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Abstract

Decisions, both moral and mundane, about saving individuals or resources at risk are often influenced not only by numbers saved and lost but also by proportions of groups saved and lost. Consider choosing between a program that saves 60 of 240 lives at risk and one that saves 50 of 100. The first option maximizes absolute number saved; the second, proportion saved. In two studies, we show that the influence of proportions on such decisions depends on how items at risk are mentally represented. In particular, we show that proportions have greater influence on people's decisions to the extent that the items at risk are construed as forming groups, as opposed to distinct individuals. Construal was manipulated by means of animated displays in which resources at risk moved either independently (promoting individual construal) or jointly (promoting group construal). Results support the hypothesis that (a) decision makers form mental representations which vary in the degree to which resources at risk are construed as groups versus individuals and (b) construal of resources as groups promotes the influence of proportions on decisions and moral judgments.

Keywords: decision making, proportion dominance, entitativity, individuation, moral reasoning, moral judgment, identifiable victim effect

A Group Construal Account of Drop-in-the-Bucket Thinking in Policy Preference and Moral Judgment

Choices can be described in both relative and absolute terms. For example, a deal on a stereo can be presented as a $50 discount or as "10% off." A government's budget cut can be spun as $100 million, which sounds large, or as a 4% reduction, which does not. A decision to send aid to a famine-struck country might be seen as saving the lives of 1,000 people or as making but a tiny dent in the problem of hunger and malnutrition in the world.

Furthermore, our evaluative judgments often depend on whether outcomes are framed in absolute or relative terms. In one study, for example, participants evaluated a program that would save the lives of two pedestrians annually (Jenni & Loewenstein, 1997). For one group of participants, the pedestrians were described as 2 of 4 people who die at an intersection annually. For a second group, they were described as 2 of 1,700 people who die in auto-related accidents in Pennsylvania annually. The first group evaluated the program more favorably. The program's consequences are identical in both cases, but relative considerations—the proportion of the reference group saved—make the first description more compelling. Other experiments employing similar between-participants designs have revealed similar effects (Baron, 1997; Fetherstonhaugh, Slovic, Johnson, & Friedrich, 1997; Friedrich et al., 1999).

More surprisingly, relative considerations often influence decisions even in cases where absolute and relative considerations are pitted against each other and where a strict focus on absolute numbers seems appropriate, or even morally obligatory (Kogut & Beyth-Marom, 2008; McDaniels, 1988). For example, participants in one study read that anthrax had been weaponized and released into the air above two cities (Bartels, 2006). They then chose between saving 225 of 300 people expected to die in one city versus saving 230 of 920 expected to die another city. Nearly half of participants preferred the first option—saving a greater proportion, even though this meant saving fewer lives. This phenomenon has been termed *proportion dominance* (Slovic, Finucane,

Peters, & MacGregor, 2002). In a subsequent task, participants were shown the conflict between saving a greater proportion and saving a greater absolute number and were asked to rate the importance of each. In this task, participants did *not* respond that saving a greater absolute number was maximally important. In other words, even upon deliberation, participants did not respond as if a strict focus on absolute numbers was the correct approach to every problem.

Previous research on proportion dominance has investigated policy preference, making little connection to research on moral reasoning and judgment. This could seem like an oversight, considering that the resources under consideration (e.g., human life, natural resources) are typically drawn from domains that are ascribed moral relevance by many people. As Baron (1997) first observed, proportion dominance, as studied in the context of judgment and decision making, is similar to a pattern in moral reasoning discussed in a prominent utilitarian ethical theory proposed by the philosopher Peter Unger (1996). Unger notes that people tend to regard saving lives as less morally obligatory when they are construed as a few among overwhelmingly many at risk, a tendency he calls "futility thinking" and that we will call "drop-in-the-bucket thinking." For example, most people judge that letting a child drown in a nearby pond is less permissible than letting a child die of malnutrition in a famine-struck country (Singer, 1972). Although there are many differences between the scenarios, Unger argues compellingly that one of the important differences is that in the latter case only a tiny proportion of those at risk can be saved, whereas in the former case *all* of those at risk (one person) can be saved.

In sum, we have multiple phenomena that involve an influence of relative considerations where a strict focus on absolute considerations might seem more "correct." In this paper, we propose a single cognitive account of these phenomena.

