Interindividual-Intergroup Discontinuity in the Prisoner's Dilemma Game: How Common Fate, Proximity, and Similarity Affect Intergroup Competition

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Abstract

In two experiments with the PDG we manipulated the Campbell (1958), or Wertheimer (1923), indices of entitativity (common fate, proximity, and similarity) to examine when a set of individuals interacts with another set of individuals in the competitive manner that is characteristic of group-on-group interactions. Experiment 1 found that interactions between two 3-person sets were more competitive when participants within each set shared (versus did not share) common fate. In Experiment 2, the Wertheimer-Campbell indices were manipulated for one 3-person set only (targets). Participants in the other 3-person set were sequestered in separate rooms (observers). Observers as well as targets were more competitive when targets shared (versus did not share) common fate. Path analyses in both experiments supported the idea that common fate increases competition via increased own-set entitativity and subsequent greed, and via increased other-set entitativity and subsequent fear. We found no consistent evidence for the possible roles of proximity and similarity.

According to Matt Ridley, "broadly speaking any situation in which you are tempted to do something, but know it would be a great mistake if everybody did the same thing, is likely to be a prisoner's dilemma" (1996, pp. 55–56). An everyday example relates to being honest versus cheating. Other examples relate to overwhaling, overfishing, pollution of the air, pollution of the water, and conservation of water during a drought. These latter examples, which may involve more than two people and may provide more than two choices (e.g., how much water to save and not just whether to save or not to save water), are often labeled *social dilemmas.* William Poundstone (1992, p. 123) maintains that recognition of the tension between self-interest and the common good has been widespread. He supports this assertion by citing numerous historical exhortations similar to the "golden rule" as stated in the Bible in Matthew 7:12, "In everything, do to others what you would have them do to you." The conflict between self-interest and the common good only became the subject of systematic research, however, after two mathematicians at RAND Corporation, Merrill Flood and Melvin Dresher (1952), cast it in the form of a 2 x 2 outcome matrix. The matrix was specifically created to provide an empirical test of mathematician John Nash's concept of an equilibrium point, developed in his 1950 dissertation at Princeton University (see Colman, 1995, pp. 58–61; Nasar, 1998, pp. 115–122). The Flood and Dresher matrix was subsequently labeled the *prisoner's dilemma game* (PDG) by Albert Tucker, Nash's advisor at Princeton in 1950.

Interindividual—Intergroup Discontinuity

The PDG has spawned a voluminous empirical literature (for recent meta-analyses, see Balliet, 2010; Balliet, Mulder, & Van Lange, 2011). An overwhelming majority of PDG studies have investigated interindividual interactions (i.e., interactions between individual players). A notable exception to this general pattern is the research program on *interindividual—intergroup discontinuity* (Schopler & Insko, 1992; Wildschut & Insko, 2007). This research has found that when the PDG is played between two groups, there is frequently, but not always, more competition than there is between individuals. John Thibaut originally labeled this phenomenon a *discontinuity effect,* based on Roger Brown's (1954) statement that "the quality of mob

behavior has always required explanation because of its apparent discontinuity with the private characters of the individuals involved" (p. 843). Although the discontinuity effect has been studied predominantly in the context of mixed-motive games involving North-American participants, it has also been documented in non-laboratory contexts (Pemberton, Insko, & Schopler, 1996), in a context where the PDG matrix was substituted by a functionally equivalent set of rules governing the exchange of folded origami products (Schopler et al., 2001, Experiment 1), and among both Dutch (Wildschut, Lodewijkx, & Insko, 2001) and Japanese (Takemura & Yuki, 2007) participants.

