Many Hands Make Overlooked Work: Over-Claiming of Responsibility Increases With Group Size

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Logically, group members cannot be responsible for more than 100% of the group's output, yet claims of responsibility routinely sum to more than 100%. This "over-claiming" occurs partly because of egocentrism: People focus on their own contributions, as focal members of the group, more than on others' contributions. Therefore, we predicted that over-claiming would increase with group size because larger groups leave more contributions from others to overlook. In 2 field studies, participants claimed more responsibility as the number of academic authors per article and the number of MBA students per study group increased. As predicted by our theoretical account, this over-claiming bias was reduced when group members considered others' contributions explicitly. Two experiments that directly manipulated group size replicated these results. Members of larger groups may be particularly well advised to consider other members' contributions before considering their own.

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Individuals often overestimate their relative contributions to collaborative endeavors. Whether completing chores with one's spouse, writing an article with collaborators, playing a team sport, or designing a product within an organization, individuals' claims of responsibility for their group's output routinely sum to more than 100%, revealing "over-claiming" at the group level (Brawley, 1984; Kruger & Gilovich, 1999; Kruger & Savitsky, 2009; Ross & Sicoly, 1979; Thompson & Kelley, 1981; for a review, see Leary & Forsyth, 1987). Believing one deserves credit that others fail to acknowledge can be a source of dissatisfaction and conflict in groups. Although such "over-claiming" is reliable across many experiments, relatively little is known about what moderates its magnitude. Here we propose what could be an important moderator: group size. Specifically, we propose that over-claiming will tend to increase as the size of a group increases. We predict this effect because over-claiming is produced, at least in part, by egocentrically focusing on one's own contributions more than on others' contributions. This egocentrism should yield more over-claiming as group size increases because there are more contributions from others to overlook.

Accurately allocating responsibility for group outcomes involves considering both one's own *and* others' contributions. Although the formula for calculating such relative comparisons is straightforward, getting accurate inputs into the formula is not. Anything that influences how much people notice, remember, and credit their own versus others' contributions to a group outcome should therefore influence over-claiming. Noticing, recalling, and therefore, crediting one's own contributions to a group is obviously easier than doing so for others.[1] As the size of a group increases, it becomes increasingly difficult to notice, recall, and therefore, credit the full extent of others' contributions. Among married couples, for instance, there is only one additional person to

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[1] Comparative judgments, such as the amount one contributes to a group compared with others, involve three distinct cognitive stages: first, recruiting information about oneself and others; second, forming absolute evaluations of the contributions of oneself and others; and third, weighting the absolute evaluations to form a comparative judgment (Chambers & Windschitl, 2004). Egocentric biases are likely to be present at each of these stages, thereby increasing over-claiming in one of several different ways. For example, during the information-recruitment stage, self-relevant information might be more accessible and more available than equivalent forms of other-relevant information, causing self-relevant information to loom larger than other-relevant information (Kuiper & Rogers, 1979; Markus, 1977; Rogers, Kuiper, & Kirker, 1977; Ross & Sicoly, 1979). During absolute valuation, people might use or select different standards when evaluating themselves versus others. During comparative judgment, people may attend more to self-relevant absolute evaluations, anchor more on self-assessments (Kruger, 1999), and feel more confident in their self-assessments and thereby rationally weight them more (Chambers & Windschitl, 2004; Klayman & Burson, 2002; Windschitl, Kruger, & Simms, 2003). Our hypotheses do not depend on the precise nature of egocentrism underlying a responsibility judgment.

consider when evaluating responsibility. Although responsibility claims in married couples may significantly exceed 100% when summed together, they do not exceed it by much (i.e., $M = 103.1\%$; Ross & Sicoly, 1979). However, in a larger group, such as a family of five, there are four other group members to consider. Each family member would be well aware of his or her own contribution but less aware of others' contributions. We therefore predict more over-claiming in a large group, such as a family of five, than in a smaller group, such as a married couple.

A phenomenon as robust as over-claiming is not produced only by a single mechanism of egocentrism but instead is produced by multiple independent mechanisms. In particular, egocentrism is part of a larger class of myopic biases in judgment, including tendencies to focus only on one item at a time (singularity principle; Evans, 2006), to insufficiently incorporate background information into judgments (focalism; Windschitl, Kruger, & Simms, 2003), to overweight more concrete entities (generalized-group theory; McConnell, Sherman, & Hamilton, 1994), and to consider collaborators as a collective group (support theory; Rottenstreich & Tversky, 1997; Tversky & Koehler, 1994). That is, an egocentric bias in responsibility allocations emerges because people tend to focus on one thing at a time, the self is typically the focus of our own attention, the self is a concrete entity, and people often divide the world into what "I do" and what "they do."

