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Journal of Experimental Social Psychology xxx (2004) xxx–xxx

Journal of
Experimental
Social Psychology

www.elsevier.com/locate/jesp

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

3 Kenneth Savitsky^{a,*}, Leaf Van Boven^b, Nicholas Epley^c, Wayne M. Wight^a

4 ^a Department of Psychology, Williams College, Bronfman Science Center, Williamstown, MA 01267, United States

5 ^b University of Colorado at Boulder, United States

6 ^c Harvard University, United States

Received 14 July 2003; revised 5 August 2004

9 Abstract

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

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19 William Maxwell, who served as an editor at *The New*
20 *Yorker* for more than 40 years, believed that a light
21 touch was best when it came to editing the works that
22 crossed his desk—manuscripts from the likes of John
23 Updike, John Cheever, and J. D. Salinger. "I tried to
24 work so slightly," Maxwell said, "that ... the writer
25 would read his story and not be aware that anybody
26 was involved but him" (Gates, 2000). Without detract-
27 ing from the skill with which Maxwell practiced his
28 craft, a large body of research suggests that little edito-
29 rial restraint may have been necessary for Maxwell's
30 authors to reach the conclusion that they alone pro-
31 duced the final product. People are notoriously prone

to take more than their fair share of the credit for collab- 32
orative endeavors, even when others have made impor- 33
tant and sizable contributions (Ross, 1981; Ross & 34
Sicoly, 1979). It would thus not be surprising to observe 35
authors claiming that they alone were responsible for a 36
finished work—or at least for them to overestimate the 37
role they played in its development and underestimate 38
others' contributions. 39

This tendency to claim more than one's fair share of 40
the credit for a collaborative endeavor may be especially 41
pronounced when an individual works with *several* oth- 42
ers—a writer, say, whose final product reflects not only 43
her own efforts, but the work of publishers, editors, 44
proof-readers, fact-checkers, and so on. In order for 45
an individual to assess the relative magnitude of his or 46
her own contributions in such cases, it is necessary to 47
consider not only his or her own contributions but those 48
of each of his or her collaborators as well. Any tendency 49
to give insufficient attention to the contributions of one 50
or more of his or her collaborators will lead the individ- 51
ual to overestimate his or her own inputs. Accordingly, 52
we suggest that people's overestimation of their contri- 53
butions to collaborative endeavors stems partly from 54

[☆] Lest we take more than our fair share of the credit for this research, we gratefully acknowledge Steve Fein, Kris Kirby, Derek Koehler, and Justin Kruger for their helpful comments and advice; and John Finkbeiner, Jeff Manning, Gabriela Pereira, Carole Savitsky, Matt Shafeek, and Kevin Van Aelst for their help in collecting these data. This research originated as an undergraduate honors thesis conducted by Wayne Wight. Portions of this research were supported by NSF Grant SES0241544 awarded to Nicholas Epley.

* Corresponding author. Fax: +1 413 597 2085.

E-mail address: ksavitsk@williams.edu (K. Savitsky).

55 their tendency to regard at least some of their collabora-
56 tors collectively, as the “rest of the group”—and that
57 inducing individuals to consider their collaborators indi-
58 vidually will therefore reduce their tendency to overesti-
59 mate their own relative contributions. A person who is
60 led to consider his or her collaborators as individuals,
61 each making individual contributions, is likely to see
62 them as relatively more productive than he or she would
63 have otherwise, and will therefore decrease estimates of
64 his or her own relative productivity.

65 We base this prediction on two bodies of research.
66 First, research on *support theory* demonstrates that con-
67 sidering the constituent elements of a set separately,
68 rather than as a whole, makes them seem more probable
69 and frequent (e.g., Tversky & Koehler, 1994). This is be-
70 cause “unpacking” the constituent elements of a set in-
71 creases their cognitive accessibility and leads people to
72 consider elements they might not have considered other-
73 wise. Second, research on egocentrism in allocations of
74 responsibility shows that the accessibility of one’s own
75 contributions—as opposed to those of one’s collabora-
76 tors—is a key determinant of individuals’ tendency to
77 overestimate their own relative contributions to collabor-
78 ative endeavors (e.g., Ross & Sicoly, 1979).

79 Egocentric allocations of responsibility

80 Individuals who work with others on collaborative
81 endeavors—whether married couples who share the
82 housework, members of a task force who work together
83 to implement a new policy, or academic colleagues who
84 co-author a paper—tend to overestimate the magnitude
85 and importance of their own contributions, and under-
86 estimate the magnitude and importance of others’ con-
87 tributions. As a consequence, the sum of each
88 collaborator’s self-assessed contributions typically ex-
89 ceeds 100%. Logically, of course, this cannot be; if three
90 collaborators each believe they have done 50% of the
91 work, then (at least) one of them is wrong. This phe-
92 nomenon was first documented by Ross and Sicoly
93 (1979) and has been replicated many times since (e.g.,
94 Brawley, 1984; Burger & Rodman, 1983; Christensen,
95 Sullaway, & King, 1983; Deutsch, Lozy, & Saxon,
96 1993; Gilovich, Medvec, & Savitsky, 2000; Kruger &
97 Gilovich, 1999; Kruger & Savitsky, 2004; Thompson &
98 Kelly, 1981; for a review, see Leary & Forsyth, 1987).