Ours is not the first attempt to explain the influence of proportions on decisions about resources at risk, but we believe it is the most comprehensive. Baron (1997) attributed proportion dominance to a general error in mathematical reasoning: a tendency to confuse relative and absolute quantities. Alternatively, Fetherstonhaugh et al. (1997) likened the diminished appreciation of loss of life when many are at risk to Weber's law of perception, which says that just-noticeable differences in stimulus intensity are greater at greater absolute intensities. They proposed that these phenomena in fact share a common underlying mechanism, a form of "psychophysical numbing" that is "ingrained in the workings of our cognitive and perceptual systems" (Fetherstonhaugh et al., 1997, p. 298; see also Slovic, 2007). Although the confusion and psychophysical numbing accounts explain some instances of proportion dominance, other instances are problematic for these accounts. The confusion account, for example, does not explain why proportion dominance remains when relative and absolute considerations are pitted against each other (making the conflict between absolute and relative transparent), nor why participants, when asked to reflect on the problem, don't consistently endorse a strict focus on absolute quantities.

Our account is explicitly cognitive; its explanatory constructs are mental representations. We posit that choices are based on mental representations of resources (lives, dollars, etc.) and that mental representations vary in the degree to which they emphasize resources as distinct individuals versus monolithic groups. In other words, representations of resources fall somewhere on a continuum whose endpoints are "individuals" and "group." Fifty sea otters can be construed as 50 individuals; as a single, deindividuated group; or anywhere in between. To the degree that they are construed as individuals, greater weight will be given to absolute considerations, and decisions will maximize the number of individuals saved. To the degree that resources are construed as a group (e.g., that 50 otters form a single raft), more weight will be given relative considerations; and

decisions will maximize the proportion of this group that is saved, as saving a large proportion of a whole unit is more satisfactory than saving a small proportion (cf. Geier, Rozin, & Doros, 2006). The greater the "groupness" of the representation, the greater the influence of relative considerations.

Our argument that individual versus group representation can influence thinking is well-founded theoretically. "Groupness" in mental representations has already met with success as an explanatory tool in social cognition, where "entitativity"—the degree to which a social group constitutes a single entity (Campbell, 1958)—influences how people explain traits (Haslam et al., 2000), behaviors, and intentions (Brewer et al., 2004), among other things.

The studies in this paper accomplish two goals: (1) We manipulate the representation of resources as individuals versus groups, and show that this difference accounts for the influence of absolute versus relative considerations on judgment. For experimental control, we manipulate construal in a way that is somewhat artificial. In the General Discussion, we consider factors that influence individual versus group construal in more natural settings. Study 1 finds that group construal promotes proportion dominance, and Study 2 finds that it promotes drop-in-the-bucket thinking. (2) In accounting for both proportion dominance and drop-in-the-bucket thinking, we bring together disparate literatures which, we believe, describe a single phenomenon from different perspectives.

Study 1

To manipulate construal, we adopted methods from studies that investigated conditions under which adults and children treat groups as single units. In a study by Bloom and Kelemen, (1995), participants were shown a static display of 15 unfamiliar-looking objects arranged in three groups of five and were told, for example, "these are fendles." The question was what participants

would take "fendle" to mean, and to answer this question, the researchers asked participants how many fendles there were. Participants in this condition interpreted the name as referring to the objects—when asked, they reported that there were 15 fendles. In another condition, the three groups moved as units, with each group following a distinct path across the display. In this condition, participants interpreted the novel name as referring to the groups, reporting that there were three fendles. In another study, participants saw groups of objects moving along distinct paths and interacting with one another. When asked to describe these animations, participants described the groups, not the objects, as agents with intentions to move in certain ways (Bloom & Veres, 1999). Joint motion, then, is a cue to "groupness."

We adapted this method to manipulate people's construal of resources at risk. In Study 1, participants saw resources (people, otters, etc.) depicted as arrays of objects. These objects appeared via computer-presented animations. In the *individuals* condition, objects emerged from different, randomly chosen off-screen locations and followed independent paths to their final locations in the array. In the *groups* condition, objects moved in concert. These animations were accompanied by verbal descriptions of scenarios in which absolute and relative considerations were pitted against each other, and participants rated their preference for one alternative or the other. We predicted that participants in the groups condition would show greater preference for maximizing proportion saved (at the expense of absolute number saved) than participants in the individuals condition.

Method

Participants

Thirty undergraduates participated for course credit.

Materials & Procedure

The experiment was administered by computer. After some initial instructions, participants advanced to a screen where they read a scenario posing a tradeoff between relative and absolute savings. The scenario involved some resources at risk, and two alternatives were described: one saving a larger number of individuals and another saving a larger proportion of an at-risk group. Revisiting our earlier example, participants were asked to decide whether to save 225 of 300 people expected to die of anthrax inhalation in one city versus saving 230 of 920 expected to die in another city. Participants then advanced to a screen where the manipulation took place. Elements appeared on this screen in the following sequence.