Several alternative mechanisms could also create over-claiming, but would be inconsistent with our prediction that group size affects over-claiming. For example, self-serving motives (Miller & Schlenker, 1985; Schlenker & Miller, 1977), additivity neglect (Riege & Teigen, 2013; Teigen & Brun, 2011), and using general standards for local comparisons (LOGE model; Giladi & Klar, 2002) can produce over-claiming. None of these theories, however, predict that group size systematically increases over-claiming. Group size should not affect one's desire to think well of oneself (e.g., self-serving bias), how people treat a 100% scale (e.g., additivity neglect), or the likelihood of conflating absolute evaluations for relative evaluations (e.g., LOGE model).[2] Our prediction about the effect of group size on over-claiming, therefore, stems uniquely from the egocentric tendency to focus more on one's own contribution as a focal member of a group than on others' contributions. Perhaps more important, our proposed mechanism also suggests a unique intervention for decreasing the magnitude of the bias in a group setting: evaluating others' contributions before evaluating one's own.

Our prediction that egocentrism underlies over-claiming, and that over-claiming should increase as group size increases, is supported by at least three lines of research. First, individuals may over-claim responsibility not only for activities that reflect positively on them, as self-serving motives would predict, but also for activities that reflect negatively on them, as only egocentrism would predict (Brawley, 1984; Kruger & Gilovich, 1999; Thompson & Kelley, 1981). For example, in a classic demonstration of over-claiming, married couples over-claimed responsibility not only for socially desirable items such as doing the chores, but also for undesirable items such as causing arguments (Ross & Sicoly, 1979; see also Kruger & Gilovich, 1999). These results suggest that over-claiming stems from a tendency to focus more on one's own contributions than on others' contributions, whether they reflect positively on the self or not.

Second, experimental manipulations that draw attention to people's own versus others' contributions can change how they allocate responsibility. Increasing a person's focus on their own contributions exacerbates their tendency to over-claim for themselves (Burger & Rodman, 1983; Ross & Sicoly, 1979), whereas increasing focus on others' contributions diminishes over-claiming (Caruso, Epley, & Bazerman, 2006; Savitsky, Van Boven, Epley, & Wight, 2005). Because these interventions directly manipulate the accessibility of others' contributions, their effects are clearly consistent with a reduced egocentric bias. The experiments we present here provide further independent tests of this intervention to reduce over-claiming.

Third, in domains extending beyond responsibility allocations, considering others' mental states and perspectives seems not to be an automatic process (Apperly, Riggs, Simpson, Chiavarino, & Samson, 2006). Rather, it requires motivation and effortful attentional resources. For example, people tend to be more egocentric when they must respond quickly (Epley, Keysar, Van Boven, & Gilovich, 2004), are under cognitive load (Lin, Keysar, & Epley, 2010), or are in a positive mood (Converse, Lin, Keysar, & Epley, 2008). This suggests that considering others' contributions to a group requires more motivation and cognitive effort than considering one's own contributions.

Here we extend these demonstrations of egocentrism in allocations of responsibility to predict that over-claiming will increase as a group's size increases. This mechanism not only predicts what will increase over-claiming, but also what should decrease over-claiming in groups. Specifically, if focusing on one's own contributions and failing to consider others' contributions creates over-claiming, then focusing on others' contributions should reduce it (Caruso et al., 2006; Savitsky et al., 2005). Therefore, we expect the most over-claiming among large groups that allocate responsibility without being led to consider others' contributions. In contrast, we expect over-claiming to be attenuated in smaller groups or when people account for others' contributions. We test our predictions in both field and laboratory contexts by reanalyzing published data and conducting three novel experiments.

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[2] We do not reject the possibility that self-serving biases, additivity neglect, and applying general standards to local comparisons can create over-claiming. However, these accounts cannot explain why group size would affect over-claiming. We consider each in turn. First, whether people only report their own contributions or also report others' contributions does not change their motive to think well of themselves. Second, the additivity neglect model suggests that people do not always treat 100% as a cut-off unless it is made explicitly clear (Riege & Teigen, 2013; Teigen & Brun, 2011). We examine participants' responses in the "other-focused" conditions in our own experiments and find very few additivity violations (see Footnote 7). We also included explicit instructions in all of our contribution measures that 0% meant contributing nothing and 100% meant contributing everything. Manipulating group size is unlikely to affect how people interpreted our scale. Finally, the LOGE model suggests that people make comparisons to more generalized groups rather than to the specific comparison group. If people were already making a comparison to a large, generalized group, then we would see no effect of increasing group size on their judgments. Furthermore, this mechanism would not predict consistent over-claiming but rather that people might over- or under-claim based on people's perceptions of the broader group.

