



The unpacking effect in allocations of responsibility for group tasks[☆]

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Abstract

Individuals tend to overestimate their relative contributions to collaborative endeavors. Thus, the sum of group members' estimates of the percentage they each contributed to a joint task typically exceeds the logically allowable 100%. We suggest that this tendency stems partly from individuals' inclination to regard their fellow group members as a collective rather than as individuals, and that leading people to think about their collaborators as individuals should therefore reduce the perceived relative magnitude of their own contributions. Consistent with this thesis, four experiments demonstrate that people's tendency to claim more than their fair share of the credit for a group task is attenuated when they "unpack" their collaborators, conceptualizing them as separate individuals, rather than as "the rest of the group."

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William Maxwell, who served as an editor at *The New Yorker* for more than 40 years, believed that a light touch was best when it came to editing the works that crossed his desk—manuscripts from the likes of John Updike, John Cheever, and J. D. Salinger. "I tried to work so slightly," Maxwell said, "that...the writer would read his story and not be aware that anybody was involved but him" (Gates, 2000). Without detracting from the skill with which Maxwell practiced his craft, a large body of research suggests that little editorial restraint was necessary for Maxwell's authors to reach the conclusion that they alone produced the final product. People are notoriously prone to take more than their fair

share of the credit for collaborative endeavors, even when others have made important and sizable contributions (Ross, 1981; Ross & Sicoly, 1979). It would thus not be surprising for authors to overestimate the role they played in the development of a work and underestimate others' contributions.

This tendency to claim more than one's fair share of the credit for a collaborative endeavor may be especially pronounced when an individual works with *several* others—a writer, say, whose final product reflects not only her own efforts, but the work of publishers, editors, proof-readers, fact-checkers, and so on. In order for an individual to assess the relative magnitude of his or her own contributions in such cases, it is necessary to consider not only his or her own contributions but also those of each of his or her collaborators. Any tendency to give insufficient attention to the contributions of one or more of his or her collaborators will lead the individual to overestimate his or her own inputs. Accordingly, we suggest that people's overestimation of their contributions to collaborative endeavors stems partly from their tendency to regard at least some of their collaborators collectively, as the "rest of the group"—and that

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inducing individuals to consider their collaborators individually will therefore reduce their tendency to overestimate their own relative contributions. A person who is led to consider his or her collaborators as individuals, each making individual contributions, is likely to see them as relatively more productive than he or she would have otherwise, and will therefore decrease estimates of his or her own relative productivity.

We base this prediction on two bodies of research. First, research on *support theory* demonstrates that considering the constituent elements of a category separately, rather than as a whole, makes them seem more probable and frequent (e.g., Tversky & Koehler, 1994). This is because “unpacking” the constituent elements of a category increases their cognitive accessibility and leads people to consider elements they might not have considered otherwise. Second, research on egocentrism in allocations of responsibility shows that the accessibility of one’s own contributions—as opposed to those of one’s collaborators—is a key determinant of individuals’ tendency to overestimate their own relative contributions to collaborative endeavors (e.g., Ross & Sicoly, 1979).

Egocentric allocations of responsibility

Individuals who work with others on collaborative endeavors—whether married couples who share the housework, members of a task force who work together to implement a new policy, or academic colleagues who co-author a paper—tend to overestimate the magnitude and importance of their own contributions, and underestimate the magnitude and importance of others’ contributions. As a consequence, the sum of each collaborator’s self-assessed contributions typically exceeds 100%. Logically, of course, this cannot be; if three collaborators each believe they have done 50% of the work, then at least one of them is wrong. This phenomenon was first documented by Ross and Sicoly (1979) and has been replicated many times since (e.g., Brawley, 1984; Burger & Rodman, 1983; Christensen, Sullaway, & King, 1983; Deutsch, Lozy, & Saxon, 1993; Gilovich, Medvec, & Savitsky, 2000; Kruger & Gilovich, 1999; Kruger & Savitsky, 2004; Thompson & Kelly, 1981; for a review, see Leary & Forsyth, 1987).

To be sure, this tendency is partly produced by individuals’ desire to think well of themselves and to present themselves in a positive light. Individuals sometimes engage in a motivated “grab for credit” in which they claim to have contributed an inflated proportion of the work in order to reap a correspondingly inflated share of the self- and social-rewards that can be expected to follow (Miller, Goldman, & Schlenker, 1985; Ross & Sicoly, 1979, Experiment 2; Schlenker & Miller, 1977).