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

108 But there is more to it than self-serving motives (Leary
109 & Forsyth, 1987). Individuals’ tendency to claim more
110 than their fair share of the credit for collaborative tasks
111 springs also from the fact that their own contributions
112 tend to be more cognitively accessible than others’ con-
113 tributions (Ross & Sicoly, 1979). Because both the
114 amount of information retrieved and the ease with
115 which it can be brought to mind are used as heuristics
116 for estimating overall frequency (Schwarz et al., 1991;
117 Tversky & Kahneman, 1973), individuals conclude that
118 their own contributions were more substantial, on aver-
119 age, than they actually were (Greenwald, 1980; Neisser,
120 1981). Consistent with this interpretation, research dem-
121 onstrates that individuals overestimate their contribu-
122 tions not only to activities that reflect positively on
123 them, but also to activities that reflect negatively (Braw-
124 ley, 1984; Kruger & Gilovich, 1999; Ross & Sicoly, 1979;
125 Thompson & Kelly, 1981). Spouses, for example, not
126 only overestimate the proportion of the housework they
127 have done and the affection they have demonstrated, but
128 also the proportion of things they have broken and
129 arguments they have started—a finding that does not
130 fit with an explanation based solely on self-aggrandize-
131 ment (Kruger & Gilovich, 1999; Ross & Sicoly, 1979).

132 In sum, it is clear that individuals’ tendency to over-
133 estimate their contributions to collaborative tasks oc-
134 curs partly because their own inputs tend to be more
135 accessible than those of their collaborators. We suggest
136 that when individuals collaborate on a project with
137 more than one other person, this tendency is aided
138 and abetted by a failure to consider each collaborator
139 as a separate individual, regarding at least some of them
140 collectively as “the rest of the group.” A tendency to
141 aggregate one’s collaborators may stem partly from at-
142 tempts to simplify an otherwise complex assessment of
143 relative responsibility, or from an inclination to categor-
144 ize the world egocentrically as “me” and “not me”
145 (James, 1892). Regardless, if individuals mentally
146 “pack” their collaborators, then encouraging them to
147 consider their collaborators as separate individuals
148 (i.e., to “unpack” them) should increase the accessibility
149 of their collaborators’ contributions, thereby decreasing
150 their estimates of the relative magnitude of their own
151 contributions.

Support theory

152 This prediction follows from Tversky and colleagues’
153 research on *support theory*, which shows, among other
154 things, that leading people to consider the constituent
155 elements of a set separately rather than holistically in-
156 creases the perceived probability and frequency of that
157 set (Rottenstreich & Tversky, 1997; Tversky & Koehler,
158 1994; see also Brenner & Koehler, 1999; Fischhoff, Slo-
159 vic, & Lichtenstein, 1978; Johnson, Hershey, Meszaros,
160

161 & Kunreuther, 1993; Kruger & Evans, in press; Macchi,
 162 Osherson, & Krantz, 1999; Mulford & Dawes, 1999;
 163 Redelmeier, Koehler, Liberman, & Tversky, 1995; Rus-
 164 so & Kolzow, 1994; Tversky & Fox, 1995; Tversky &
 165 Kahneman, 1973; Van Boven & Epley, 2003; see Bren-
 166 ner, Koehler, & Rottenstreich, 2002, for a review). For
 167 instance, participants in one study indicated that a per-
 168 son was more likely to die from “heart disease, cancer,
 169 or other natural causes” than simply from “natural
 170 causes,” even though the category natural causes in-
 171 cludes heart disease, cancer, and a host of other condi-
 172 tions as well (Tversky & Koehler, 1994).

173 One reason for these effects is that unpacking the con-
 174 stituent elements of a set—that is, considering each ele-
 175 ment separately—renders those elements easier to think
 176 about and leads people to think of elements they would
 177 not have considered otherwise (Rottenstreich & Tver-
 178 sky, 1997; Tversky & Koehler, 1994). Accordingly, we
 179 propose that if individuals overestimate their contribu-
 180 tions to collaborative tasks in part because of the rela-
 181 tively greater accessibility of their own contributions,
 182 then leading them to think about their collaborators
 183 individually rather than collectively should diminish this
 184 tendency. We report four experiments that test this pre-
 185 diction—that is, whether instructions to unpack their
 186 collaborators significantly reduce individuals’ tendency
 187 to overestimate the magnitude of their contributions to
 188 a joint task.

189 Study 1

190 Elementary school children participating in a team-
 191 based extracurricular program on creative problem
 192 solving estimated their own contributions to their
 193 team’s final product (a written document). Those in
 194 the control condition simply indicated the proportion
 195 of the work they contributed with no mention of the
 196 other members of their team. Those in the unpacked
 197 condition indicated their contribution after estimating
 198 the proportion of work that each of their collabora-
 199 tors contributed, with the provision that the four allo-
 200 cations had to sum to 100%. The four members of
 201 each team were always assigned to the same condition
 202 so that their four self-allocations of responsibility
 203 could be summed and compared to a baseline of
 204 100%.