(1) On the left side of the screen, a frame labeled "Program A" appeared. Gray objects representing Program A's reference group appeared. For example, if Program A would save 14 of 17 people, then 17 stick figures appeared. In the individuals condition, these 17 figures followed distinct paths from locations around the edges of the frame (see Individuals A in Figure 1) and assembled into a rows-and-columns array. In the groups condition, the individuals moved together into the frame, like an army marching in formation (see Groups A). The final rows-and-columns arrangement was the same in both conditions.

(2) A description appeared (e.g., "Program A saves 14 of 17"), followed by the text "To see this depicted, click on the figure above." Participants had to click for the task to proceed, and when they did so, the resources lost (e.g., 3 figures) remained gray, while the resources saved (e.g., 14 figures) came into color.

(3) A frame labeled "Program B" appeared on the right side of the screen. Step 1 was then repeated for Program B. For example, if Program B saved 15 of 175 refugees, 175 figures appeared, by either independent or joint motion depending on condition (see Individuals B and Groups B).

(4) Step 2 was repeated for Program B.

(5) Finally, with the end-state depictions of Program A and Program B on screen, a rating scale appeared: "Which program would you be more willing to support?" with endpoints "strong preference for Program A" and "strong preference for Program B" (see Screen C).

Importantly, only steps 1 and 3 differed between conditions. The end-state depictions that participants saw while registering preferences were identical in the two conditions. Consequently, any difference in preferences between conditions can be attributed to whether the resources had moved jointly or independently and would be evidence that (a) people construct mental representations in which resources are more or less individuated and (b) less individuation results in a greater influence of proportions on decisions.

Participants were given five scenarios—two involving human lives and three involving nonhumans (otters, fish, dolphins)—in random order. Whether Program A maximized absolute savings and Program B maximized relative savings or vice versa was determined randomly for each trial. Each participant was randomly assigned to the individuals or group condition.

Proportion dominance was measured as follows: The end of the scale corresponding to a strong preference for maximizing relative savings was set to 1 and the absolute-maximizing end to 0.

Pre-test. To assess whether independent versus joint motion induced individual versus group construal, an initial group of participants (N = 115) took part in a pre-test. They viewed the opening segment of an animation used in the main experiment (where resources emerged on screen), drawn from either the groups or individuals condition (between subjects). As the animation looped, participants rated "the degree to which the people in this animation seem like individuals or like a group." The scale was continuous and was explained as follows: "A rating of –3 means that

they are individuals with distinct identities. A rating of +3 means that they are a tight group with a single identity. A rating of 0 means that they are individuals and a group to equal degrees."

As expected, joint motion promoted group construal. Participants who saw group motion rated the resources as more group-like (M = 1.84, SD = 1.13) than participants who saw independent motion (M = 0.86, SD = 1.37, $t(113) = 4.19$, $p < .001$, $\eta_p^2 = .13$).

Results & Discussion

For the overall analysis, we computed each participant's average preference, collapsing across items. As predicted, participants in the groups condition exhibited more proportion dominance (M = .56, SD = .27) than participants in the individuals condition (M = .34, SD = 20), $t(28) = 2.42$, $p < .05$, $\eta_p^2 = .17$ (see Table 1 for item results). This result suggests that construal of resources as groups (versus individuals) causes people to preferentially weight relative (versus absolute) considerations in policy preferences concerning resources at risk.

Study 2

Study 1 dealt with decisions about whether to support one policy over another. Whereas participants might have afforded moral relevance to some of the decisions they faced, we did not ask about moral judgments but only about willingness to support given actions or policies. However, our explanation of proportion dominance may also account for a similar phenomenon in moral judgment, and so in Study 2 we extend our theory and methods into the moral domain.

As Baron (1997) observed, there is a striking similarity between proportion dominance in policy preference and drop-in-the-bucket thinking in moral judgment, where saving lives is less morally obligatory when they are construed as a few among overwhelmingly many at risk. In Unger's (1996) view, drop-in-the-bucket thinking (or, to use his term, futility thinking) is one reason why people do not feel obligated to, for example, send aid to people suffering from famine.

Unger also considers factors that counteract drop-in-the-bucket thinking. One involves presenting a life as belonging to a smaller reference group, perhaps a group of one. In Study 2, we investigate whether the same mechanism that underlies proportion dominance in policy preference also underlies drop-in-the-bucket thinking in moral judgment. Consistent with the Study 1's findings, we expected group construal to undercut utilitarian intuition in a manner similar to what Unger (1996) suggests.[1] We expected the group condition to induce more drop-in-the-bucket thinking because it induces participants to attend to the size of the bucket, meaning each individual drop is afforded less weight in judgment of an act's moral status.