But there is more to egocentric allocations of responsibility than self-serving motives (Leary & Forsyth, 1987). The tendency to claim more than one’s fair share of the credit for collaborative tasks also occurs because one’s own contributions tend to be more cognitively accessible than others’ contributions (Ross & Sicoly, 1979). Because both the amount of information retrieved and the ease with which it can be brought to mind are used as heuristics for estimating overall frequency (Schwarz et al., 1991; Tversky & Kahneman, 1973), individuals conclude that their own contributions were more substantial, on average, than they actually were (Greenwald, 1980; Neisser, 1981). Consistent with this interpretation, research demonstrates that individuals overestimate their contributions not only to activities that reflect positively on them, but also to activities that reflect negatively (Brawley, 1984; Kruger & Gilovich, 1999; Ross & Sicoly, 1979; Thompson & Kelly, 1981). Spouses, for example, not only overestimate the proportion of the housework they have done and the affection they have demonstrated, but also the proportion of things they have broken and arguments they have started—a finding that is inconsistent with an explanation based solely on self-aggrandizement (Kruger & Gilovich, 1999; Ross & Sicoly, 1979).

In sum, it is clear that individuals’ tendency to overestimate their contributions to collaborative tasks occurs partly because their own inputs tend to be more accessible than those of their collaborators. We suggest that when individuals collaborate on a project with more than one other person, this tendency is aided and abetted by a failure to consider each collaborator as a separate individual, regarding at least some of them collectively as “the rest of the group.” A tendency to aggregate one’s collaborators may stem partly from attempts to simplify an otherwise complex assessment of relative responsibility, or from an inclination to categorize the world egocentrically as “me” vs. “not me” (James, 1892). Regardless, if individuals mentally “pack” their collaborators, then encouraging them to consider their collaborators as separate individuals (i.e., to “unpack” them) should increase the accessibility of their collaborators’ contributions, thereby decreasing their estimates of the relative magnitude of their own contributions.

Support theory

This prediction follows from research on support theory, which shows, among other things, that leading people to consider the constituent elements of a category separately rather than holistically increases the perceived probability and frequency of that category (Rottenstreich & Tversky, 1997; Tversky & Koehler, 1994; see also Brenner & Koehler, 1999; Fischhoff, Slovic, &

Lichtenstein, 1978; Johnson, Hershey, Meszaros, & Kunreuther, 1993; Kruger & Evans, 2004; Macchi, Osherson, & Krantz, 1999; Mulford & Dawes, 1999; Redelmeier, Koehler, Liberman, & Tversky, 1995; Russo & Kolzow, 1994; Tversky & Fox, 1995; Tversky & Kahneman, 1973; Van Boven & Epley, 2003; see Brenner, Koehler, & Rottenstreich, 2002, for a review). For instance, participants in one study indicated that a person was more likely to die from “heart disease, cancer, or other natural causes” than simply from “natural causes,” even though the category natural causes includes heart disease, cancer, and a host of other conditions as well (Tversky & Koehler, 1994).

One reason for this effect is that unpacking the constituent elements of a category—that is, considering each element separately—renders those elements easier to think about and leads people to think of elements they would not have considered otherwise (Rottenstreich & Tversky, 1997; Tversky & Koehler, 1994). Accordingly, we propose that if individuals overestimate their contributions to collaborative tasks in part because of the greater relative accessibility of their own contributions, then leading them to think about their collaborators individually rather than collectively should diminish this tendency. We report four experiments that test this prediction—that is, whether instructions to unpack their collaborators significantly reduce individuals’ tendency to overestimate the magnitude of their contributions to a joint task.

Study 1

Elementary school children participating in a team-based extracurricular program on creative problem solving estimated their own contributions to their team’s final product (a written document). Those in the control condition simply indicated the proportion of the work they contributed with no mention of the other members of their team. Those in the unpacked condition indicated their contribution after estimating the proportion of work that each of their collaborators contributed, with the provision that the four allocations had to sum to 100%. The four members of each team were always assigned to the same condition so that their four self-allocations of responsibility could be summed and compared to a baseline of 100%.

We expected that instructing participants to apportion responsibility to each of their teammates separately would increase allocations of responsibility to participants’ teammates, and thus decrease the proportion of responsibility claimed by participants themselves. Thus, we expected participants in the unpacked condition to overestimate their contributions to the group task less than participants in the control condition.

Method

Participants

One hundred thirty-two fourth-grade students working in one of 33 teams of four participated in the study (63 males, 69 females). All participants were enrolled in the “Future Problem Solving Program” (FPSP; see www.fpsp.org), a national program in which elementary and high school students work in teams to explore various real-world problems (e.g., depletion of the rainforests, homelessness, violence in schools). After researching their problem for several weeks, each team spends two hours producing a written document proposing solutions for their assigned problem. Judges at a central office then evaluate these documents.

Procedure

We contacted the coaches of several FPSP teams at an elementary school in central Indiana and invited their teams to participate in our research. Questionnaires were distributed to the students by their coaches several weeks after they had completed a project on the topic of organ donation. Thus, prior to receiving our questionnaires, all participants had collaborated with three other students for several weeks and had spent two hours preparing a written document. They had not yet received any official feedback on their performance.