205 We expected that instructing participants to appor-
 206 tion responsibility to each of their teammates separately
 207 would increase allocations of responsibility to partici-
 208 pants’ teammates, and thus decrease the proportion of
 209 responsibility claimed by participants themselves. Thus,
 210 we expected participants in the unpacked condition to
 211 overestimate their contributions to the group task less
 212 than participants in the control condition.

Method 213

Participants 214

215 One hundred thirty-two fourth-grade students work-
 216 ing in one of 33 teams of four participated in the study
 217 (63 males, 69 females, *M* age = 11.3). All participants
 218 were enrolled in the “Future Problem Solving Pro-
 219 gram” (FPSP; see www.fpsp.org), a national program
 220 in which elementary and high school students work
 221 in teams to explore various real-world problems (e.g.,
 222 depletion of the rainforests, homelessness, violence in
 223 schools). After researching their problem for several
 224 weeks, each team spends two hours producing a writ-
 225 ten document proposing solutions for their assigned
 226 problem. Judges at a central office then evaluate these
 227 documents.

Procedure 228

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

240 Participants were asked to think back to their work
 241 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.

251
 252 Participants were then asked to allocate responsibility
 253 for the group’s final product. Those randomly assigned
 254 to the control condition ($n = 16$ groups) were asked to
 255 indicate the proportion of the overall work for which
 256 they were responsible. They did so by indicating a per-
 257 centage between 0% (*did none of it*) and 100% (*did all*
 258 *of it*). Those assigned to the unpacked condition
 259 ($n = 17$ groups) were asked to record the initials of each
 260 of their teammates and to check off each set of initials
 261 after they had taken a moment to consider “that per-
 262 son’s participation in and contributions to your work
 263 on this problem.” These participants were then asked
 264 to apportion responsibility to each of their teammates,
 265 one by one, and then to themselves. They were reminded
 266 that their four allocations should sum to 100%. All

267 members of each team were assigned to the same condi-
 268 tion so that self-allocations could be summed across the
 269 members of each team and compared with a baseline of
 270 100%.

271 Results and discussion

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

275 Self-allocations of responsibility, summed across the
 276 members of each team, exceeded 100% in both the con-
 277 trol condition ($M = 154.6\%$), $t(15) = 6.13$, $p < .0001$,
 278 and the unpacked condition ($M = 106.8\%$),
 279 $t(16) = 2.54$, $p < .05$. As expected, however, teams as-
 280 signed to the unpacked condition demonstrated signifi-
 281 cantly less of this tendency than did teams assigned to
 282 the control condition, $t(31) = 5.28$, $p < .0001$. Instruct-
 283 ing participants to consider each of their teammates sep-
 284 arately substantially diminished their tendency to
 285 overestimate the magnitude of their own contributions,
 286 but did not eliminate it entirely.¹

287 Study 2

288 Study 2 was designed to replicate the results of
 289 Study 1 in a different domain with an older (and pre-
 290 sumably more mature) sample of participants. We
 291 again made use of naturally occurring groups by
 292 examining undergraduate business students who had
 293 been working in groups on a class project. Two weeks
 294 after completing their projects, students were asked to
 295 indicate the proportion of the work they had person-
 296 ally contributed to each of four activities. Once again,
 297 students in groups assigned to the control condition
 298 simply indicated the proportion for which they were
 299 responsible, whereas students in groups assigned to
 300 the unpacked condition allocated responsibility to
 301 themselves and to each of their other group members.
 302 We again expected unpacking to diminish participants'
 303 tendency to overestimate the magnitude of their
 304 contributions.

¹ One member of each of two teams failed to complete the dependent measures, and 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.

Method 305

Participants 306

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

Procedure 310

311 Early in the academic term, participants were ran-
 312 domly assigned to groups of four to work on a pa-
 313 per—a case analysis of a business situation in which
 314 students were to recommend a marketing strategy for
 315 a novel household appliance. Groups met regularly over
 316 four weeks, both in class and outside of class, to discuss
 317 their project. Fifteen days after they handed in their
 318 group paper, participants were asked to complete a
 319 questionnaire in exchange for course credit regarding
 320 the experience of working in their groups. Participants
 321 were assured that their responses were confidential and
 322 would not be seen by their instructor. They had not
 323 yet learned of their grade for their project when they
 324 completed the questionnaire.

325 Participants completed questionnaires similar to
 326 those used in Study 1. This time, however, they were
 327 asked to indicate the proportion of the work—from
 328 0% (*none of it*) to 100% (*all of it*)—they had contributed
 329 to each of four activities: *writing, creativity and idea gen-*
 330 *eration, scheduling and administrative work, and overall*
 331 *work*. Participants in groups randomly assigned to the
 332 control condition ($n = 13$ groups) did so without any
 333 mention of the other members of their group. Partici-
 334 pants in groups assigned to the unpacked condition
 335 ($n = 13$ groups), in contrast, did so after indicating the
 336 proportion of work performed by each of the three other
 337 members of their group. Specifically, participants in the
 338 unpacked condition were asked to record the initials of
 339 each of their group members and then to take a moment
 340 to think about each individual's participation in, and
 341 contributions to, the group. After considering each indi-
 342 vidual's contributions, they were asked to place a check
 343 mark next to that person's initials and to move to the
 344 next person until they had considered the contributions
 345 of each group member. Participants were then asked to
 346 indicate the proportion of work performed by each
 347 group member, including themselves. They were re-
 348 minded that their four allocations should sum to 100%.