Even though we asked participants to make specifically moral judgments in Study 2, there was reason to suspect that participants might attach greater moral relevance to some scenarios than to others and that this might affect the results. Previous studies have found that the degree of moral relevance ascribed to given scenarios affects judgment (Greene et al., 2001), reasoning (Fiddick, 2004), and decision making (Mandel & Vartanian, 2008). Our Study 2 involves a specifically moral task, and so it is necessary to take account of individual variation in how morally charged the participants perceive the different scenarios to be. We do this by measuring participants' moral conviction—the degree to which their attitudes about each resource under consideration are distinctly moral (Skitka, Bauman, & Sargis, 2005)—and testing it as a possible moderator of the effect of individual versus group construal on drop-in-the-bucket thinking.

One possibility is that participants who attach greater moral conviction to a given scenario will be more strongly influenced by group versus individual construal when making moral judgments about that scenario. This possibility is suggested by another line of research on decisions involving "protected" or "sacred values" (i.e., resources for which people tend to reject tradeoffs on moral grounds; Baron & Spranca, 1997; Tetlock et al., 2000), which has found that participants who

ascribe greater moral relevance to an issue are more sensitive to task characteristics when they are forced to make tradeoffs between competing moral demands (Bartels, 2008; Iliev et al., 2009). And, of course, for participants who see little or no moral relevance in a given scenario, we might expect moral judgments to have little or no meaning, and this too will be important to take into account.

Method

Participants

Fifty undergraduates participated for course credit.

Materials & Design

Participants proceeded through Steps 1-4 as in Study 1, but Steps 5-6 differed as follows:

(5) With the end-state depictions of Program A and Program B on screen, the dependent measure for Study 2 appeared at the bottom of the screen: "Choosing to implement Program A (instead of Program B)." Participants registered their responses by moving a slider any point along a continuum from –100 ("Morally forbidden") to +100 ("Morally obligatory"), and clicking "Continue". Participants then made the same judgment for Program B (instead of Program A).

(6) After responding to the five scenarios, participants' moral conviction was assessed for each of the five resources referred to in the scenarios. Participants were presented with a topic—"Threat of potential harm to (resource)"—and rated agreement with the statement "My attitude about this topic is closely related to my core moral values and convictions" on a scale ranging from -100 ("Strongly disagree") to +100 "Strongly agree".

Note that in step 5 we asked for two judgments for each scenario: one in which Program A was foregrounded and another in which Program B was foregrounded. One might expect these two judgments to be redundant; for example, if choosing Program A instead of Program B is morally obligatory, then one might expect that choosing Program B instead of Program A is morally

forbidden to just the same degree. But, of course, this requires that the participant truly believe that the two programs are mutually exclusive, and it was to make this point clear that we asked for both judgments. Also, there was the possibility that foregrounding just one program and relegating the other to an "instead of" phrase might affect results in some unintended and uninteresting way, and to wash out any such effects we averaged the rating given to the proportion-maximizing action (e.g., save 14 of 17) and the complement of the rating given to the absolute-number-maximizing action (e.g., save 15 of 175). If the two judgments were in fact redundant, then this averaging would have no impact on our analysis; however, if judgments did reflect some artifact of foregrounding one program at the expense of the other, then averaging would be expected to remove this effect from analysis. The resulting measure of drop-in-the-bucket thinking ranged from –100 (meaning that saving the greater absolute number was morally obligatory and saving the greater proportion forbidden) to +100 (meaning that saving the greater proportion was morally obligatory and saving the greater absolute number forbidden).

Results & Discussion

We analyzed the results for all scenarios combined and for each scenario separately. For the overall analysis, each participant's scores on the five items were averaged to yield a single composite score for each participant.

As predicted, participants in the individuals condition exhibited less drop-in-the-bucket thinking (M = -13.22, SD = 35.57) than participants in the group condition, (M = 9.07, SD = 34.83, $t(48) = 2.23$, $p < .05$, $\eta_p^2 = .09$). Also as expected, this difference is moderated by moral conviction. To test for moderation by moral conviction, we ran multiple regressions predicting drop-in-the-bucket thinking by individual/group construal, our continuous measure of moral conviction, and the interaction of these factors for the scenarios combined and for each scenario separately. As seen in

Table 2, the effect of independent versus joint motion on drop-in-the-bucket thinking is qualified by a reliable or marginally reliable interaction with moral conviction for each scenario and for the scenarios combined (bottom row). We show this interaction in Figure 2 by plotting the effects of group and individual construal on estimated drop-in-the-bucket thinking at plus and minus one standard deviation from the mean of moral conviction.