Participants were asked to think back to their work on the problem they had just completed:

Working on a problem involves lots of things: reading and remembering background research, being creative, writing down problems and solutions, understanding the problem-solving process, keeping the team on track, keeping track of time, and so on. When it comes to group projects like this, the work isn’t always divided evenly. For a variety of reasons, people often do more or less than an even share.

Participants were then asked to allocate responsibility for the group’s final product. Those randomly assigned to the control condition ($n = 16$ groups) were asked to indicate the proportion of the overall work for which they were responsible. They did so by indicating a percentage between 0% (*did none of it*) and 100% (*did all of it*). Those assigned to the unpacked condition ($n = 17$ groups) were asked to record the initials of each of their teammates and to check off each set of initials after they had taken a moment to consider “that person’s participation in and contributions to your work on this problem.” These participants were then asked to apportion responsibility to each of their teammates, one by one, and then to themselves. They were reminded that their four allocations must sum to 100%. All members of each team were assigned to the same condition so that self-allocations could be summed across the members of each team and compared with a baseline of 100%.

Results and discussion

Gender did not influence the results in this or any of the following experiments and is therefore not discussed further.

Self-allocations of responsibility, summed across the members of each team, exceeded 100% in both the control condition ($M = 154.6\%$), $t(15) = 6.13$, $p < .0001$, and the unpacked condition ($M = 106.8\%$), $t(16) = 2.54$, $p < .05$. As expected, however, teams assigned to the unpacked condition claimed significantly less responsibility than did teams assigned to the control condition, $t(31) = 5.28$, $p < .0001$. Instructing participants to consider each of their teammates separately substantially diminished their tendency to overestimate the magnitude of their own contributions, but did not eliminate it entirely.¹

Study 2

Study 2 was designed to replicate the results of Study 1 in a different domain with an older (and presumably more mature) sample of participants. We again made use of naturally occurring groups by examining undergraduate business students who had been working in groups on a class project. Two weeks after completing their projects, students were asked to indicate the proportion of the work they had personally contributed to each of four activities. Once again, students in groups assigned to the control condition simply indicated the proportion for which they were responsible, whereas students in groups assigned to the unpacked condition allocated responsibility to themselves and to each of their other group members. We again expected unpacking to diminish participants' tendency to overestimate the magnitude of their contributions.

Method

Participants

Participants included the complete enrollment ($N = 104$) of two introductory undergraduate marketing classes at the University of British Columbia.

¹ One member of each of two teams failed to complete the dependent measures so we used the average of his or her teammates' self-allocations as a proxy for the missing responses. In addition, in five groups assigned to the unpacked condition, one or more team members provided allocations of responsibility for the team that did not sum to 100%, as instructed. Because we could detect this error only among participants in the unpacked condition, we included these participants' unaltered responses in our analyses. Re-computing the analyses excluding all seven of these teams, however, does not affect the results reported above.

Procedure

Early in the academic term, participants were randomly assigned to groups of four to work on a paper—a case analysis of a business situation in which students were to recommend a marketing strategy for a novel household appliance. Groups met regularly over four weeks, both in class and outside of class, to discuss their project. Fifteen days after they handed in their group paper, participants were asked to complete a questionnaire in exchange for course credit regarding the experience of working in their groups. Participants were assured that their responses were confidential and would not be seen by their instructor. They had not yet learned of their grade for their project when they completed the questionnaire.

Participants completed questionnaires similar to those used in Study 1. This time, however, they were asked to indicate the proportion of the work—from 0% (*none of it*) to 100% (*all of it*)—they had contributed to each of four activities: *writing, creativity and idea generation, scheduling and administrative work, and overall work*. Participants in groups randomly assigned to the control condition ($n = 13$ groups) did so without any mention of the other members of their group. Participants in groups assigned to the unpacked condition ($n = 13$ groups), in contrast, did so after indicating the proportion of work performed by each of the three other members of their group. Specifically, participants in the unpacked condition were asked to record the initials of each of their group members and then to take a moment to think about each individual's participation in, and contributions to, the group. After considering each individual's contributions, they were asked to place a check mark next to that person's initials and to move to the next person until they had considered the contributions of each group member. Participants were then asked to indicate the proportion of work performed by each group member, including themselves. They were reminded that their four allocations must sum to 100%.