Re-Analysis of Authorship Data

Caruso et al. (2006, Study 1) emailed surveys to authors of articles published in major organizational behavior journals with 3 to 6 authors.[3] Authors estimated the percentage that they personally contributed of the overall amount of work, amount of writing, and amount of thought. Participants in the control condition ($n = 108$) answered these questions only for themselves. To assess whether drawing attention to others' contributions would reduce over-claiming, participants in the other-focused condition ($n = 89$) first listed the initials of each of their coauthors on the article and the percentage that each coauthor contributed before estimating their own contributions.[4]

Because we did not have responsibility claims from all authors on all articles, we computed an index of implied responsibility. To do this, we averaged each participant's claims of work, thought, and writing contributed ($\alpha = .92$) and multiplied this number by the size of their author group. For example, if an author on a four-author article claimed to have contributed 30% of the work, 25% of the writing, and 20% of the thought, the implied responsibility would be 100%. This metric provides an appropriate measure of over-claiming for two reasons. First, it approximates the standard measure of over-claiming whereby each person's claimed contributions in the group are summed and compared to the logical limit of 100% (Ross & Sicoly, 1979). If our sample included all people from all groups, our implied measure of responsibility would be identical to this standard measure. Second, our measure requires only one assumption: total work in a group cannot logically exceed 100%. It does not require any assumptions regarding the actual distribution of work accomplished because we do not compare each individual's claim to his or her actual contribution but rather to the logical limit of 100%.

Results were partially consistent with our hypotheses (see Figure 1). First, we conducted a linear regression predicting implied responsibility using group size and dummy variables (0 or 1) for each author order (second author position, third author position, fourth author position, and fifth author position) as our independent variables. We controlled for author order because author order correlated with implied responsibility, $r = -0.68$, $p < .001$, as one

would expect given author ordering standards in this field. As predicted, over-claiming increased with group size, $\beta = 0.16$, $p = .004$. This relationship was statistically significant in the control condition, $\beta = 0.19$, $p = .014$, and was statistically nonsignificant in other-focused condition, $\beta = 0.11$, $p = .129$. However, a separate regression analysis predicting implied responsibility from the experimental condition (0 = control, 1 = other-focused), group size, the size by condition interaction, and the author position dummy variables, yielded a statistically nonsignificant size by condition interaction, $\beta = -0.22$, $p = .354$. Finally, in a separate analysis predicting implied responsibility from experimental condition (0 = control, 1 = other-focused) controlling for author position, participants in the other-focused condition over-claimed less than did participants in the control condition, $\beta = -0.12$, $p = .018$.

Although all of the authors surveyed produced objectively high quality articles—articles published in top-tier organizational behavior journals—larger author groups claimed more responsibility for their published article than the smaller author groups. Authors also reported contributing relatively less when they considered others' contributions before their own. These findings from a previously published experiment provide some support for our hypotheses: over-claiming increases with group size, and considering others' contributions reduces over-claiming. We conducted three new experiments to test our hypotheses more systematically.

Experiment 1: Study Groups

Large author groups claimed more responsibility for their published article than small author groups in Caruso et al. (2006). Experiment 1 used a different field context to test our hypotheses: MBA study groups. One explanation for the results in the authorship study is that indicating the percentage contributed by each coauthor in the other-focused condition simply made the 100% contribution limit salient. To explore this possibility, we added a more implicit other-focused condition in which participants merely considered their other group members' contributions before reporting their own, but did not explicitly indicate contributions that summed to 100% (Savitsky et al., 2005). We again hypothesized that implied responsibility would increase with group size, and that considering others' contributions (both explicitly and implicitly) would reduce over-claiming.

Method

Participants. Participants were 699 MBA students enrolled in a negotiations course. We sent an online survey to all students enrolled in the course as part of a learning exercise; 710 students completed the entire survey, but 11 of them requested to have their data removed from any analyses that were not related to the course learning exercise.

Procedure. We randomly assigned participants to a control ($n = 282$), implicitly other-focused ($n = 211$), or explicitly other-
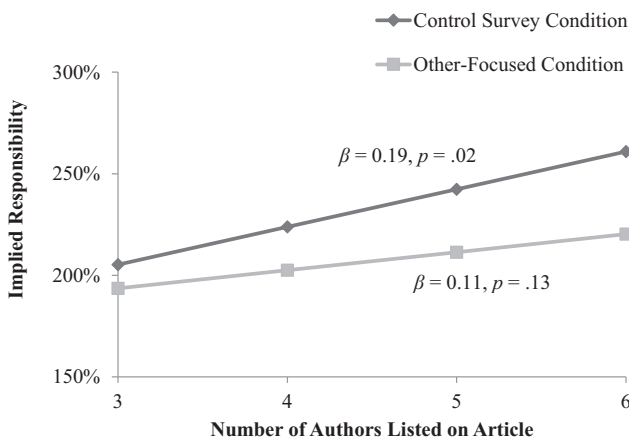

Figure 1. Implied responsibility in the reanalysis of Caruso et al. (2006) authorship data by the number of authors per article and the survey condition.