Participants higher in moral conviction — i.e., those who agree more with the statement "this topic strongly relates to my core moral convictions" — exhibit less drop-in-the-bucket thinking than those lower in moral conviction in the individuals condition, but the reverse holds for the groups condition. In other words, people with a high degree of moral conviction give greater weight to absolute considerations than do people with low moral conviction when the individuality of those threatened is highlighted. But they also give greater weight to relative considerations when the groupness of those threatened is highlighted. In contrast, we find a greatly diminished effect of independent versus joint motion on the judgments of participants who afford less moral relevance to the decision; those who see less moral relevance in the decision are less compelled to judge either action to be morally forbidden or morally obligatory in either condition. The greater sensitivity to the task for participants higher in moral conviction is consistent with other research showing that people who ascribe greater moral relevance to a situation are more influenced by task characteristics that shift attention between attributes involved in a tradeoff than are people for whom the situation is not morally relevant (Iliev et al., 2009).

In sum, the findings of Study 2 extend the results of Study 1 into the moral domain. Construal of resources as groups (versus individuals) causes those participants who assign moral relevance to the resources to preferentially weight relative (versus absolute) considerations in moral

judgment. To put it more simply, in cases where morality is at stake, group versus individual construal is a driver of drop-in-the-bucket thinking.

General Discussion

When decisions or evaluations permit both relative and absolute considerations, the weights given to these considerations depend on the degree to which resources are construed as groups versus individuals. Unger (1996) suggested that presenting a life as belonging to a smaller reference group reduces drop-in-the-bucket thinking. Our studies demonstrate a related point, that when the size of a reference group is fixed, drop-in-the-bucket thinking and proportion dominance are reduced when its members are construed more as individuals and less as a group.

Our approach to proportion dominance offers a new perspective on the phenomenon. Baron (1997) saw proportion dominance as a manifestation of a more general tendency to confuse relative and absolute quantities. Fetherstonhaugh et al. (1997) suggested that proportion dominance is attributable to a psychophysical mechanism that underlies analogous effects in perception. Our framework, in which construal influences PD, makes more detailed predictions about why and how strongly proportion dominance should appear. The current account also suggests a way of discouraging proportion dominance in situations where it is undesirable: Promoting construal of resources as individuals should increase the weight given to absolute considerations.

Groupness versus Individuality in Cultural and Social Psychology

The notion of group versus individual construal has appeared in various forms in several areas of psychology. As we noted earlier, our use of animated displays to manipulate construal afforded experimental control, but at the expense of naturalness. Yet the ways in which group versus individual construal has appeared in other areas of psychology suggest how construal may influence decision making and moral judgment in more natural settings.

Several studies in social psychology have examined factors that promote entitativity (e.g., Brewer, Weber, & Carini, 1995) and the consequences of entitativity for memory of, and thinking about, social entities (for a review, see Hamilton & Sherman, 1996). For example, perceived entitativity influences how people explain traits (Haslam et al., 2000) and behaviors and intentions (Brewer et al., 2004). Most relevant to the current paper are findings that perceivers see greater entitativity in out-groups (Wilder, 1981), minority groups, and groups with whom the perceiver has a competitive relationship (Brewer et al., 1995). Given our current work, we expect that people would show greater proportion dominance or drop-in-the-bucket thinking in decisions concerning members of out-groups, minority groups, and competing groups.

Group versus individual construal has also appeared in cultural psychology, as holistic versus analytic cognition (Nisbett et al., 2001), interdependent versus independent self-construal (Markus & Kitayama, 1991), and collectivism versus individualism (Hofstede, 1980). Very broadly speaking, this work suggests that cultures emphasize groupness/interconnectedness versus individuality to different degrees. Given our current work, one might expect that cultural differences in construal should lead to corresponding differences in proportion dominance or drop-in-the-bucket thinking.

Differences Between Human Lives and Non-Human Lives

There may also be tendencies to construe different types of resources differently, and these may influence decision making and moral judgment. Using scenarios involving both human and non-human lives at risk, Bartels (2006) found that nearly half of participants exhibited proportion dominance, preferring to save a greater proportion, even though this meant saving fewer lives. This was an overall result, but, when participants were asked to reflect on the strategy they had employed in making their decisions, an interesting difference emerged between scenarios in which human

lives were at stake and scenarios involving non-humans. Whereas most participants felt that absolute savings should in general be maximized, they endorsed this strategy more strongly for problems involving human lives than for other problems (for example, involving sea otters).

Other explanations of proportion dominance that we have reviewed—the confusion account (Baron, 1997) and the psychophysical numbing account (Featherstonhaugh et al., 1997)—cannot easily account for such differences among content domains. There is no clear reason why confusion of relative and absolute quantities should be greater in some content domains than in others. Nor is there a clear reason why psychophysical numbing, which by definition is so general as to occur both in perception and in higher-order cognition, should be more pronounced for some types of content than for others.