Results and discussion 349

350 Once again, we expected participants in the control
 351 condition, who simply allocated responsibility to them-
 352 selves, to overestimate the magnitude of their contribu-
 353 tions to the group task to a greater degree than
 354 participants in the packed condition, who allocated
 355 responsibility to themselves and to each of the other
 356 members of their group. Participants' responses yielded

Table 1

Claimed 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

357 strong support for this prediction. As can be seen in Ta-
 358 ble 1, the summed responses of groups assigned to the
 359 control condition exceeded 100% by a larger margin,
 360 for each of the four activities, than did the summed re-
 361 sponses of groups assigned to the packed condition.
 362 To analyze these results statistically, we averaged across
 363 participants' responses to the four items to create an
 364 overall index of responsibility allocations ($\alpha = .92$). As
 365 in Study 1, summed self-allocations exceeded 100% for
 366 groups in both the control and packed conditions
 367 ($M_s = 141.6$ and 110.3% , respectively), $t_s(12) > 3.64$,
 368 $p_s < .005$. As predicted, however, this tendency was sig-
 369 nificantly reduced among groups in the unpacked condi-
 370 tion compared to groups in the control condition,
 371 $t(24) = 4.14$, $p < .001$.

372 The results of Study 2 suggest that university business
 373 students bear remarkable similarity to the elementary
 374 school students from Study 1 when it comes to allocat-
 375 ing responsibility for a group project. In both cases,
 376 inducing participants to unpack their group and con-
 377 sider their collaborators separately substantially dimin-
 378 ished (but did not eliminate) their tendency to
 379 overestimate the magnitude of their contributions.

380 Study 3

381 The results of Studies 1 and 2 demonstrate that
 382 instructing participants to unpack their collaborators re-
 383 duces their tendency to overestimate the magnitude of
 384 their contributions to a collaborative task. We maintain
 385 that unpacking has this effect because it leads individu-
 386 als to think of others' contributions that they may not
 387 have otherwise considered, and renders others' contribu-
 388 tions more cognitively accessible than they would be
 389 otherwise (cf. Tversky & Koehler, 1994). This, in turn,
 390 allows individuals to recognize that their own contribu-
 391 tions account for a smaller "slice of the pie" than they
 392 would otherwise believe.

393 There are, however, a number of possible alternative
 394 interpretations of these results. First, recall that partic-
 395 ipants in the unpacked condition (but not those in the
 396 control condition) were informed that their responsibil-
 397 ity allocations had to sum to 100%. It is conceivable

that this requirement served as a "reality check," 398
 reminding participants that there was only so much 399
 responsibility to go around (specifically, 100% of it) 400
 and alerting them that their allocations of responsibility 401
 should be constrained accordingly. The mere mention 402
 of the 100% constraint, then, may have led participants 403
 in the unpacked condition to consider their allocations 404
 of responsibility more carefully, perhaps resulting in 405
 more conservative self-allocations. Alternatively, to 406
 the extent that participants converted the 100% con- 407
 straint into "about 25% each," self-allocations could 408
 have been decreased in the unpacked condition as a re- 409
 sult of an anchoring effect (i.e., a tendency to cling to 410
 and/or adjust insufficiently from the "anchor" of 411
 25%; Chapman & Johnson, 2002; Epley, in press). It 412
 is instructive to recall that Brenner and Koehler 413
 (1999) demonstrated unpacking effects even when a 414
 set of judgments was required to sum to 100%, a find- 415
 ing that casts doubt on the possible alternatives just 416
 mentioned. Nevertheless, we address this issue empiri- 417
 cally in the next study. 418

419 Finally, note that participants in the unpacked condi-
 420 tion were required to make multiple allocations of
 421 responsibility (i.e., to all group members), whereas
 422 those in the control condition made only one allocation
 423 (i.e., to themselves). If participants in the unpacked
 424 condition were disinclined to allocate a small amount
 425 of responsibility to one or more of their collaborators
 426 (e.g., out of politeness, group loyalty, or a reluctance
 427 to use extreme ends of the scale; Fiedler & Armbruster,
 428 1994), then the amount allocated to "others" may have
 429 been increased artifactually, resulting in a decrease in
 430 self-allocations.