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[3] See the original article for rationale behind selection; 41% of the sample responded to the e-mailed survey.
[4] We do not list survey items irrelevant to our current hypotheses. For all items, see Supplemental Material.

focused ($n = 206$) condition.[5] Participants in the control condition first answered six measures of work claiming. The first item was: "Of the total work that your study group did last semester, what percent of the work do you feel like you personally contributed?" Items 2–6 asked participants to indicate the percentage they personally contributed to: preparation of case write-ups; creative or intellectual insight; suggestions for how the group should best run; interesting questions raised; and answers to other group members' questions. Finally, participants reported their study group size and each member's name.

Participants in the implicitly other-focused condition completed the same questions in a different order, reporting their group size and each member's name first and *then* reporting the percentage they personally contributed on the six items. Participants in the explicitly other-focused condition answered in the same order, but also reported the percentage each group member contributed before reporting their own contributions.

Results

We could not match each individual with their group members because students completed surveys anonymously. Therefore, we computed implied responsibility using the same methodology for the authorship experiment: We averaged each individual's claims on the six items ($\alpha = .82$) and multiplied this number by the group size (see Figure 2). Results were consistent with our primary hypothesis. In a regression that predicted implied responsibility from group size, a dummy variable for the implicitly other-focused condition ($1 = $ *implicitly other-focused*, $0 = $ *control*, $0 = $ *explicitly other-focused*), and a dummy variable for the control condition ($1 = $ *control*, $0 = $ *implicitly other-focused*, $0 = $ *explicitly other-focused*), we found that over-claiming increased as group size increased $\beta = 0.19$, $p < .001$. Consistent with an egocentric account of over-claiming, a regression predicting implied responsibility from the implicitly other-focused condition ($1 = $ *implicitly other-focused*, $0 = $ *control*, $0 = $ *explicitly other-focused*) and explicitly other-focused condition ($1 = $ *explicitly other-focused*, $0 = $ *control*, $0 = $ *implicitly other-focused*) revealed that consider-

ing others' contributions both explicitly ($\beta = -0.34$, $p < .001$) and implicitly ($\beta = -0.15$, $p < .001$) significantly reduced implied responsibility compared to the control condition. Finally, considering others' contributions marginally reduced the relationship between group size and responsibility in the control condition ($n = 282$, $r = .29$, $p < .001$) compared with both the implicit condition ($n = 211$, $r = .13$, $p = .053$) and the explicit condition ($n = 206$, $r = .14$, $p = .042$), $zs = 1.83$ and 1.71, $ps = .067$ and $.087$. In a regression predicting implied responsibility from group size, control condition ($1 = $ *control*, $0 = $ *implicitly other-focused*, $0 = $ *explicitly other-focused*), implicitly other-focused condition ($1 = $ *implicitly other-focused*, $0 = $ *control*, $0 = $ *explicitly other-focused*), the control condition by group size interaction, and the implicitly other-focused condition by group size interaction, we found a significant control condition by group size interaction, $\beta = 0.47$, $p = .003$. All other predictors were nonsignificant.

Discussion

Larger MBA study groups claimed more responsibility for their group's output than smaller groups, with groups of eight plus members dramatically claiming more than 140% credit. However, explicitly—and implicitly—considering group members' contributions reduced the extent of over-claiming. These results again demonstrate that over-claiming increases as group size increases. Being led to focus on others' contributions significantly reduced over-claiming, again suggesting that over-claiming comes not from self-serving motives but rather from a self-centered focus on one's own contributions. Even a relatively subtle reminder of others' contributions, one that did not mention the 100% contribution limit, significantly reduced over-claiming. These results make it clear that the tendency to overweight one's own contributions to a group comes not from an inability to consider others' contributions, but rather from a tendency to overlook them unless prompted to do so.

Experiment 2: Hand Grips

The first two experiments test our hypotheses in naturally occurring groups, but these field experiments have at least three potential drawbacks: differential selection by members into large or small groups, unobservable interdependence of the data, and no objective standard of accuracy. Experiment 2 addresses all of these concerns by manipulating group size experimentally, analyzing data from complete groups, and selecting a task with measurable performance: a handgrip competition. Because we can match individuals to their groups in this experiment, we computed over-claiming using the standard measure whereby we sum each group member's individual responsibility claim to create a total percentage score for each group (Ross & Sicoly, 1979).