Our account, however, provides an intuitive explanation for the difference between human lives and non-human lives: Participants in Bartels (2006) may have tended to construe humans as individuals and therefore focused on absolute considerations; they construed nonhumans as more group-like and thus gave greater weight to relative considerations.

Note that we did not observe a difference between human and non-human lives in the current work[2], but this is not surprising. These experiments were not designed to detect such an effect, and indeed it seems quite plausible that our active manipulation of individual versus group construal overwhelmed any preexisting tendency participants may have had to apply a more individual construal to human lives than to non-humans. But these experiments have provided strong support for our cognitive account of proportion dominance and drop-in-the-bucket thinking. This account, in turn, can explain the difference between human and non-human lives on the assumption that participants tend to construe humans more individualistically than non-humans. We leave it to future work to further examine this idea.

Relation to Research on the Identifiable Victim Effect

The first empirical investigation of the "identifiable victim effect"—the tendency for identifiable victims to elicit greater aid than is given for statistical victims—tested several possible explanations and concluded that identifiable victims receive more aid because they comprise a large proportion of the group perceived to be at-risk (Jenni & Loewenstein, 1997). In the extreme case, a single identifiable victim is its own reference group of size one. More recent research, however, has taken an *affect-based* approach, arguing that the effect is due to the greater sympathy elicited by an identifiable (as opposed to anonymous) victim (Kogut & Ritov, 2005a; 2005b; 2007; Slovic, 2007; Small & Loewenstein, 2003; 2007; Small, Loewenstein, & Slovic; 2007). We have offered a "colder" account of proportion dominance that is more closely aligned to the original explanation of this effect, but we believe that the identifiable victim effect (like proportion dominance) is multiply-determined, and we allow that these two kinds of approaches may be complementary, each focusing on a different level of analysis (e.g., perhaps we have provided a characterization of the appraisal mechanisms that govern some kinds of sympathetic responses).

Moral Judgment and Decision Making

Finally, people's *moral judgments* exhibit a version of proportion dominance. Study 2 suggests that when people are induced to think about groups (i.e., "the bucket"), the moral weight afforded to individual lives saved (i.e., "the drops") is reduced, inducing drop-in-the-bucket thinking. Participants induced to think about resources as a collection of individuals, instead, exhibited less drop-in-the-bucket thinking—these preferences were more consistent with utilitarianism.

Further, the effect of group versus individual construal is greatest for participants who think of the choice situation as *especially* morally relevant. In fact, Study 2 finds nearly identical response

patterns across experimental conditions for participants who afford less moral relevance to the decision. But participants who ascribe moral relevance to the situation indicate preferences both *less* consistent with utilitarianism (in the groups condition) and *more* consistent with utilitarianism (in the individuals condition). One might have expected that moral judgments are more rigid than mundane decisions (cf. Baron, 1994; Sunstein, 2005)—and therefore less susceptible to cognitive effects of the sort we have demonstrated in this paper. Yet our results and other recent findings (Bartels, 2008) suggest that, in fact, moral preference is often more flexible, or more variable across contexts than is mundane preference.

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Footnotes

[1] Following others' definitions (Goodin, 1993, p. 242; Kagan, 1998, p. 52), utilitarianism requires summing welfare over individuals, counting each equally, and requires treating individual lives as fungible for each other. Thus, in the choice contexts studied here, utilitarianism implies that groups are meaningless units of analysis and dictates that one choose the alternative that saves the greater number of individuals. See DeKay and Kim (2005) for an exploration of whether and when outcomes are summed over individuals and Bloomfield (2008) for an investigation of how treating groups as meaningful units of analysis affects risk preference.

[2] Analyses comparing the effect of independent and joint motion on the average proportion dominance exhibited for scenarios involving humans (Anthrax and Zaire) to its effect on average proportion dominance exhibited for scenarios involving natural resources (Otters, Paper, and Tuna) suggest that both kinds of scenarios respond similarly to individual versus group construal in Studies 1 and 2. Two 2 x 2 mixed-model ANOVAs using condition (individual vs. group construal) as a between subjects factor and scenario type (human vs. natural resources) as a repeated measures factor find only a main effect of condition in each study ($F(1,28) = 6.05$, $p < .05$, $\eta_p^2 = .18$ in Study 1; $F(1,48) = 4.73$, $p < .05$, $\eta_p^2 = .09$ in Study 2) and no significant effects for scenario type or for the interaction term (Fs ≤ 1.05, ps $> .10$).

Table 1

Effects of Group vs. Individual Construal on Proportion Dominance in Policy Preference in Study 1.