431 To address these issues, we added two new conditions
 432 to our design for Study 3: a packed condition and an
 433 implicitly unpacked condition. Participants assigned to
 434 the packed condition were asked to divide responsibility
 435 for a collaborative endeavor between themselves and
 436 "the rest of the group," with the stipulation that these
 437 two allocations sum to 100%. Because this condition
 438 did not require participants to unpack their collabora-
 439 tors, we did not expect a reduction in the degree to
 440 which they overestimated the magnitude of their own
 441 contributions—despite the fact that the instructions *did*
 442 mention the 100% "reality" constraint. Participants as-
 443 signed to the implicitly unpacked condition (cf. Tversky
 444 & Koehler, 1994), in contrast, were asked to consider
 445 each of their collaborators individually, as in the un-
 446 packed condition from Studies 1 and 2, but were not
 447 asked to make separate allocations of responsibility
 448 for each of them. Because this condition required partic-
 449 ipants to unpack their collaborators (mentally, at least),
 450 we expected to observe a reduction in the degree to
 451 which they overestimated the magnitude of their own
 452 contributions—despite the fact that they did not make
 453 multiple allocations of responsibility.

454 *Method*455 *Participants*

456 Eighty-one Cornell University students (53 women,
457 28 men) participated in exchange for extra credit in their
458 psychology or human development courses.

459 *Procedure*

460 Participants were asked to recall a time when they
461 had worked in a group of 3–6 people to complete a task.
462 They were told that they were free to select a group from
463 any domain that they wished—e.g., a group from a class
464 they had taken in high school or college or from a job
465 they had held—but were instructed to have a specific
466 group in mind. Participants described their group in a
467 few sentences and indicated how many people (including
468 themselves) had been in the group. They then rated their
469 group experience on a number of bipolar scales ranging
470 from -3 to $+3$: *unpleasant pleasant*, *boring interesting*,
471 *useless useful*, *inefficient efficient*, and *failure success*.
472 Participants also indicated how interested they would
473 be in working with the group they listed in the future,
474 on a scale ranging from 0 (*not at all*) to 10 (*very much*).

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

487 Participants were randomly assigned to one of four
488 conditions, two of which were identical to the conditions
489 in Studies 1 and 2. Those assigned to the control condi-
490 tion ($n = 20$) indicated the proportion of each activity
491 for which they themselves were responsible without
492 any mention of their collaborators. Participants as-
493 signed to the unpacked condition ($n = 21$) recorded the
494 initials of each of their collaborators, took a moment
495 to think about each individual's contributions, and then
496 allocated responsibility to each member of their group
497 (including themselves), one by one. As before, we re-
498 minded participants in the unpacked condition that their
499 allocations should sum to 100%.

500 We also added two new conditions not included in
501 Studies 1 and 2. Participants assigned to both the
502 packed ($n = 20$) and implicitly unpacked ($n = 20$) condi-
503 tions allocated responsibility two ways—to “the other
504 group members” (i.e., the rest of their group, as a single,
505 holistic entity), and to themselves; in both conditions,
506 they were reminded that these two allocations should
507 sum to 100%. Participants in the packed condition re-

ceived no additional instructions, whereas participants 508
assigned to the implicitly unpacked condition were 509
asked to record the initials of their collaborators and 510
think about each individual's contributions, just as par- 511
ticipants did in the unpacked condition. In short, the 512
packed condition resembled the control condition in 513
that neither included instructions for participants to re- 514
gard their collaborators as individuals, but differed from 515
the control condition in that participants in the packed 516
condition were asked to allocate responsibility to their 517
collaborators (albeit holistically), and were reminded 518
of the 100% constraint. Likewise, the implicitly un- 519
packed condition resembled the unpacked condition in 520
that both included instructions for participants to re- 521
gard their collaborators as individuals (i.e., list their ini- 522
tials and so on), but differed from the unpacked 523
condition in that participants in the implicitly unpacked 524
condition were not asked to make allocations of respon- 525
sibility for each of their collaborators separately. 526

527 *Results and discussion*

Participants selected groups with which they were 528
quite satisfied. They rated their groups on average as 529
having been pleasant ($M = .95$), interesting ($M = .88$), 530
useful ($M = .88$), efficient ($M = .46$), and successful 531
($M = 1.75$), and indicated a willingness to work with 532
their groups again ($M = 5.69$). All of these means were 533
significantly above the midpoint of each scale, all 534
 $t(80) > 2.11$, all $ps < .05$. Because they were randomly 535
assigned to their conditions, we did not expect any be- 536
tween-condition differences in the groups participants 537
selected. And indeed, separate one-way ANOVAs indi- 538
cated no significant differences in any of participants' 539
ratings of their groups. There were also no between-con- 540
dition differences in group size ($M = 4.32$ group mem- 541
bers, including participants themselves). 542

We next examined participants' allocations of respon- 543
sibility in each of the four conditions. We expected that 544
instructing participants to consider their collaborators 545
as individuals—whether participants were asked to allo- 546
cate responsibility to them each separately (unpacked 547
condition) or as a group (implicitly unpacked condi- 548
tion)—would render their collaborators' contributions 549
more cognitively accessible relative to the packed and 550
control conditions. As a result, we expected participants 551
in the unpacked and implicitly unpacked conditions to 552
allocate relatively less responsibility to themselves than 553
would participants in the packed and control conditions. 554