Method

Participants. Participants were visitors to the Chicago Museum of Science and Industry ($N = 339$, $M_{age} = 35.8$ years, 51% men). Because we conduct analyses at the group level, we ex-
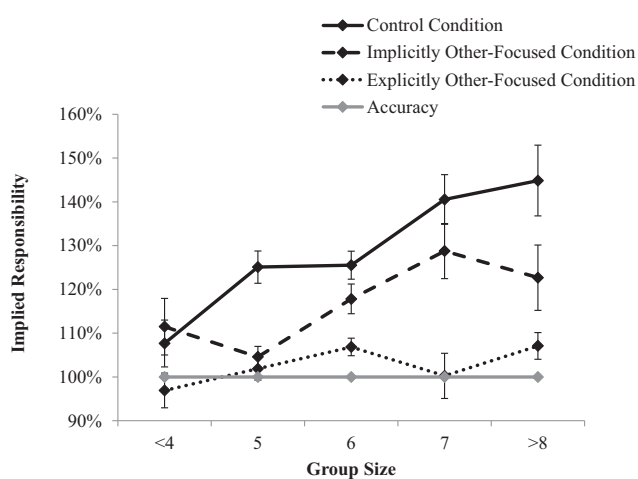

Figure 2. Implied responsibility as a function of group size and survey condition in Experiment 1. Error bars represent ± 1 *SEM*.

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[5] See Supplemental Material for an explanation of unequal sample sizes across conditions.

cluded three groups in which at least one participant failed to answer our primary dependent variable.

Procedure. We randomly assigned participants to one of four conditions in a 2 (group size: 3 vs. 6) × 2 (survey: control vs. other-focused) between-groups design. Once the experimenter assembled a complete group, she explained that this group would be competing against other groups in a handgrip competition. Each group member then received a handgrip with a built-in counter (obscured during the competition). The experimenter explained that the handgrip competition had four rules: "Rule Number 1: you have exactly 1 min to grip as much as you can. Rule Number 2: you can only grip with one hand at a time, but feel free to switch hands if one gets tired. Rule Number 3: you can grip however you want but you have to use your hand and not your body or anything else to do the gripping. Rule Number 4: you can't help your teammates by taking their grips for them, but you can feel free to shout encouragements and strategy to each other." The experimenter further told participants that the winning group would have the highest average number of team grips, and that each member of this winning group would receive a $20 Amazon.com gift card. Participants competed together in a line, so they could each see each other's efforts. On the experimenter's signal, each group member squeezed the handgrip as many times as possible for 1 min.

After their session, participants completed a survey individually. In the control condition, participants reported the percentage they personally contributed to the group's total. In the other-focused condition, participants first reported the percentage each other group member contributed to the total, and then the percentage they personally contributed. To make it clear that 100% was the maximum contribution participants could report, we measured claimed percentage contributions as follows: "What percentage of the total number do you think you were personally responsible for? 0% means that you contributed *none* of the total count (you had 0 grips), and 100% means that you contributed *all* of the total count."[6]

Results

We summed each individual's claims of responsibility to create a total responsibility claim for each group, and then conducted analyses at the group level (see Figure 3). Consistent with our primary hypothesis, six person groups ($M = 113.6\%$, $SD = 23.7\%$) claimed more responsibility than three person groups ($M = 104.0\%$, $SD = 19.6\%$), $F(1, 73) = 4.44$, $p = .04$, $\eta_p^2 = 0.06$. Consistent with an egocentric mechanism, control condition groups ($M = 114.8\%$, $SD = 27.0\%$) claimed more responsibility than other-focused groups ($M = 102.6\%$, $SD = 14.0\%$), $F(1, 73) = 7.13$, $p < .01$, $\eta_p^2 = 0.09$. Finally, consistent with our prediction that the most over-claiming should occur in large groups that allocate responsibility without being led to explicitly consider others' contributions, we found that individuals in the six person control condition (coded as 3) claimed more responsibility ($M = 122.8\%$, $SD = 29.5\%$) than the other three conditions combined (each coded as -1), $t(74) = 3.21$, $p < .01$, $d = 0.75$.

Our account further suggests that calling attention to others' contributions should help people adjust their egocentric absolute assessments of effort into relative assessments, thereby increasing the accuracy of their assessments. Testing this prediction, we
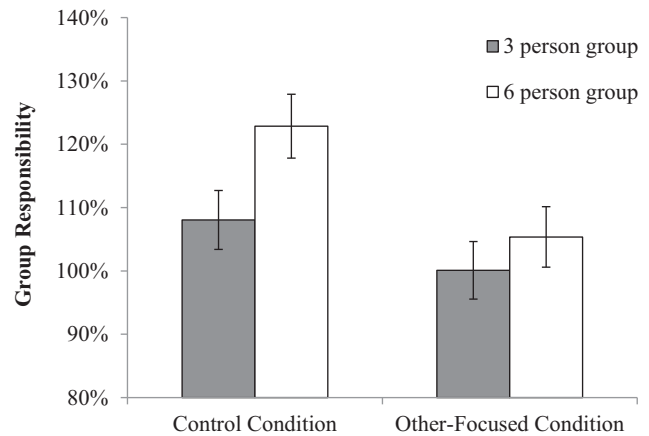

Figure 3. Claimed responsibility as a function of group size and survey condition in Experiment 2. Error bars represent ±1 *SEM*.

conducted a hierarchical regression model predicting individual claims from the actual percentage contribution (at the individual level). This regression revealed a marginally significant interaction between survey condition and actual contribution, $\beta = -0.36$, $p = .08$, such that the relationship between the actual and claimed percentage was directionally larger in the other-focused condition ($r = .71$) than in the control condition ($r = .52$).