Results and discussion

Once again, we expected participants in the control condition, who simply allocated responsibility to themselves, to overestimate the magnitude of their contributions to the group task more than participants in the packed condition, who allocated responsibility to themselves and to each of the other members of their group. Participants' responses yielded strong support for this prediction. As can be seen in Table 1, the summed responses of groups assigned to the control condition exceeded 100% by a larger margin, for each of the four activities, than did the summed responses of groups assigned to the unpacked condition. To analyze these re-

Table 1
Claimed percentage responsibility for four activities by participants in the control and unpacked conditions, summed across the members of each group, Study 2

| Activity | Condition | |
|---------------------|-----------|----------|
| | Control | Unpacked |
| Writing | 135.5 | 104.9 |
| Idea generation | 147.8 | 110.4 |
| Administrative work | 137.3 | 114.9 |
| Overall work | 145.9 | 111.0 |

sults statistically, we averaged across participants' responses to the four items to create an overall index of responsibility allocations ($\alpha = .92$). As in Study 1, summed self-allocations exceeded 100% for groups in both the control and unpacked conditions ($M_s = 141.6$ and 110.3% , respectively), $t_s(12) > 3.64$, $p_s < .005$. As predicted, however, responsibility allocations were significantly reduced in the unpacked condition compared to the control condition, $t(24) = 4.14$, $p < .001$.

Study 2 suggest that university business students bear remarkable similarity to the elementary school students from Study 1 when it comes to allocating responsibility for a group project. In both cases, inducing participants to unpack their group and consider their collaborators separately substantially diminished (but did not eliminate) their tendency to overestimate the magnitude of their contributions.

Study 3

The results of Studies 1 and 2 demonstrate that instructing participants to unpack their collaborators reduces their tendency to overestimate the magnitude of their contributions to a collaborative task. We maintain that unpacking has this effect because it leads individuals to think of others' contributions that they may not have otherwise considered, and therefore renders others' contributions more cognitively accessible (cf. Tversky & Koehler, 1994). This, in turn, allows individuals to recognize that their own contributions account for a smaller "slice of the pie" than they would otherwise believe.

There are, however, a number of possible alternative interpretations of these results. First, recall that participants in the unpacked condition (but not those in the control condition) were informed that their responsibility allocations had to sum to 100%. It is conceivable that this requirement served as a "reality check," reminding participants that there was only so much responsibility to go around (specifically, 100% of it) and alerting them that their allocations of responsibility should be constrained accordingly. The mere mention of the 100% constraint, then, may have led participants in the unpacked condition to consider their allocations of respon-

sibility more carefully, perhaps resulting in more conservative self-allocations. Alternatively, to the extent that participants converted the 100% constraint into "about 25% each," self-allocations could have been decreased in the unpacked condition as a result of an anchoring effect (i.e., a tendency to cling to and/or adjust insufficiently from the "anchor" of 25%; Chapman & Johnson, 2002; Epley, 2004). It is instructive to recall that Brenner & Koehler (1999) demonstrated unpacking effects even when a set of judgments was required to sum to 100%, a finding that casts doubt on the possible alternatives just mentioned. Nevertheless, we address this issue empirically in the next study.

Finally, note that participants in the unpacked condition were required to make multiple allocations of responsibility (i.e., to all group members), whereas those in the control condition made only one allocation (i.e., to themselves). If participants in the unpacked condition were disinclined to allocate a small amount of responsibility to one or more of their collaborators (e.g., out of politeness, group loyalty, or a reluctance to use extreme ends of the scale; Fiedler & Armbruster, 1994), then the amount allocated to "others" may have been increased artifactually, resulting in a decrease in self-allocations.

To address these issues, we added two new conditions to our design for Study 3: a packed condition and an implicitly unpacked condition. Participants assigned to the packed condition were asked to divide responsibility for a collaborative endeavor between themselves and "the rest of the group," with the stipulation that these two allocations sum to 100%. Because this condition did not require participants to unpack their collaborators, we did not expect a reduction in the degree to which they overestimated the magnitude of their own contributions—despite the fact that the instructions *did* mention the 100% "reality" constraint. Participants assigned to the implicitly unpacked condition (cf. Tversky & Koehler, 1994), in contrast, were asked to consider each of their collaborators individually, as in the unpacked condition from Studies 1 and 2, but were not asked to make separate allocations of responsibility for each of them. Because this condition required participants to unpack their collaborators (mentally, at least), we expected to observe a reduction in the degree to which they overestimated the magnitude of their own contributions—despite the fact that they did not make multiple allocations of responsibility.

Method

Participants

Eighty-one Cornell University students (53 women, 28 men) participated in exchange for extra credit in their psychology or human development courses.

Procedure

Participants were asked to recall a time when they had worked in a group of three to six people to complete a task. They were told that they were free to select a group from any domain that they wished—e.g., a group from a class they had taken in high school or college or from a job they had held—but were instructed to have a specific group in mind. Participants described their group in a few sentences and indicated how many people (including themselves) had been in the group. They then rated their group experience on a number of bipolar scales ranging from -3 to $+3$: *unpleasant / pleasant*, *boring / interesting*, *useless / useful*, *inefficient / efficient*, and *failure / success*. Participants also indicated how interested they would be in working with the group they listed in the future, on a scale ranging from 0 (*not at all*) to 10 (*very much*).

