, $p = .020$.

While we replicated the *N-Equality* effect and linked it to allocators’ concern about social comparison among the recipients, we next performed a mediation analysis to assess whether this concern

mediates the effect. We found *condition* a significant predictor of *social comparison* ($b = .275, p = .020$). Next, *social comparison* was added as a predictor variable, along with *condition*, and emerged as a significant predictor of payoff choice ($b = .6512, p < .0001$), but *condition* was no longer a significant predictor of payoff choice ($b = .3951, p = .1199$). Finally, using the Hayes Process Model 4 (Version 4.2, 5,000 bootstrap samples), we observed that the indirect effect was significant ($ab = .1791, 95\% \text{ CI } [.0270, .3751]$), suggesting that the allocator's concern about the social comparison among the payoff recipients mediates the effect.

Study 3c: The Monotonic Effect of N on Social Comparison

Study 3c further implicated the role of allocators' concern about social comparison among the recipients. Using a similar low versus high variance payoff paradigm as in Study 2, we predicted that the *N-Equality* effect will manifest monotonically and that allocators' concern for recipients' social comparisons will mirror this monotonic pattern. See preregistration at https://osf.io/5kyve/?view_only=2f06148f8d7548bd8fbc4b7f315b5e6e.

Method

Participants

Two hundred three individuals (82 females, 119 males; average age = 40.36 years) were recruited on Amazon Mechanical Turk to participate in this experiment via CloudResearch.

Procedure

In a within-subjects design, participants read:

Imagine you are a manager who is assigning bonuses. The bonuses will be based on annual performance. You are determining which of two bonus distributions. Both distributions are plausible, both entail same total amount of money, and both have a bonus average of \$3,500.

Participants then responded to four randomly presented iterations of the following question: "If you were assigning bonuses to 6 [60] [600] [6,000] employees, which distribution would you use?" They then choose between a "Low Variance Option: 3 [30] [300] [3,000] employees get \$3,700 3 [30] [300] [3,000] employees get \$3,300" and a "More Variance Option: 1 [10] [100] [1,000] employee(s) gets \$4,000 2 [20] [200] [2,000] employees get \$3,700 2 [20] [200] [2,000] employees get \$3,300 1 [10] [100] [1,000] employee(s) gets \$3,000."

On the next page, participants read, "In light of the bonus allocations, please rate the following." They then rated the same three-item social comparison measure used in Study 3, except regarding "employees" instead of "students," for each of the four levels of N ("When there are 6 [60] [600] [6,000] employees"). They also responded to demographic questions and the basic knowledge question about social comparison.²

Results

As predicted, a monotonic pattern emerged such that allocators chose the more equal distribution when the number of recipients was smaller than when it was larger: 60.4% in the 6 N , 45.0% in the 60 N ,

41.1% in the 600 N , and 38.1% in the 6,000 N conditions ($\chi^2 = 23.92, p < .0001$). Moreover, a generalized estimating equations analysis confirmed that this pattern of within-subjects binary responses was significant ($\chi^2 = 33.16, p < .0001$). In addition, the 6 N condition was significantly different from the 60 N ($\chi^2 = 23.44, p < .0001$), 600 N ($\chi^2 = 22.04, p < .0001$), and 6,000 N ($\chi^2 = 29.25, p < .0001$) conditions. The 60 N condition was significantly different from the 6,000 N condition ($\chi^2 = 4.38, p = .0363$) but not the 600 N condition ($p = .1701$), and the 600 N and 6,000 N conditions were not significantly different from each other ($p = .1836$). See Figure 1.

To implicate a possible social comparison mechanism, we created a composite measure of our social comparison items (Cronbach's α per level of N ranged from .734 to .821) and observed a reciprocal monotonic pattern. As N increases, allocators' concern for the social comparison experience of the recipients decreases (i.e., higher values = less concern): 6 recipients ($M = 2.40, SD = 1.15$), 60 recipients ($M = 2.83, SD = 1.06$), 600 recipients ($M = 3.17, SD = 0.94$), and 6,000 recipients ($M = 3.41, SD = 0.97$), $F(3, 606) = 88.985, p < .0001$. Incidentally, paired comparisons showed that all conditions significantly differed: 6 N and 60 N ($t = 8.28, p < .0001$), 6 N and 600 N ($t = 10.65, p < .0001$), 6 N and 6,000 N ($t = 11.27, p < .0001$), 60 N and 600 N ($t = 5.62, p < .0001$), 60 N and 6,000 N ($t = 8.68, p < .0001$), and 600 N and 6,000 N ($t = 5.49, p < .0001$). See Figure 1.