A complete understanding of social dilemmas requires careful consideration of the differences between interindividual and intergroup interactions because basic 'laws' identified by social dilemma research operate differently in interindividual and intergroup contexts. For instance, the well-known beneficial effect of reciprocal strategies (e.g., TIT FOR TAT) on cooperation (Axelrod, 1984) is amplified in intergroup (compared to interindividual) interactions (Insko et al., 1998; Wildschut, Pinter, Insko, Vevea, & Schopler, 2003). By contrast, the robust beneficial effect of communication on cooperation (Balliet, 2010) is amplified in interindividual (compared to intergroup) interactions (Insko et al., 1993; Wildschut et al., 2003). According to the fear and greed perspective on the discontinuity effect, these empirical findings are compatible with two key postulates: (1) that interacting with a group increases fear, or a concern that the other side is hostile and competitive, and (2) that acting as a group increases greed, or a concern with maximizing self-interest (Schopler & Insko, 1992; Wildschut & Insko, 2007; Wildschut, Insko, & Pinter, 2007).[1] Careful consideration of the differences between interindividual and intergroup interactions is also important from a more pragmatic, socially relevant reason; it may provide insight into why intergroup conflicts are frequently more destructive, protracted, and intractable than are conflicts between individuals. The main goal of the present research, then, was to address a foundational, yet unanswered question pertaining to interindividual—intergroup discontinuity: when does a set of individuals interact with another set of individuals in the competitive manner that is characteristic of group-on-group interactions?

The Wertheimer-Campbell Indices of Entitativity

Our point of departure is Campbell's (1958) influential treatise on the perception of social groupings. Campbell coined the term "entitativity" to refer to the perception of an aggregate of singular individuals as a group or entity. He focused on three of Wertheimer's (1923) factors determining the extent to which objects are perceived as an organized figure (i.e., "Gestalt"). The selected factors were common fate, or covariation, proximity, and similarity. Consider the simple example of a mountaineer peering up from the valley floor at the boulders on a mountain. According to the Wertheimer perspective, these singular boulders will be seen as one figure to the extent that they are similar in color (similarity), close together (proximity), or are rolling down the mountain in a landslide (common fate). Campbell's discussion is historically interesting because it explicitly links the Gestalt perspective on perception to the enduring social-psychological issue as to what changes the perception of an aggregate of individuals to the perception of a single entity. This perceived entitativity of social aggregates, we propose, provides a key to understanding when interactions between two (or more) sets of separate individuals acquire the competitive characteristics of group-on-group interactions.

Campbell (1958) particularly emphasized the importance of common fate—perhaps because this is the only one of the three indices that involves change. For this or some other reason, Campbell believed that similarity was less important than common fate: "… for human social groupings, the boundaries drawn by similarity seem somewhat secondary to those based upon common fate" (1958, p. 20). He also considered proximity to be the least important of the three factors: "Contemporaneous spatial contiguity of particles seems still less 'essential' than either common fate or similarity as a cue for entity" (1958, p. 22).

There are numerous instances of common fate in addition to the above example of a landslide of boulders: the sun-circling asteroid belt, a migrating flock of birds, a moving herd of buffalo, parading soldiers, a marching band, and so on. All of these examples involve physical movement, but Campbell (1958) explicitly emphasized that common fate need not involve the actual physical movement of objects but could more generally involve co-variation: "The

essence of the common fate coefficient is co-variability in time and other variable parameters such as activity level, temperature, reflected light, morale, hedonic tone, nutritional status, etc. could be emphasized" (1958, p. 19). Such a broad conceptualization is, for our present purposes, particularly important because it allows for flexibility when manipulating common fate. In the present research we have operationalized common fate, or "co-variability," as simultaneous voting for a PDG choice. We believe that such "co-variability" is the essence of what Campbell and Wertheimer (1923) meant by common fate.

Others (e.g., Kramer & Brewer, 1984; Bornstein, 1992) have sometimes operationalized common fate as a common outcome. Note, however, that a careful reading of Campbell (1958) suggests that common fate was not just common outcomes (rewards or costs). This point becomes particularly obvious when it is recognized that Campbell was following Wertheimer (1923) in conceptualizing common fate as co-variability among objects that produce the perception of entities, or figures, and objects when they are inanimate do not have rewards or costs. We argue below, however, that implicit in Campbell's discussion of similarity and common fate is that these indices become more influential determiners of entitativity to the extent that they imply consequences and certainly outcomes are consequences. We do not mean to imply that an emphasis on common rewards and costs is not a possible, or important, perspective on entitativity, but simply point out that the present research focuses on testing the more explicit Wertheimer-Campbell perspective of co-variability.