To examine between-condition differences across 555
groups of different size, we multiplied each participant's 556
estimate of his or her own contribution by the reported 557
size of his or her group (e.g., an individual who worked 558
in a group of four, and claimed to have done 25% of the 559
work, would receive a value of 100%). Table 2 presents 560
the means of these transformed values across the four 561

Table 2

Claimed 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

562 conditions for each of the four dependent measures.
 563 Although the responses of participants in all conditions
 564 appeared to exceed 100%, care should be taken in inter-
 565 preting values in excess of 100% as evidence of “overes-
 566 timation.” Because participants were free to select any
 567 group they wished, it is possible that they called to mind
 568 and reported groups in which they themselves played an
 569 especially large role (i.e., groups in which they really *did*
 570 do more than their fair share of the work), meaning that
 571 one can hardly fault them for making self-allocations
 572 that, when multiplied by group size, exceed 100%. Thus,
 573 because we did not obtain responses from all members
 574 of participants’ groups, as we did in Studies 1 and 2,
 575 we cannot address the extent to which participants over-
 576 estimated their own contributions.

577 Importantly, however, because this feature of our de-
 578 sign was equally true for participants in all four of our
 579 conditions, we *can* address between-condition differ-
 580 ences. To do so, we averaged across participants’ re-
 581 sponses to the four items to create an overall index of
 582 responsibility allocations ($\alpha = .81$).² Analysis of this in-
 583 dex indicated that allocations of responsibility did in-
 584 deed vary by condition, $F(3, 77) = 3.65$, $p < .025$.
 585 Planned contrasts revealed that participants’ self-allo-
 586 cations³ in the control and packed conditions did not differ
 587 from one another ($M_s = 180.8$ and 183.9% , respec-
 588 tively), nor did the self-allocations of participants in
 589 the unpacked and implicitly unpacked conditions
 590 ($M_s = 135.8$ and 128.1% , respectively), both $t_s < 1$. As
 591 expected, however, participants in the control and
 592 packed conditions claimed more responsibility for their
 593 group’s output than did participants in either the un-
 594 packed condition, $t_s(77) = 2.09$ and 2.24 , respectively,
 595 $p_s < .05$, or the implicitly unpacked condition,
 596 $t_s(77) = 2.42$ and 2.56 , respectively, $p_s < .025$.

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.

597 These findings are consistent with Studies 1 and 2,
 598 and demonstrate, again, that inducing individuals to un-
 599 pack their collaborators attenuates the amount of
 600 responsibility they allocate to themselves for collabora-
 601 tive tasks. Moreover, the results from the packed and
 602 implicitly unpacked conditions rule out a number of
 603 possible alternative interpretations for the findings from
 604 Studies 1 and 2—namely, that they stemmed from con-
 605 servative self-allocations inspired by the 100% “reality
 606 check” constraint, that they stemmed from an anchoring
 607 effect, or that they stemmed from an artifact of making
 608 multiple allocations of responsibility. Study 3 thus lends
 609 further support to our position that unpacking influ-
 610 ences responsibility allocations because it renders the
 611 contributions of one’s collaborators more accessible
 612 than they would otherwise be.

Study 4

613

614 The first three studies indicate that leading individu-
 615 als to consider their collaborators separately, rather
 616 than as a group, diminishes the extent to which they
 617 overestimate their contribution to collaborative tasks.
 618 In Study 4, we wished to replicate this result once again,
 619 this time using a somewhat different technique to
 620 encourage participants to unpack their collaborators
 621 and thereby extending the breadth of the unpacking ef-
 622 fect in this context. Doing so also allowed us to address
 623 an additional possible alternative interpretation of our
 624 results from the first three studies. It could be argued
 625 that the unpacking manipulations in our previous stud-
 626 ies constituted a subtle (or not so subtle) suggestion to
 627 participants that they *should* allocate less responsibility
 628 to themselves than they might otherwise. Instructions
 629 to list the initials of their collaborators, think about each
 630 person’s contributions, and (in some conditions) allocate
 631 a portion of the total responsibility to each of them, may
 632 therefore have served as something of a demand charac-
 633 teristic, alerting participants as to what responses were
 634 expected and/or normative.

635 We took steps in Study 4 to eliminate this possibility
 636 by disguising the unpacking manipulation, making it
 637 significantly more subtle than in the previous studies.
 638 Specifically, participants in Study 4 were asked to think
 639 about a group of which they had been a member, as in
 640 Study 3, but this time were then asked to draw a picture
 641 related to their group. Those in the control condition
 642 were asked to draw a picture of the physical location
 643 in which their group worked. Those in the unpacked
 644 condition, in contrast, were asked to draw a picture of
 645 themselves and each of the other members in their
 646 group—thereby unpacking their group into its constitu-
 647 ent members. All participants then indicated only the
 648 proportion of the work they themselves contributed.
 649 By not asking participants in the unpacked condition

650 explicitly to stop and consider each member of their
651 group, or think about other group members' contribu-
652 tions in any way, this procedure constitutes a relatively
653 subtle manipulation of unpacking—one that, if success-
654 ful, minimizes concerns about possible demand charac-
655 teristics in Studies 1, 2, and 3.