Because this experiment provides a measure of actual contribution (e.g., actual grips), we conducted an additional test that could provide insight into consequences of group size. Specifically, we tested whether the actual number of handgrips participants performed varied by experimental condition. We predicted that group size would increase over-claiming, but not actual performance. Consistent with this prediction, the number of grips per member did not vary significantly by survey condition, $F(1, 73) = 0.10$ or group size, $F(1, 73) = 1.91$, or the interaction between these conditions, $F(1, 73) = 1.30$. Although responsibility claims are correlated with the actual amount of work performed, group size is a stronger predictor of claimed responsibility than of actual work.

Discussion

Few people, if any, would claim that their handgrip ability plays a central role in their lives, nor would they claim that being a good hand-gripper contributes meaningfully to their sense of self-worth. And yet, being randomly placed in a large group as part of a handgrip competition increased over-claiming of responsibility compared to being randomly placed in a small group. This experiment provides critical *causal* evidence that being in a large group increases over-claiming, in a context where alternative mecha-

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[6] We examined the data to further ensure that participants understood that 100% was the maximum limit for the scale. Specifically, we examined how many participants' reports of their own and their team members' contributions summed to exactly 100% in the "other-focused" conditions. There were 19 6-person groups and 21 3-person groups in the other-focused conditions in Experiment 2. We removed one group who did not report all of their group members' contributions, yielding 174 participants. The majority of participants' reports summed to exactly 100% (120 out of 174), providing evidence that most participants treated the scale additively. The average sum of the member reports was 100.1% ($SD = 7.8\%$).

nisms based on task desirability or self-esteem are unlikely expla-nations for over-claiming. Replicating Experiment 1, considering others' contributions reduced inflated responsibility claims, espe-cially in the larger group. These results suggest that over-claiming is produced at least partly by an egocentric focus on one's own contributions. Smaller groups may tend to over-claim less because group members can more easily think about the contributions of other members, whereas larger groups need a reminder to think about others' contributions to reduce over-claiming.

Experiment 3: Remembered Groups

To achieve both high ecological and internal validity, we in-structed participants to recall real groups that were either relatively small or large. As an additional test of the underlying mechanism of egocentrism, we manipulated the relative accessibility of one's own versus others' contributions by having some participants report their own contributions first and others report their own contributions last. Finally, in addition to assessing responsibility as a percentage of total work, we also asked participants to assess responsibility on a more absolute measure (not bounded by the logical limit of 100% responsibility). If over-claiming is produced by focusing egocentrically on one's own contributions, then the correlation between the amount of work claimed on the absolute scale and the percentage of total work claimed should be larger in the control condition than in the other-focused condition. That is, participants' responsibility claims in the control condition should be based more heavily on the absolute amount of work they believe they did than in the other-focused condition, where judg-ments should be more sensitive to the amount of work they did *compared* to others.

Method

Participants. An online panel ($N = 1962$, $M_{age} = 50.2$ years, 50% men) maintained by Qualtrics participated.

Procedure. We randomly assigned participants to one of six conditions in a 2(group size: small vs. large) × 3(focus: control vs. other-focused you first vs. other-focused you last) between-participants design. We instructed participants to think of a time when they worked with a group of either 2–4 (small group) or 5–10 (large group) individuals. Participants reported the exact number of group members and then described the project briefly. In the control condition, participants next reported their own contributions to the group as both a percentage of the total (0–100%, entered in a blank box), and as an absolute amount (on a slider scale ranging from "*contributed none of the work*" to "*con-tributed all of the work*"). We counterbalanced the order of the percentage and absolute claiming measures across participants.

In the other-focused conditions, participants reported their group members' names after describing the project. They then reported their own contributions either first or last, along with the contri-butions of each group member (whose names were populated automatically) on the same percentage and scale items (the order of which was again counterbalanced).

Results

We computed implied responsibility by multiplying each indi-vidual's responsibility claims by the group size. Consistent with

our primary hypothesis, large groups ($M = 171.0\%$, $SD = 148.1\%$) claimed more implied responsibility than small groups ($M = 141.1\%$, $SD = 90.3\%$), $F(1, 1956) = 36.01$, $p < .01$, $\eta_p^2 = 0.02$.[7] Consistent with egocentrism, focus condition affected im-plied responsibility, $F(2, 1956) = 102.47$, $p < .01$, $\eta_p^2 = 0.10$. Participants in the control condition claimed more ($M = 204.0\%$, $SD = 143.2\%$) than participants in the other-focused you first condition ($M = 144.5\%$, $SD = 108.5\%$), who in turn claimed more than participants in the other-focused you last condition ($M = 117.7\%$, $SD = 90.6\%$), $ts(1959) > 4.21$, $ps < .01$, $ds > 0.19$. Individuals in the large group control condition (coded as 5) claimed more responsibility ($M = 235.8\%$, $SD = 164.6\%$) than the other five conditions combined (each coded as -1; $M = 141.3\%$, $SD = 106.6\%$), $t(1956) = 12.85$, $p < .01$, $d = 0.58$ (see Figure 4).[8]