Finally, participants were asked to indicate the proportion of the work—from 0% (*none of it*) to 100% (*all of it*)—they contributed to each of the same four activities examined in Study 2: *writing, creativity and idea generation, scheduling and administrative work, and overall work*. Participants were reminded that even if their group had done very little of some activity (e.g., only a small amount of writing), some person or group of people was still responsible for 100% of it. If, however, their group had not engaged in *any* of some activity, they were instructed to mark the item as “not applicable.”

Participants were randomly assigned to one of four conditions, two of which were identical to the conditions in Studies 1 and 2. Those assigned to the control condition ($n = 20$) indicated the proportion of each activity for which they themselves were responsible without any mention of their collaborators. Participants assigned to the unpacked condition ($n = 21$) recorded the initials of each of their collaborators, took a moment to think about each individual’s contributions, and then allocated responsibility to each member of their group (including themselves), one by one. As before, we reminded participants in the unpacked condition that their allocations must sum to 100%.

We also added two new conditions not included in Studies 1 and 2. Participants assigned to both the packed ($n = 20$) and implicitly unpacked ($n = 20$) conditions allocated responsibility two ways—to “the other group members” (i.e., the rest of their group, as a single, holistic entity), and to themselves; in both conditions, they were reminded that these two allocations must sum to 100%. Participants in the packed condition received no additional instructions, whereas participants assigned to the implicitly unpacked condition were asked to record the initials of their collaborators and think about each individual’s contributions, just as participants did in the unpacked condition. In short, the packed condition resembled the control condition in

that neither included instructions for participants to regard their collaborators as individuals, but differed from the control condition in that participants in the packed condition were asked to allocate responsibility to their collaborators (albeit holistically), and were reminded of the 100% constraint. Likewise, the implicitly unpacked condition resembled the unpacked condition in that both included instructions for participants to regard their collaborators as individuals (i.e., list their initials and so on), but differed from the unpacked condition in that participants in the implicitly unpacked condition were not asked to make allocations of responsibility for each of their collaborators separately.

Results and discussion

Participants selected groups with which they were quite satisfied. They rated their groups on average as having been pleasant ($M = .95$), interesting ($M = .88$), useful ($M = .88$), efficient ($M = .46$), and successful ($M = 1.75$), and indicated a willingness to work with their groups again ($M = 5.69$). All of these means were significantly above the midpoint of each scale, all $t(80) > 2.11$, all $ps < .05$. Because they were randomly assigned to conditions, we did not expect any between-condition differences in the groups participants selected. And indeed, separate one-way analyses of variance indicated no significant differences in any of participants’ ratings of their groups. There were also no between-condition differences in group size ($M = 4.32$ group members, including participants themselves).

We next examined participants’ allocations of responsibility in each of the four conditions. We expected that instructing participants to consider their collaborators as individuals—whether participants were asked to allocate responsibility to them each separately (unpacked condition) or as a group (implicitly unpacked condition)—would render their collaborators’ contributions more cognitively accessible relative to the packed and control conditions. As a result, we expected participants in the unpacked and implicitly unpacked conditions to allocate relatively less responsibility to themselves than would participants in the packed and control conditions.

To examine between-condition differences across groups of different size, we multiplied each participant’s estimate of his or her own contribution by the reported size of his or her group (e.g., an individual who worked in a group of four and claimed to have done 25% of the work would receive a value of 100%). Table 2 presents the means of these transformed values across the four conditions for each of the four dependent measures. Although the responses of participants in all conditions appeared to exceed 100%, care should be taken in interpreting values in excess of 100% as evidence of “overestimation.” Because participants were free to select any group they wished, it is possible that they called to mind

Table 2
Claimed percentage responsibility for four activities by participants in the control, packed, implicitly unpacked, and unpacked conditions, multiplied by group size, Study 3

| Activity | Condition | | | |
|---------------------|-----------|--------|---------------------|----------|
| | Control | Packed | Implicitly unpacked | Unpacked |
| Writing | 180.0 | 185.8 | 112.6 | 128.0 |
| Idea generation | 168.0 | 170.0 | 120.5 | 128.1 |
| Administrative work | 200.5 | 222.6 | 144.2 | 149.5 |
| Overall work | 169.5 | 172.5 | 138.2 | 141.3 |

and reported groups in which they themselves played an especially large role (i.e., groups in which they really *did* do more than their fair share of the work), meaning that one can hardly fault them for making self-allocations that, when multiplied by group size, exceed 100%. Thus, because we did not obtain responses from all members of participants' groups, as we did in Studies 1 and 2, we cannot address the extent to which participants overestimated their own contributions.