The key objective of the present research was to examine the role of the Wertheimer-Campbell indices in producing the discontinuity effect. In a sense, the present research was guided more by a question concerning the possible effects of the three Campbell indices than specific hypotheses regarding their relative strengths. However, we clearly did expect and hypothesize effects for common fate on outgroup entitativity (the perception that an aggregate of other individuals is a group), ingroup entitativity (the perception that "I" and others are a group), fear, greed, and competition. Beyond that, we hypothesized that both outgroup entitativity and ingroup entitativity would be associated with competition, but that there would be different

associations of outgroup entitativity and ingroup entitativity with fear and greed. To be precise, we hypothesized that outgroup entitativity would be associated with fear (and not greed), and ingroup entitativity would be associated with greed (and not fear).

Why did we assume that outgroup entitativity would be associated with fear? We have an abundance of evidence that when either an individual or a group interacts with a group (as compared to another individual) there are associated beliefs or perceptions that groups are competitive, untrustworthy, and abrasive. Evidence for such differential distrust of groups and individuals comes from both laboratory and non-laboratory studies (for reviews, see Insko & Schopler, 1998; Wildschut & Insko 2007; Wildschut, Insko, & Pinter, 2004). For example, in a diary study, Pemberton, Insko, & Schopler (1996) found that people, whether alone or in a group, experienced interactions with other groups as more abrasive than interactions with other individuals. They also found that these experienced differences were accentuated in memory, such that when they were later recalled, the relative abrasiveness of interactions with other groups was magnified.

Why did we assume that ingroup entitativity would be associated with greed? We have an abundance of evidence that interacting in a group increases competitiveness by providing a cloak of anonymity, providing a potential source of social support, making salient a norm of group interest, and enabling group members to rationalize their competitiveness as being enacted for the sake of the group (see Wildschut & Insko, 2007 for a review and discussion of the evidence). For example, support for the importance of a norm of group interest comes from an experiment by Wildschut, Insko, and Gaertner (2002) indicating that voting by physically separated group members was more competitive when they anticipated meeting to discuss their votes than when they anticipated being individually dismissed**.**

Existing Research on Entitativity

Campbell's (1958) analysis has stimulated research on a diverse set of questions (Hamilton, 2007; Yzerbyt, Judd, & Corneille, 2004). Much of this research has focused on the role of perceived entitativity in the formation, maintenance, and modification of group

stereotypes (e.g., Hamilton & Sherman, 1996), and on the nature and causes of individual and cultural differences in perceptions of entitativity (e.g., Kashima et al., 2005). For our purposes, however, the most relevant evidence comes from three additional strands of inquiry. The first strand has examined how different properties of social groups explain variation in perceived entitativity (Castano, Yzerbyt, & Bourguignon, 2003; Hamilton, Sherman, Lickel, & Thakkar, 2010; Dasgupta, Banaji, & Abelson, 1999; Ip, Chiu, & Wan, 2006; Lickel, Hamilton, Wieczorkowska, Lewis, Sherman, & Uhles, 2000). Lickel et al. (2000), for instance, found evidence for five variables that related to increases in laypersons' rated entitativity of social groups: perception of interaction, common goals, common outcomes, similarity, and the importance of the group. Their findings corroborated Campbell's (1958) emphasis on common fate as an important antecedent of perceived entitativity, although similarity also played a role. Studies in this category, however, did not examine how variation in common fate, similarity, or proximity influences intergroup behavior. In fact, nearly all extant research on entitativity has focused on perceptions and judgments of groups rather than on how entitativity (or cues to entitativity) influences actual behavior within and between groups (Hamilton, Chen, & Way, 2011). An exception, however, is Gaertner, Iuzzini, and O'Mara (2008) who found that victims retaliated more aggressively against groups that were high rather than low in perceived entitativity. The present research, like Gaertner et al., included a behavioral measure, and further assessed possible motivations linking entitativity to behavior.