656 Despite various procedural changes, we expected our
657 results to be consistent with those from our earlier stud-
658 ies. Specifically, we expected participants in the un-
659 packed condition to allocate less responsibility to
660 themselves than did participants in the control
661 condition.

662 Method

663 Participants

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

669 Procedure

670 Participants completed a questionnaire based in part
671 on the one used in Study 3. Specifically, participants
672 were asked to recall a time when they had worked with
673 a group of 3 to 6 people to complete a task. They de-
674 scribed their group in a few sentences and indicated
675 how many people (including themselves) had been in
676 the group.

677 Next, participants were asked to spend a few minutes
678 drawing a picture related to their group. Participants in
679 the control condition were given a page with a blank sec-
680 tion (approximately 15 cm \times 15 cm) and were asked to
681 draw a representation of the physical location in which
682 their group had worked, including furniture, doorways,
683 and other contextual elements of the space. They were
684 told that their drawings would later be analyzed for in-
685 sights into how they conceptualized the context in which
686 they worked.

687 Participants in the unpacked condition, in contrast,
688 were given a page on which the blank section was di-
689 vided into six areas, labeled "Me," "Group member
690 A," "Group member B," and so on. These participants
691 were asked to spend a few minutes drawing a picture of
692 each individual that had been a member of their group,
693 including themselves. They were told that their drawings
694 should capture the essential features of each individual,
695 as he or she appeared during the project. Importantly,
696 no mention was made at this point of contributions or
697 allocating responsibility, nor were these participants
698 asked explicitly to think about their collaborators as
699 individuals. Participants in the unpacked condition were
700 simply told that their drawings would later be analyzed
701 for insights into how they conceptualized themselves
702 and the other members of their group.

703 Finally, participants were asked to indicate the pro-
704 portion of the work they had contributed for each of
705 the same four activities examined in Studies 2 and 3.

706 Results and discussion

707 There was no between-condition difference in the size
708 of the groups participants recalled ($M = 4.62$ group
709 members, including participants themselves). As in
710 Study 3, in order to examine between-condition differ-
711 ences on the dependent measures across groups of differ-
712 ent size, we multiplied each participant's estimate of his
713 or her contribution by the reported size of his or her
714 group. Table 3 presents the means of these transformed
715 values for both conditions for each of the four depen-
716 dent measures, adjusted for participants' institution
717 (Harvard, Colorado, or Williams). As before, the re-
718 sponses of participants in both conditions appeared to
719 exceed 100%, but we again caution that such values do
720 not necessarily indicate overestimation because partici-
721 pants recalled their own groups and we did not obtain
722 responses from all group members.

723 More important, further analyses showed that the
724 unpacking manipulation reduced the proportion of
725 responsibility participants allocated to themselves. We
726 averaged across participants' responses to the four items
727 to create an overall index of responsibility allocations
728 ($\alpha = .78$)⁴ and subjected this index to an analysis of
729 covariance, controlling for participants' institution with
730 two dummy variables. This analysis revealed a signifi-
731 cant effect for condition, $F(1, 85) = 4.95, p < .05$.⁵ As ex-
732 pected, participants assigned to the unpacked condition
733 allocated less responsibility to themselves (adjusted
734 $M = 131.4\%$) than did participants assigned to the con-
735 trol condition (adjusted $M = 172.3\%$).

736 The results of this study offer a replication of the find-
737 ings from Studies 1, 2, and 3. Our relatively subtle
738 manipulation of unpacking was enough to lower the
739 magnitude of participants' self-allocations of responsi-
740 bility. At the same time, these results cast doubt on
741 the possibility that our findings in the previous studies
742 reflected the operation of a demand characteristic.

743 Finally, note that the results of Study 4 also allow us
744 to address another question left unanswered in our pre-
745 vious studies—namely, whether the 100% constraint is
746 necessary for reducing self-allocations of responsibility.

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 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

747 Recall that our packed condition in Study 3, in which
 748 the 100% constraint was made salient, gave rise to self-
 749 allocations of responsibility that were just as high as
 750 those of participants in the control group. Thus, the
 751 requirement that allocations sum to 100% is not suffi-
 752 cient, by itself, to lower individuals' self-allocations of
 753 responsibility. In addition, the results of Study 4 show
 754 that the 100% constraint is not a *necessary* condition
 755 for unpacking effects to emerge in responsibility alloca-
 756 tion. That we observed a reduction in self-allocations of
 757 responsibility among participants in the unpacked condi-
 758 tion, despite the fact that those participants were not
 759 required to ensure that their allocations summed to
 760 100%—or even give the 100% constraint any consider-
 761 ation at all—demonstrates that the 100% constraint is
 762 not necessary for unpacking to result in reductions in
 763 self-allocation.