Importantly, however, because this feature of our design was equally true for participants in all four of our conditions, we *can* address between-condition differences. To do so, we averaged across participants' responses to the four items to create an overall index of responsibility allocations ($\alpha = .81$).² Analysis of this index indicated that allocations of responsibility did indeed vary by condition, $F(3, 77) = 3.65$, $p < .025$. Planned contrasts revealed that participants' self-allocations³ in the control and packed conditions did not differ from one another ($M_s = 180.8$ and 183.9% , respectively), nor did the self-allocations of participants in the unpacked and implicitly unpacked conditions ($M_s = 135.8$ and 128.1% , respectively), both $t_s < 1$. As expected, however, participants in the control and packed conditions claimed more responsibility for their group's output than did participants in either the unpacked condition, $t_s(77) = 2.09$ and 2.24 , respectively, $p_s < .05$, or the implicitly unpacked condition, $t_s(77) = 2.42$ and 2.56 , respectively, $p_s < .025$.

These findings are consistent with Studies 1 and 2, and again demonstrate that inducing individuals to unpack their collaborators attenuates the amount of responsibility they allocate to themselves for collaborative tasks. Moreover, the results from the packed and implicitly unpacked conditions rule out a number of

possible alternative interpretations for the findings from Studies 1 and 2—namely, that they stemmed from conservative self-allocations inspired by the 100% “reality check” constraint, that they stemmed from an anchoring effect, or that they stemmed from an artifact of making multiple allocations of responsibility. Study 3 thus lends further support to our position that unpacking influences responsibility allocations because it renders the contributions of one's collaborators more accessible than they would otherwise be.

Study 4

The first three studies indicate that leading individuals to consider their collaborators separately, rather than as a group, diminishes the extent to which they overestimate their contribution to collaborative tasks. In Study 4, we wished to replicate this result once again, this time using a somewhat different technique to encourage participants to unpack their collaborators, thereby extending the breadth of the unpacking effect in this context. Doing so also allowed us to address an additional possible alternative interpretation of our results from the first three studies. It could be argued that the unpacking manipulations in our previous studies constituted a subtle suggestion to participants that they *should* allocate less responsibility to themselves than they might otherwise. Instructions to list the initials of their collaborators, think about each person's contributions, and (in some conditions) allocate a portion of the total responsibility to each of them, may therefore have served as something of a demand characteristic, alerting participants to what responses were expected and/or normative.

We took steps in Study 4 to eliminate this possibility by disguising the unpacking manipulation, making it significantly more subtle than in the previous studies. Specifically, participants in Study 4 were asked to think about a group of which they had been a member, as in Study 3, but this time were then asked to draw a picture related to their group. Those in the control condition were asked to draw a picture of the physical location in which their group worked. Those in the unpacked condition, in contrast, were asked to draw a picture of themselves and each of the other members in their group—thereby unpacking their group into its constituent members. All participants then indicated only the proportion of the work they themselves contributed. By not asking participants in the unpacked condition explicitly to stop and consider each member of their group, or think about other group members' contributions in any way, this procedure constitutes a relatively subtle manipulation of unpacking—one that, if successful, minimizes concerns about possible demand characteristics in Studies 1, 2, and 3.

² Eight participants (including participants in each of the four conditions) left blank a total of nine self-allocations of responsibility, five for writing, two for creativity and idea generation, and three for scheduling and administrative work.

³ Strictly speaking, these means are not themselves self-allocations of responsibility because they have been transformed (multiplied by group size). To remain consistent with our earlier studies, however, we use the term “self-allocations” throughout the remainder of this paper.

Despite various procedural changes, we expected our results to be consistent with those from our earlier studies. Specifically, we expected participants in the unpacked condition to allocate less responsibility to themselves than did participants in the control condition.

Method

Participants

Eighty-nine individuals participated in exchange for extra credit in their psychology class or on a volunteer basis. Participants were students at Harvard University ($n = 52$), the University of Colorado, Boulder ($n = 26$), or Williams College ($n = 11$).

Procedure

Participants completed a questionnaire similar to the one used in Study 3. Specifically, participants were asked to recall a time when they had worked with a group of three to six people to complete a task. They described their group in a few sentences and indicated how many people (including themselves) had been in the group.

Next, participants were asked to spend a few minutes drawing a picture related to their group. Participants in the control condition were given a page with a blank section (approximately 15cm × 15cm) and were asked to draw a representation of the physical location in which their group had worked, including furniture, doorways, and other contextual elements of the space. They were told that their drawings would later be analyzed for insights into how they conceptualized the context in which they had worked.

Participants in the unpacked condition, in contrast, were given a page on which the blank section was divided into six areas, labeled “Me,” “Group member A,” “Group member B,” and so on. These participants were asked to spend a few minutes drawing a picture of each individual that had been a member of their group, including themselves. They were told that their drawings should capture the essential features of each individual, as he or she appeared during the project. Importantly, no mention was made at this point of contributions or allocating responsibility, nor were these participants asked explicitly to think about their collaborators as individuals. Participants in the unpacked condition were simply told that their drawings would later be analyzed for insights into how they conceptualized themselves and the other members of their group.

Finally, participants were asked to indicate the proportion of the work they had contributed for each of the same four activities examined in Studies 2 and 3.