As further evidence for egocentrism, the amount participants claimed to have contributed on the scale measure was more strongly correlated with percentage claims in the control condition ($r = .80$) than in either of the other-focused conditions ($rs = 0.40$), $zs = 2.81$, $ps < .01$. Calling attention to others' contributions led participants to rely less on an absolute assessment of the amount they contributed than on a relative assessment of the percentage they contributed.[9]

Discussion

Using an experimental design with high internal validity that also captured the ecological validity of real group work, we dem-onstrated again that over-claiming increases in larger groups. We also provided two further points of evidence showing that over-claiming is egocentric. First, asking participants to list other group members' contributions, whether first or last, reduced over-claiming. This addresses the concern that any score listed last would be trimmed because of the 100% limit. Instead, our findings imply it is not simply the case that listing one's own contributions *last* per se reduces over-claiming—but rather that the act of considering group members' contributions, whether first or last, is what reduces over-claiming. Second, considering others' contribu-tions also reduced reliance on absolute assessments of contribu-tion. When not reminded of others' contributions, participants' relative claims of responsibility were largely a function of how

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[7] As expected, implied responsibility increases with group size when actual group size is treated as a continuous variable collapsed across our two experimental conditions, $r(1962) = 0.33$, $p < .001$.

[8] See Supplemental Material for additional analyses.

[9] These data allow us to test an alternative explanation for our findings, which is that divisions of 100% by smaller numbers (e.g., 3–33.3%, 4–25%, and 5–20%) are more accessible (more fluent and less effortful) than divisions by larger numbers (e.g., 6–16.67%, 7–14.29%, and 8–12.5%). Specifically, people might be more likely to anchor on their "equal share" for smaller-sized groups because the division is easier. If this were true, then people in 10-person groups (10% each) should over-claim less than people in 9-person groups (11.11%). However, if our account is correct, there should be more over-claiming in groups of 10 compared to 9. The data reveal that 10-person groups over-claim more ($n = 30$, $M = 441.3\%$, $SD = 264.0\%$) than 9-person groups ($n = 9$, $M = 373.0\%$, $SD = 190.4\%$), although this difference was not statistically significant, $t(37) = -0.72$, $p = .48$. However, the increase in over-claiming from 9-person to 10-person groups was similar to the increase from 8-person to 9-person groups, suggesting that ease of processing did not reduce over-claiming.
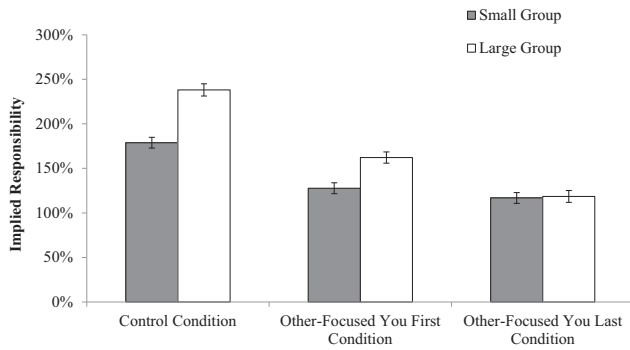
Figure 4. Implied responsibility as a function of group size and survey condition in Experiment 3. Error bars represent ±1 *SEM*.

much absolute work they believed they did—suggesting that individuals were egocentrically relying on absolute assessments to inform their relative claims. However, after considering others' contributions, absolute assessments of own contribution did not predict relative claims as strongly.

General Discussion

In four field and laboratory experiments, with academic authors, students, museum-goers, and a large-scale national sample, we demonstrate that over-claiming responsibility for group tasks increases with group size. Whereas classic demonstrations of egocentric allocations of responsibility show rather meager over-claiming never exceeding an average of 110% (e.g., spouses, Ross & Sicoly, 1979; video game pairs, Kruger & Gilovich, 1999), we find dramatic over-claiming exceeding 235% in larger groups (Experiment 3), suggesting that biased responsibility assessments may be more consequential than previously demonstrated because prior research has primarily studied small groups. Over-claiming increases with group size, at least in part because people tend to assess responsibility by focusing on their own contributions and overlooking others' contributions. As groups get larger, there are simply more contributions from others to overlook. Across our experiments, over-claiming was consistently highest in large groups when people only reported their own relative contribution, and was attenuated in smaller groups or when people explicitly considered others' contributions.