These results show that, as N increases, allocators become less likely to prefer the low variance distribution over the high variance one, mirroring their diminishing concerns about social comparison among the recipients. Moreover, although we only predicted a monotonic pattern, Figure 1 shows that, while remaining linear, the impact of N in this study begins to diminish after 60 participants (i.e., when moving from an already large- N to an even larger- N recipient group). At any rate, these results again demonstrate that allocators' concern for recipients' social comparison experience mirrors the *N-Equality* effect, this time in a within-subjects design in which allocators are faced with varying numbers of recipients, as is prevalent in real-life situations.

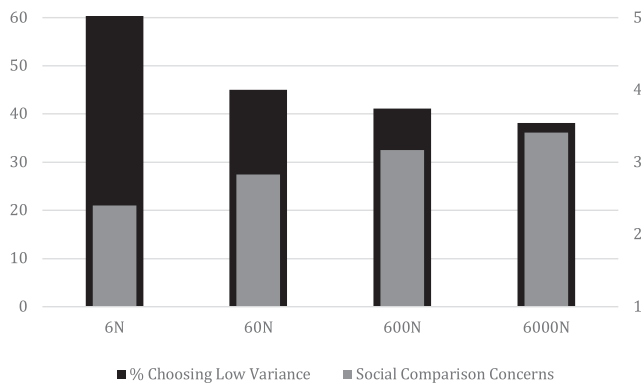
General Discussion

The present findings demonstrate that the extent of the commonly documented aversion to inequality can depend on the number of social comparison targets. More specifically, as the number of recipients increases, allocators become less concerned about making unequal resource allocations. While we illustrate this effect with faculty salaries in a pilot study, Study 1 experimentally demonstrates the *N-Equality* effect in equality-efficiency trade-offs using real monetary payoffs. Study 2 further finds the *N-Equality* effect in a choice between low variance and high variance allocations that forced an equality-equity trade-off while holding overall expected value (i.e., efficiency) constant. Studies 3a–c further explore the *N-Equality* effect: Studies 3a and 3b link it to decision makers' concerns about social comparisons among their recipients, with Study 3a replicating the *N-Equality* effect in a within-participants

² Note that a manipulation check on the different values of N was added to the Qualtrics survey after it was already set up on CloudResearch; however, none of the participants responded to the manipulation check, perhaps for lack of refresh on CloudResearch. Nevertheless, capturing a manipulation check on a within-participants factor is usually less necessary than on a between-participants factor.

Figure 1

Preference for the Low Variance Option and Allocators' Concern About Social Comparison Among Recipients (Higher Value = Less Concern)



design, showing that decision makers report greater concerns about social comparison among their recipients when the latter are fewer than when they are many; Study 3b further reveals, using real monetary payoffs, that decision makers' concern about social comparisons among the recipients mediates the *N-Equality* effect. Study 3c concludes by showing a monotonic pattern, such that as the number of payoff recipients increases from a few to increasingly larger numbers, decision makers become increasingly less concerned about social comparisons among their recipients.

Implications

Our findings advance a number of important research streams: Most obviously, they reveal a new phenomenon in distributive decision making, an area in which the *N-Equality* effect has both theoretical and practical significance. From a theoretical perspective, the effect demonstrates how common features of the decision environment can systematically shape resource allocations even when such features—like the mere number of recipients—have little (if any) normative bearing on distributional principles like equality, efficiency, or equity. Moreover, given the current centrality of equality concerns in public discourse and social science research alike, this observation offers promising venues for research on the causes of inequality in diverse areas, from public policy and economics (e.g., the role of *N* in income inequality), through education (e.g., how monetary or nonmonetary resources are distributed within educational systems comprising fewer vs. many schools or students, such as rural vs. suburban systems), to public health (e.g., the impact of *N* on the distribution of public health resources, such as vaccines in short supply, in smaller vs. larger communities).