Results and discussion

There was no between-condition difference in the size of the groups participants recalled ($M = 4.62$ group

members, including participants themselves). As in Study 3, in order to examine between-condition differences on the dependent measures across groups of different size, we multiplied each participant’s estimate of his or her contribution by the reported size of his or her group. Table 3 presents the means of these transformed values for both conditions for each of the four dependent measures, adjusted for participants’ institution (Harvard, Colorado, or Williams). As before, the responses of participants in both conditions appeared to exceed 100%, but we again caution that such values do not necessarily indicate overestimation because participants recalled their own groups and we did not obtain responses from all group members.

More important, further analyses showed that the unpacking manipulation reduced the proportion of responsibility participants allocated to themselves. We averaged across participants’ responses to the four items to create an overall index of responsibility allocations ($\alpha = .78$)⁴ and subjected this index to an analysis of covariance, controlling for participants’ institution with two dummy variables. This analysis revealed a significant effect for condition, $F(1, 85) = 4.95$, $p < .05$.⁵ As expected, participants assigned to the unpacked condition allocated less responsibility to themselves (adjusted $M = 131.4\%$) than did participants assigned to the control condition (adjusted $M = 172.3\%$).

The results of this study offer a replication of the findings from Studies 1, 2, and 3. Our relatively subtle manipulation of unpacking was enough to lower the magnitude of participants’ self-allocations of responsibility. At the same time, these results cast doubt on the possibility that our findings in the previous studies reflected the operation of a demand characteristic.

Finally, note that the results of Study 4 also allow us to address another question left unanswered in our previous studies—namely, whether the 100% constraint is necessary for reducing self-allocations of responsibility. Recall that our packed condition in Study 3, in which the 100% constraint was made salient, gave rise to self-allocations of responsibility that were just as high as those of participants in the control group. Thus, the requirement that allocations sum to 100% is not sufficient, by itself, to lower individuals’ self-allocations of responsibility. In addition, the results of Study 4 show that the 100% constraint is not a *necessary* condition

⁴ Twelve participants (including participants in both conditions) left blank a total of 16 self-allocations of responsibility, nine for writing, two for creativity and idea generation, three for administrative work, and two for overall work.

⁵ Additional analyses revealed some differences in the amount of responsibility claimed by participants from the three schools, with participants from Harvard claiming the most responsibility and participants from Williams claiming the least—which is why institution was included as a covariate. Importantly, however, there was no significant interaction between participants’ institution and condition.

Table 3
Claimed percentage responsibility for four activities by participants in the control and unpacked conditions, multiplied by group size and adjusted for participants' institution, Study 4

| Activity | Condition | |
|---------------------|-----------|----------|
| | Control | Unpacked |
| Writing | 143.0 | 106.9 |
| Idea generation | 193.5 | 159.0 |
| Administrative work | 155.0 | 117.6 |
| Overall work | 194.1 | 146.7 |

for unpacking effects to emerge in responsibility allocation. We observed a reduction in self-allocations of responsibility among participants in the unpacked condition despite the fact that those participants were not required to ensure that their allocations summed to 100%—or even give the 100% constraint any consideration at all.

General discussion

The tendency to claim more than one's fair share of the credit for collaborative tasks is ubiquitous in social life—among co-authors, co-workers, and co-habitators alike (Ross, 1981). Previous research has indicated that this phenomenon stems partly from individuals' tendency to be more aware of their own contributions than those of others and bring them to mind with relative ease (Ross & Sicoly, 1979). The present research suggests that this tendency is exacerbated by individuals' propensity to regard their fellow group members collectively, rather than individually. In four studies, we showed that inducing participants to unpack the members of their group and think about them as individuals caused them to allocate more responsibility to their collaborators—and correspondingly less to themselves. The results of Study 3 helped us rule out a number of possible alternative interpretations of our results—i.e., that they stemmed from conservative self-allocations inspired by the 100% “reality check” constraint, that they stemmed from an anchoring effect, or that they stemmed from an artifact of making multiple allocations of responsibility. Study 4 cast doubt on the possibility that our earlier findings stemmed from demand characteristics and showed that consideration of the 100% constraint was not necessary for unpacking to bring about a reduction in participants' self-allocations of responsibility.

Taken together, these studies reinforce our hypothesis that unpacking reduces the degree to which individuals overestimate the magnitude of their contributions by increasing the accessibility of their collaborators' contributions. Note that this interpretation underscores a recurrent message from the research literature that cognitive accessibility is a key mechanism in judgments of relative responsibility (Brawley, 1984; Burger & Rod-

man, 1983; Kruger & Gilovich, 1999; Kruger & Savitsky, 2004; Ross & Sicoly, 1979; Thompson & Kelly, 1981). Our findings thus dovetail nicely with existing research on responsibility allocations.