The second strand of relevant research has examined the impact of entitativity on ingroup bias and intergroup discrimination (Brewer & Kramer, 1986; Castano, Yzerbyt, Paladino, & Sacchi, 2002; L. Gaertner, Iuzzini, Witt, & Oriña, 2006; L. Gaertner & Schopler, 1998; S. L. Gaertner et al., 1989; Kramer & Brewer, 1984; Wit & Kerr, 2002). Most studies in this category implemented manipulations of entitativity, that is, created manipulations that simultaneously varied multiple Wertheimer-Campbell indices. L. Gaertner et al. (2006, Experiment 1), for example, had participants rank order items in terms of their usefulness for surviving a winter storm (winter survival task; Johnson & Johnson, 1975). In one condition, group members were

seated in separate cubicles and completed the task individually. In another condition, group members were seated in the same room and completed the task together. This manipulation thus varied simultaneously proximity and common fate. Results showed that completing the task together in the same room (compared to completing it individually in separate rooms) gave rise to greater perceived ingroup entitativity and more positive ingroup evaluation. Studies in this category have provided compelling evidence for a link between ingroup entitativity and ingroup bias. They did not, however, manipulate independently the Campbell indices and therefore could not identify their unique or synergistic contributions.

The third strand of research consists of a series of studies on the discontinuity effect that provided evidence for the importance of a consensus rule or 'procedural interdependence' in producing both the discontinuity effect and a shift in perceived entitativity (Insko et al., 1987; Insko et al. 1988; Wildschut et al., 2001). These studies are relevant to the Wertheimer-Campbell indices because when group members change from individual preferences to a consensus, they are manifesting a type of common fate. In the Insko et al. (1988) experiment, for instance, three participants on one side of an experimental suite interacted in a PDG context with three participants on the opposite side of the experimental suite. Results indicated that moving the three participants on either side of the suite into a common room did not increase competition unless they were also required to reach a consensus on a common group decision. This pattern was tracked by ratings of how strongly the other set was perceived as a group and how strongly own set was perceived as a group. Studies in this category suggest that proximity alone does not increase intergroup competitiveness but proximity combined with common fate does. However, because these studies did not manipulate independently the Wertheimer-Campbell indices, they leave open the possibility that proximity is also important and provide no direct evidence that common fate increases intergroup competitiveness in the absence of proximity.

Research Overview

Campbell's treatise on the perception of social groupings has inspired a large, yet segmented empirical literature. Our key objective for the present experiments was to craft

together the above-described strands of inquiry and, by so doing, to answer a set of important questions that cannot be addressed by each isolated strand. Our basic approach involves manipulating independently the Wertheimer-Campbell indices, examining their effects on (1) perceptions of entitativity, (2) fear and greed, and (3) competitiveness, and then testing theory-based process models linking the indices to competitiveness via perceptions of entitativity and subsequent fear and greed. We tested these process models mindful of the fact that they cannot determine the causal sequence of measured variables but can provide evidence that is at least consistent with a postulated sequence (Fielder, Schott, & Meiser, 2011).

In both experiments, the sessions involved six participants, with three participants seated in separate rooms on opposite sides of a laboratory suite. In Experiment 1, we manipulated common fate and proximity for participants on each side of the laboratory suite. In Experiment 2, we manipulated all three indices for participants on only one side of the suite. We refer to these three participants as the targets, and to the participants on the opposite side of the suite as observers. The observers always remained in separate rooms and always made individual decisions. Our intent in Experiment 2 was to model the Wertheimer-Campbell perspective in which there are observers of a number of targets (objects or persons) that vary in terms of their common fate, proximity, and similarity.

Experiment 1

Experiment 1 had two key objectives. First, we tested whether common fate alone can make two sets of individuals interact with each other in the competitive manner that is characteristic of group-on-group interactions in the prisoner's dilemma game, or whether competition is increased only when common fate and proximity are juxtaposed. Existing research indicates that common fate is important but leaves open the possibility that its effect on competition is contingent on proximity (Insko et al. 1987; Insko et al. 1988; Wildschut et al., 2001). The second key objective was to test if common fate and proximity can be linked to competitiveness via perceptions of other-set entitativity and subsequent fear, and via perceptions of own-set entitativity and subsequent greed.