Our results make at least two important theoretical contributions. First, we provide additional evidence that over-claiming stems from an egocentric focus on one's own contributions. Over-claiming is robust partly because it is produced by multiple mechanisms, such as self-serving motives to claim credit for positive outcomes (Leary & Forsyth, 1987; Schlenker & Miller, 1977) and the tendency to use scales nonadditively (Teigen & Brun, 2011). Indeed, interventions could shift the relative weight of these different mechanisms for over-claiming. For example, if we rewarded our participants for their claimed contributions, thereby incentivizing them to claim more, over-claiming might result more from self-serving motives and as such would probably be less affected by other-focused interventions designed to combat egocentrism. However, in the absence of extrinsic incentives to over-claim, our research provides several unique pieces of evidence consistent with an egocentric mechanism for over-claiming. In particular,

focusing on other group members' contributions in all experiments reduced over-claiming. Extending prior research (Caruso et al., 2006; Savitsky et al., 2005), we also demonstrated the robustness of the effect for different types of focus manipulations: asking participants to explicitly list their group members' percentage contributions before or after their own contributions as well as merely asking participants to list their group members' names. These findings suggest that even more subtle manipulations to increase individuals' focus on others may be effective to reduce over-claiming, such as priming an interdependent self-focus (Brewer & Gardner, 1996).

Our experiments provide two further results that support an egocentric mechanism. Perhaps most novel, our experiments demonstrated that focusing on others' contributions not only reduced over-claiming but also increased the accuracy with which participants estimated others' contributions. Reducing bias in evaluations of one's own contributions need not automatically increase accuracy in estimates of others' relative contributions (Teigen & Brun, 2011). A coach who learns that she overvalued one player does not automatically become more accurate in her evaluations of other players on the team. Furthermore, group members also relied less on absolute assessments of their own contributions for reporting relative contributions when reminded of their group members. These new findings collectively point to egocentrism as an important mechanism for over-claiming, implicating previously unconsidered factors, such as group size, that should moderate responsibility allocations.

Second, our results make a broader theoretical point about the aggregation of seemingly small psychological effects. More than two decades ago, Prentice and Miller (1992) cautioned against using effect size as a measure of importance because effect sizes depend on the strength of an independent variable and the malleability of a dependent variable. Our results contribute another cautionary note to their argument. Effects that are objectively small when studied at the individual level—such as egocentric biases in dyads—may compound when aggregated across groups. This is true for small amounts of accuracy in individual judgment, where aggregating across individuals within a group is responsible for the well-known "wisdom of crowds" effect (Hastie & Kameda, 2005; Surowiecki, 2004). Our results, in concert with others (Simmons, Nelson, Galak, & Frederick, 2011), demonstrate the same result for small amounts of bias that, when aggregated across larger groups, can also reveal the foolishness of crowds.

Finally, our research also has important consequences for groups across domains, whether in organizations, sports teams, or academic collaborations. Based on our findings, we expect it would become increasingly difficult for groups to determine how to equitably split rewards (and punishments) as group size increases. Just as the team of 3,221 coauthors on a single publication (ATLAS Collaboration, 2010) will over-claim more than the team of three coauthors, the former team is also likely to have trouble deciding how to split a reward. Larger groups may show greater reliance on equality heuristics (i.e., each group member receiving the same amount; Messick, 1993) than on equitable distributions of returns. Perceived violations of equity, a dominant concern in nearly every social relationship (Walster, Walster, & Berscheid, 1978), are likely to be especially common in larger groups because individuals will believe they received less compensation than their deserved share.

Accordingly, larger groups are likely prone to more dissatisfaction than smaller groups—especially when group members' unequal responsibility allocations are made explicit. Consistent with this proposition is empirical evidence that egocentrism instigates dissatisfaction in groups: Group members dislike those who appear to take more credit than they deserve (Forsyth, Berger, & Mitchell, 1981), negotiators often overestimate the likelihood a neutral judge will agree with their egocentric assessments of fairness (Babcock, Loewenstein, Issacharoff, & Camerer, 1995), and egocentrism predicts negotiation impasse (Thompson & Loewenstein, 1992). The lead author on a two-author article is relatively unlikely to claim an outsized share of credit, meaning that both authors will feel suitably appreciated for their work. However, should one of the 3,221 authors in the ATLAS collaboration claim to have done the lion's share of the group's work, he or she will surely leave many disaffected colleagues.

Concluding Thought

Whether collaborating on an article, competing in a handgrip challenge, or completing work for an organization, larger groups tend to claim more than their fair share of credit compared with smaller groups. We suggest that over-claiming increases with the size of the group because overlooking group members' contributions becomes easier as group size increases. As a result, members of larger groups tend to rely more on their egocentric assessments of contribution to inform relative responsibility allocations, and also tend to be less accurate in their allocations. Members of larger groups may be particularly well-advised to remember that many hands make overlooked work—and to consider others' contributions alongside their own.

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