764 General discussion

765 The tendency to claim more than one's fair share of
 766 the credit for collaborative tasks is a ubiquitous phe-
 767 nomenon of social life—among co-authors, co-workers,
 768 and co-habitators alike (Ross, 1981). Previous research
 769 has indicated that this phenomenon stems partly from
 770 the individuals' tendency to be more aware of their
 771 own contributions than those of others and bring them
 772 to mind with relative ease (Ross & Sicoly, 1979). The
 773 present research suggests that this tendency is exacer-
 774 bated by individuals' propensity to regard their fellow
 775 group members collectively, rather than individually.
 776 In four studies, we showed that inducing participants
 777 to unpack the members of their group and think about
 778 them as individuals causes them to allocate more
 779 responsibility to their collaborators—and correspond-
 780 ingly less to themselves. The results of Study 3 helped
 781 us rule out a number of possible alternative interpreta-
 782 tions of our results—i.e., that they stemmed from con-
 783 servative self-allocations inspired by the 100% “reality
 784 check” constraint, that they stemmed from an anchoring
 785 effect, or that they stemmed from an artifact of making
 786 multiple allocations of responsibility. Study 4 cast doubt
 787 on the possibility that our earlier findings stemmed from
 788 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 hypothe-
 sis that unpacking reduces the degree to which individu-
 als overestimate the magnitude of their contributions by
 increasing the accessibility of their collaborators' contri-
 butions. Note that this interpretation underscores a
 recurrent message from the research literature that cog-
 nitive accessibility is a key mechanism in judgments of
 relative responsibility (Brawley, 1984; Burger & Rod-
 man, 1983; Kruger & Gilovich, 1999; Ross & Sicoly,
 1979; Thompson & Kelly, 1981; but see Kruger & Savit-
 sky, 2004, for an alternative account). 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 fore-
 casts (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, in press; 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 foreshad-
 owed by Tversky and Koehler (1994), who noted that
 “although unpacking plays an important role in proba-
 bility judgment, the cognitive mechanism underlying
 this effect is considerably more general,” reflecting “a
 general characteristic of human judgment” (p. 562).

Aside from these theoretical contributions, our find-
 ings also have applied value. People's tendency to over-
 estimate the magnitude and importance of their own
 contributions to collaborative endeavors can have seri-
 ous implications for group functioning and performance
 (Gilovich, Kruger, & Savitsky, 1999). When the rela-
 tively 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

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845 and interpersonal tension. This possibility is illustrated
846 in the results of a study in which participants engaged
847 in a group exercise and received feedback indicating that
848 some of their collaborators appeared to overestimate the
849 magnitude of their own contributions. Predictably, partic-
850 ipants rated these individuals as harder to get along
851 with, less likeable, and less desirable as future work part-
852 ners than they rated those with more modest and realis-
853 tic self-assessments (Forsyth, Berger, & Mitchell, 1981;
854 see also Burrus, Kruger, & Savitsky, 2004).

855 In some cases, individuals' tendency to overestimate
856 their relative contributions to collaborative endeavors
857 can even lead to the dissolution of a group (Leary &
858 Forsyth, 1987). We suspect, for example, that many in-
859 stances of so-called "creative differences" cited to ex-
860 plain the breakups of collaborations in the music and
861 entertainment industries may often amount to little
862 more than divergent allocations of responsibility for
863 the products of the collaboration—and that a tendency
864 to regard one's collaborators collectively can play a role
865 in this tendency. Indeed, we cannot help but see evidence
866 of a failure to unpack a group of collaborators in a re-
867 cent remark by Yoko Ono. When the music group
868 The Beatles was honored at the 2004 Grammy Awards
869 for the 40th anniversary of their original appearance
870 on the Ed Sullivan Show, Ono noted that "if John were
871 here, he would have been very happy that his efforts with
872 the other three were acknowledged in this way." One
873 wonders if this failure to consider each collaborator sep-
874 arately is related to the notorious tension that has ex-
875 isted between Ono and "the other three."

876 Given that people's tendency to overestimate their
877 contribution to collaborative tasks can lead to such neg-
878 ative consequences, it is useful to remind readers that
879 simply asking our participants to consider their collabo-
880 rators separately, rather than collectively, significantly
881 reduced self-allocations of responsibility in our studies.
882 Unpacking the members of the groups one works in
883 may thus be a useful prescription for avoiding conflict.
884 The same may be true, moreover, for the groups one
885 supervises or evaluates. In other research, we have
886 shown that asking participants to unpack the members
887 of a group of which they themselves were not a mem-
888 ber—specifically, a five-person discussion of the 2000
889 US Presidential election from the political talk show
890 "The McLaughlin Group"—resulted in increased
891 assessments of the amount and quality of the group's
892 output. Seeing the group as comprised of individuals,
893 rather than as a holistic entity, caused participants to
894 see the group as more productive than they would have
895 otherwise (Savitsky, Wight, Van Boven, & Epley, 2004).

896 Unfortunately, because an individual can engage in
897 unpacking only when he or she has multiple collabora-
898 tors or evaluates the productivity of a group of peo-
899 ple—as opposed to those times in which an individual
900 works with or evaluates only one person—the applica-

tion of our research may appear to be confined to only
multi-person groups. Then again, inasmuch as it is possi-
ble 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 indi-
viduals to overestimate their own contributions and the
various deleterious consequences that follow. A hus-
band 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 individ-
uals 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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