Similarity was not examined in Experiment 1 because manipulating similarity among participants within each set would produce a complexity regarding the similarity between sets. However, Experiment 2 altered the Wertheimer-Campbell indices for one side only, and in that experiment all three indices were examined. We return to this issue in the discussion section for Experiment 1.

Method

Participants and design. Two hundred and fifty (128 female) University of North Carolina at Chapel Hill undergraduates participated for course credit. The experiment used a Common Fate x Proximity between-participants design with gender as an additional independent variable. Sessions involved two sets of three participants (all of the same gender) seated on opposite sides of a laboratory suite. Common fate was manipulated by having the three participants within each set make individual decisions or decisions based on a majority vote. Proximity was manipulated by locating the three participants within each set in different rooms or in the same room. Because participants did not actually interact with each other, they were treated as separate units of analysis.

Procedure. Participants signed informed consent forms and drew numbered cards (1-6) to determine their room assignment. The number on the card designated membership in one of two 3-person sets. The 3-person sets were seated on opposite sides of the laboratory and each participant was yoked to a person in the opposite set for the purpose of the PDG interaction. In the *low-proximity* condition, participants in each set were seated in separate rooms on either side of the laboratory suite. In the *high-proximity* condition, participants in each set were seated in the same room and instructed not to talk to each other. Next, participants received a copy of the PDG matrix (parameters: $T = 205$, $R = 160$, $P = 100$, $S = 55$; Rapoport & Chammah, 1965) and instructions relevant to the common fate manipulation. In the *low-common-fate* condition, participants were instructed that they would make individual choices. In this condition, participants' outcomes were determined by combining their individual choice with the choice of the person to whom they were yoked. In the *high-common-fate* condition, participants were

instructed that they would make individual choices, but that a majority rule would be used to combine these choices into a collective choice for their 3-person set. In this condition, participants' outcomes were determined by combining the majority choice of their 3-person set with that of the other 3-person set. Participants were told that they would interact for one trial with the person to whom they were yoked. Participants then practiced using the PDG and had their exercises individually corrected by the experimenter. Participants were instructed that the matrix values represented money (US ¢) that they would be allowed to keep at the end of the study.

Because much intergroup interaction involves at least some intergroup communication, participants were instructed to send a note to their opponent before beginning the PDG trial. Also, in a one-trial situation in which there is no feedback before the choice, the exchange of notes may make the interaction seem less abstract and more meaningful. As in previous research (Cohen, Wildschut, & Insko, 2010; Wildschut et al., 2007), these participant-generated notes were switched surreptitiously with prepared notes that indicated a proposal to select the cooperative X choice (e.g., "Let's choose X"). The reason for so doing was that, when individuals and groups communicate, they typically (but not always) propose to cooperate (Insko, Schopler, Drigotas, Graetz, Kennedy, Cox, & Bornstein, 1993). By holding note content constant, participants could be treated as independent observations. We used slightly different versions of the prepared notes to avoid any potential problem from overseen notes in the high-proximity condition. After receiving the supposed note from their opponent, participants recorded a PDG choice. They then completed a questionnaire assessing perceptions of entitativity and choice reasons. Finally, they received their earnings (for participants in the high-common-fate condition the majority vote was implemented as announced) and were debriefed.

Dependent variables. The main dependent variable was the competitive (or noncooperative) PDG choice (0 = *cooperation*, 1 = *competition*). In addition, there were a number of questionnaire assessments relating to perceived entitativity and choice reasons. The initial part of the questionnaire assessed the perceived entitativity of both sets of participants.