	Proportion Dominance			
	Group	**Individual**	***t*(28)**	η_p^2
Anthrax	0.61	0.35	2.29*	.16
Otter	0.47	0.35	< 1	
Paper	0.61	0.36	2.23*	.15
Tuna	0.51	0.26	2.08*	.13
Zaire	0.59	0.39	1.64	.09
Ps' Avg's	0.56	0.34	2.42*	.17

* = $p < .05$

Table 2

Effects of Condition, Rated Moral Conviction, and Their Interaction on Drop-in-the-Bucket Thinking in Moral Judgment in Study 2.

	Group-Individual		**Conviction**		**Interaction**	
	β	**(*SE*)**	***β***	**(*SE*)**	***β***	**(*SE*)**
Anthrax	-14.84*	(5.87)	-0.09	(0.15)	-0.31*	(0.15)
Otter	-7.24	(5.44)	-0.07	(0.13)	-0.28*	(0.13)
Paper	-14.74**	(5.15)	0.03	(0.11)	-0.26*	(0.11)
Tuna	-14.35*	(6.07)	0.08	(0.14)	-0.34*	(0.14)
Zaire	-3.44	(5.86)	-0.14	(0.18)	-0.37†	(0.18)
Ps' Avg's	-10.63*	(4.55)	-0.11	(0.14)	-0.46**	(0.14)