Practically speaking, moreover, within organizational and social settings, allocators can variously strive to avoid succumbing to the *N-Equality* effect, recognize and accommodate it, or even employ it to reduce social comparison concerns from unequal yet more equitable or efficient allocations, as they see fit. For instance, salary is a common yardstick by which people compare to one another in the workplace (Card et al., 2012). We also know that pay secrecy policies (Belogolovsky & Bamberger, 2014; Day, 2007) are often used to shield employee salary information. However, the present

analysis suggests that pay secrecy policies may be less important where there are many employees or payees more generally. That is, as the number of payees increases, allocators who become less concerned with inequality may be more willing to introduce salary variance to promote equity, recognizing differences in employee performance or other merits. On the other hand, pay secrecy policies may be more important when determining raises for units with smaller numbers of employees, when allocators may be less willing to increase inequality even at the cost of making less equitable or efficient allocations. In fact, insofar as our findings suggest the *N-Equality* effect can manifest—albeit less strongly—even when the payoff distribution is unknown to recipients, allocators may be reluctant to increase inequality in smaller-*N* settings even if their decisions are shielded by pay secrecy policies.

The *N-Equality* effect may also bear implications for new entrants into organizations. It might be easier, for instance, to offer a higher starting salary to new employees joining larger units than to those entering smaller ones. The same dynamic might also come into play with employee retention packages, making it easier to match or exceed employees' competing outside offers when they are members of larger organizational units than when they belong to smaller ones. On the other hand, average, or slightly below average, recruits may face better starting salary prospects when joining a smaller unit than when joining a larger one with the same average salary, due to the lower pay dispersion in the former. Of course, further empirical testing and study are needed to confirm these intriguing but speculative conjectures.

Beyond these possibilities, the *N-Equality* effect is important for organizational design. Depending on their priorities and goals, organizational leaders may want to create smaller or larger units within the organization. For example, if one wishes to increase competitiveness among sales agents working autonomously, it may be advisable to put them in smaller units and offer unequal sales commissions. The *N*-effect (Garcia & Tor, 2009; Tor & Garcia, 2010) already suggests that the motivation to compete is greater in smaller units, and the *N-Equality* effect further indicates that the social comparison pressure for sales agents in these smaller units to work harder will be even greater under a regime of commission-based inequality. On the other hand, where employees must collaborate to achieve organizational goals, the best environments will likely involve smaller units in which people are paid more equally or larger-*N* environments that render differences in remuneration more acceptable.

Limitations and Future Directions

The studies reported here offer substantial evidence for the *N-Equality* effect, replicating it across multiple measures of inequality, a variety of trade-offs, and a range of contexts and linking the effect to a social comparison mechanism. Beyond these findings, one particularly intriguing question is whether the *N-Equality* effect extends to allocations of negative outcomes or costs or only to beneficial allocations. Scholars have noted that distributional justice research has overwhelmingly focused on the allocation of positive rather than negative outcomes (Mannix et al., 1995). There is, however, some reason to expect the present effect to extend to negative allocations, perhaps even with greater force given recipients' likely greater sensitivity to losses than to gains (Kahneman & Tversky, 1979). Still, the evidence on equality norms in the domain of

losses is mixed. Some research suggests that where the recovery of resources is concerned, equality norms operate with greater force (McLean Parks et al., 1999), perhaps even with sufficient force to override the effect of N , while other studies find to the contrary that equality norms apply more strongly in allocations of positive outcomes (Mannix et al., 1995).

Finally, some factors that were controlled for in our studies might eliminate or even reverse the N -Equality effect in certain situations. To illustrate, the evidence on the equality heuristic (Messick, 1993, 1995; Messick & Schell, 1992) implies that when the presence of numerous recipients significantly complicates allocators' decisions, they would increasingly rely on equality over other distributive principles. Our experimental designs controlled for this possibility by being not only rather simple but, importantly, identical in the degree of simplicity of the allocation decisions across the different N conditions. Nonetheless, our pilot study on real-world faculty salaries suggests that the N -Equality effect is strong enough to overcome the heuristic benefits of equal allocations in at least some common real-world circumstances.

Conclusion

Inequality is ubiquitous, and the concern for inequality has been linked to pay dissatisfaction, controversial policies, societal unrest, and more. While disciplines such as anthropology, economics, political science, and sociology offer theories on why inequality transpires, we reveal a simple psychological factor that affects people's willingness to pay others unequally: the number of recipients. We find that allocators become more tolerant of inequality in their allocations as the number of recipients increases. We further offer a social comparison account for this N -Equality effect: As the number of recipients increases, allocators become less concerned about potential social comparisons among them. These studies therefore demonstrate how a common factor of social comparison can shape resource allocations.

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