Our findings also extend research on support theory. In particular, the present results show that assessments of responsibility and group productivity, like probability judgments (Rottenstreich & Tversky, 1997; Tversky & Koehler, 1994), assessments of frequency (Dawes & Mulford, 1993; Mulford & Dawes, 1999), affective forecasts (Van Boven & Epley, 2003), and judgments of numerosity (Pelham, Sumarta, & Myaskovsky, 1994), are subject to unpacking effects (for additional examples of unpacking effects in other domains, see Fiedler & Armbruster, 1994; Kruger & Evans, 2004; and van der Plight, Eiser, & Spears, 1987). Thus, the findings we report suggest that support theory describes the way in which people make a broad range of intuitive judgments. In this regard, our findings were foreshadowed by Tversky & Koehler (1994), who noted that “although unpacking plays an important role in probability judgment, the cognitive mechanism underlying this effect is considerably more general,” reflecting “a general characteristic of human judgment” (p. 562).

In addition to these theoretical contributions, our findings also have applied value. People's tendency to overestimate the magnitude and importance of their own contributions to collaborative endeavors can have serious implications for group functioning and performance (Gilovich, Kruger, & Savitsky, 1999). When the relatively meager public accolades an individual receives for his or her contributions to a project fail to match his or her inflated private assessments of what he or she “deserves,” the individual can feel underappreciated and even taken advantage of—and may be likely to underperform on future projects as a result. Moreover, if the individual makes his or her private assessments public, others may be likely to interpret these inflated self-assessments as a calculated and unscrupulous grab for credit, rather than as a logical consequence of the heightened accessibility of his or her own contributions (Kruger & Gilovich, 1999). Here too, group functioning may suffer, as the individual's collaborators may harbor negative assessments of him or her, leading to animosity and interpersonal tension. This possibility is illustrated in the results of a study in which participants engaged in a group exercise and received feedback indicating that some of their collaborators appeared to overestimate the magnitude of their own contributions. Predictably, participants rated these individuals as harder to get along with, less likeable, and less desirable as future work partners than they rated those with more modest and realistic self-assessments (Forsyth, Berger, & Mitchell, 1981; see also Burrus, Kruger, & Savitsky, 2004).

In some cases, individuals' tendency to overestimate their relative contributions to collaborative endeavors

can even lead to the dissolution of a group (Leary & Forsyth, 1987). We suspect, for example, that many instances of so-called “creative differences” cited to explain the breakups of collaborations in the music and entertainment industries may amount to little more than divergent allocations of responsibility for the products of the collaboration—and that a tendency to regard one’s collaborators collectively can play a role in this tendency. Indeed, we cannot help but see evidence of a failure to unpack a group of collaborators in a recent remark by Yoko Ono. When the music group The Beatles was honored at the 2004 Grammy Awards for the 40th anniversary of their original appearance on the Ed Sullivan Show, Ono noted that “if John were here, he would have been very happy that his efforts with the other three were acknowledged in this way.” One wonders if this failure to consider each collaborator separately is related to the notorious tension that has existed between Ono and “the other three.”

Given that people’s tendency to overestimate their contribution to collaborative tasks can lead to such negative consequences, it is useful to remind readers that simply asking our participants to consider their collaborators separately, rather than collectively, significantly reduced self-allocations of responsibility in our studies. Unpacking the members of the groups one works in may thus be a useful prescription for avoiding conflict. The same may be true, moreover, for the groups one supervises or evaluates. In other research, we have shown that asking participants to unpack the members of a group of which they themselves were not a member—specifically, a five-person discussion of the 2000 U.S. Presidential election from the political talk show “The McLaughlin Group”—resulted in increased assessments of the amount and quality of the group’s output. Seeing the group as comprised of individuals, rather than as a holistic entity, caused participants to see the group as more productive than they would have otherwise (Savitsky, Wight, Van Boven, & Epley, 2004).

Unfortunately, because an individual can engage in unpacking only when he or she has multiple collaborators or evaluates the productivity of a group of people—as opposed to those times in which an individual works with or evaluates only one person—the application of our research may appear to be confined to only multi-person groups. Then again, inasmuch as it is possible to unpack one’s collaborators, it is also possible to unpack their contributions (cf. Van Boven & Epley, 2003). And once again, a failure to do so may lead individuals to overestimate their own contributions and the various deleterious consequences that follow. A husband and wife may each believe they have performed a majority of the housework, for example, because the husband naturally unpacks his own contribution (“I wash the dishes, sweep the floor, wipe the countertops,

and store the leftovers”), but fails to unpack his wife’s (“All she does is the laundry!”)—at the same time as the wife commits the complementary error (“I sort, wash, dry, fold, and iron all of the clothes; all he does is clean the kitchen!”). Such a predicament appears to render tension virtually inevitable. Encouraging individuals who collaborate, whether in pairs or in larger groups, to unpack not only their groups, but also the contributions of each of their collaborators, may help alleviate some of this tension.

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