** = $p < .01$

* = $p < .05$

† = $p < .10$

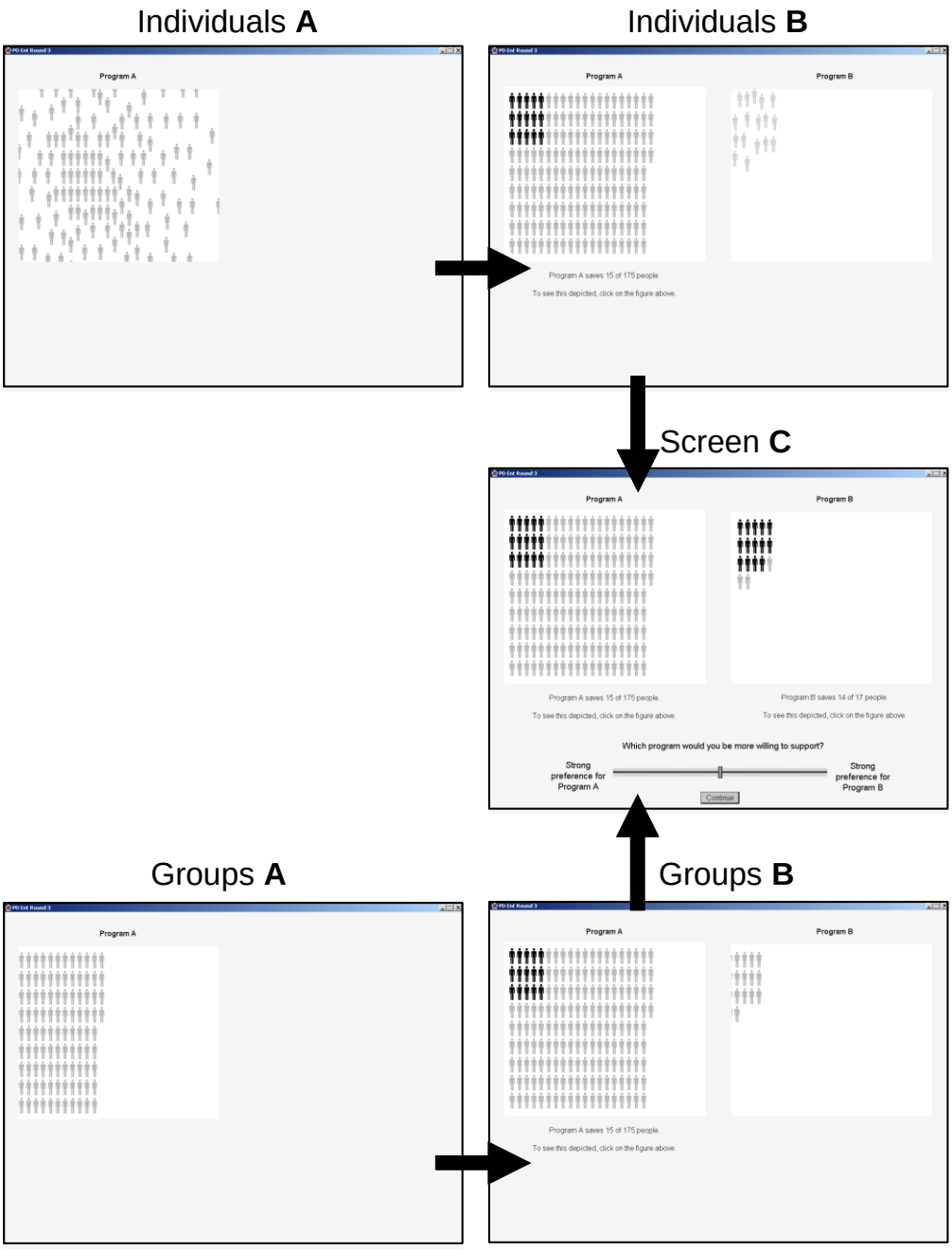

Figure 1. Displays presented to participants in the two conditions

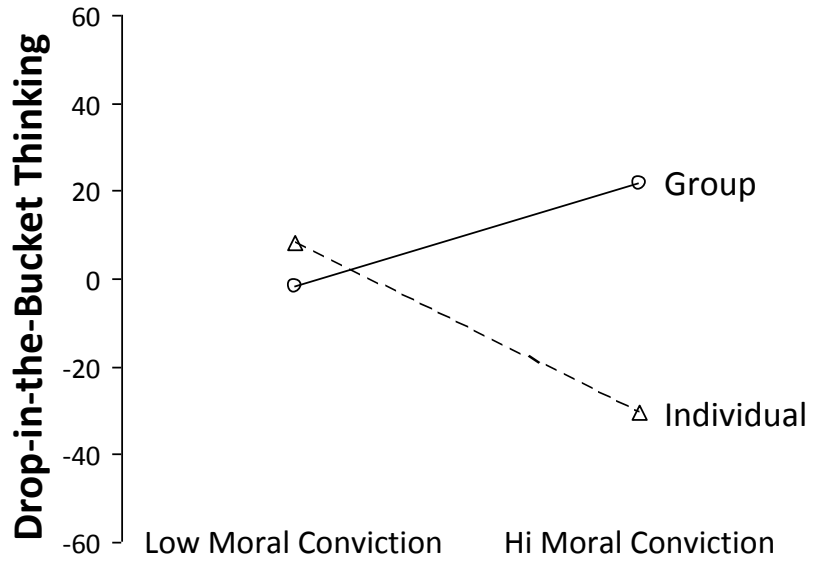

Figure 2. Drop-in-the-Bucket Thinking by Condition (Group or Individual Construal) and Rated Moral Conviction in Study 2. Low is one standard deviation below the mean; high is one standard deviation above the mean.

Appendix

Scenarios

Anthrax. Anthrax powder has been weaponized and released into the air above two mid-sized cities. In each city, a number of people are expected to die as a result of anthrax inhalation. There exists a powerful antibiotic that will successfully treat some victims, but there is a limited amount of this treatment. Program A would delegate the treatment to City A, and 15 of the 175 at risk of death will be saved. Program B would delegate the treatment to City B, and 14 of the 17 people at risk of death will be saved. These programs are mutually exclusive and the only two options available.

Otters. An oil spill around Puget Sound is threatening the sea otter populations in two areas of the bay. Two cleanup plans are proposed, but there is only enough money to support one plan. So, there are only enough resources to save otters in one of these areas of the bay. Program A will save 24 of the 171 otters near the north end of the bay. Program B will save 22 of the 26 otters near the south end of the bay. These programs are mutually exclusive and the only two options available.

Paper. You are on a committee at a major paper company with two factories on a mid-sized river. These factories use water from the river to cool their machines. Once used, the water is exhausted back into the stream. This polluted water causes a number of fish to die every year near the factory from which it is exhausted. Filters can be installed that will save a number of fish, but filter installation is expensive, and there is only enough money in the budget to install filters at one factory. Program A filters the water exhausted from Factory A, resulting in the prevention of 25 of the annual 182 fish deaths due to pollution. Program B filters the water exhausted from Factory B, preventing 24 of the annual 39 fish deaths due to pollution. These programs are mutually exclusive and the only two options available.

Tuna. Two areas off the southeast coast of Florida are heavily populated with dolphins and tuna. Tuna fishermen accidentally catch a number of dolphins in these areas every year. Dolphins that get caught in the tuna nets drown, because they cannot surface to breathe. To combat this problem, new nets have been designed that will save a number of dolphins. The tuna fishing industry has agreed to fish with the new nets in only one of these two areas. Program A would require boats in Area A to use a different type of net, which would save 15 of the 28 dolphins that die in that area each year. Program B would require boats in Area B to use a different type of net, which would save 13 of the 17 dolphins that die in that area each year. These programs are mutually exclusive and the only two options available.

Zaire. Recent political developments in Zaire have severely marginalized some of the population. These refugees are clustered about in two camps, struggling to survive, because very little clean water is available. A plane with water treatment capabilities will be sent. There is only enough fuel, supplies, and time to visit one camp. Program A would treat enough water to save 24 refugees in the camp of 176. Program B would treat enough water to save 22 refugees in the camp of 26. These programs are mutually exclusive and the only two options available.