Participants rated (1 = *not at all*, 7 = *very much*) the extent to which participants in each 3-person set were "one group" and "separate individuals" (after S. L. Gaertner, Mann, Murrell, & Dovidio, 1989). We reversed ratings of the "separate individuals" item and then averaged the items to create composite measures of perceived own-set entitativity (α = .88) and other-set entitativity (α = .91). The next part of the questionnaire assessed choice reasons. Participants completed a 10-item questionnaire assessing five choice reasons with two items each: concern for maximizing absolute outcomes (max own; e.g., "I wanted to earn as much as possible"); concern for maximizing relative outcomes (max rel; e.g., "I wanted to earn more than the other person"); concern for minimizing the difference in outcomes between the players (min dif; e.g., "I wanted both persons to earn an equal amount"); concern for maximizing the joint outcomes of both players (max joint; e.g., "I wanted both persons to earn as much as possible together"); and fear (e.g., "I did not trust the other person because they were part of a group").[2] Items were rated on a 7-point scale (1 = *not at all*, 7 = *very much*). Reliability alphas for the five 2-item composites exceeded .74.

Results

Competition. We entered competitive choice in a Common Fate x Proximity x Gender logistic regression analysis. Relevant means are presented in Table 1. A significant main effect of common fate, $\chi^2(1, N = 250) = 12.73$, $p < .001$, indicated that there was more competition when common fate was high (compared to low). The proximity main effect was not significant, $\chi^2(1, N = 250) = 2.46$, $p = .117$, although the descriptive pattern was for high (compared to low) proximity to increase competition. The Common Fate x Proximity interaction was not significant, $\chi^2(1, N = 250) = 0.49$, $p = .485$. Finally, there was a significant gender main effect, $\chi^2(1, N = 250) = 9.38$, $p = .002$, indicating that males ($M = 0.48$, $SD = 0.50$) were more competitive than females ($M = 0.29$, $SD = 0.45$). None of the gender interactions were significant. These results indicated that common fate can make two sets of individuals interact with each other in the competitive manner that is characteristic of group-on-group interactions, and that this common-fate effect is not contingent upon proximity.

Perceived entitativity. Common Fate x Proximity x Gender analyses of variance (ANOVAs) revealed significant common fate main effects for perceived other-set entitativity, $F(1, 242) = 45.58$, $p < .001$, and for perceived own-set entitativity, $F(1, 242) = 42.86$, $p < .001$ (Table 1). High (compared to low) common fate strengthened both perceived other-set entitativity and perceived own-set entitativity. The correlation between perceived own- and other-set entitativity was high, $r(250) = .78$, $p < .001$.

Choice reasons. Common Fate x Proximity x Gender ANOVAs revealed significant common fate main effects on max rel, $F(1, 242) = 9.34$, $p = .003$, max own, $F(1, 242) = 6.50$, $p = .011$, and fear, $F(1, 242) = 17.08$, $p < .001$ (Table 1). Compared to participants in the low-common-fate condition, those in the high-common-fate condition reported more max rel, max own, and fear. The analyses further revealed significant gender main effects on max joint, $F(1, 242) = 5.51$, $p = .020$, min dif, $F(1, 242) = 8.94$, $p = .003$, and fear, $F(1, 242) = 4.08$, $p = .045$. Compared to men, women reported more max joint ($M = 4.82$, $SD = 1.99$ vs. $M = 5.41$, $SD = 1.75$) and min dif ($M = 4.05$, $SD = 1.86$ vs. $M = 4.77$, $SD = 1.81$), and less fear ($M = 2.68$, $SD = 1.57$ vs. $M = 2.30$, $SD = 1.39$).

Path analyses. There were parallel main effects of common fate on (1) competition, (2) other- and own-set entitativity, and (3) fear, max rel, and max own. The path analyses therefore focused on common fate. We tested an extended chain in which common fate is linked to competitiveness via increased other-set entitativity and subsequent fear, and via increased own-set entitativity and subsequent greed (max rel and max own). The path model is presented in Figure 1. We tested the model using Proc CALIS in SAS 9.22 with weighted least squares (WLS) estimation. Model fit was good, $\chi^2(9, N = 250) = 14.97$, $p = .092$; standardized root mean square residual (SRMR) = .06; comparative fit index (CFI) = .98; root mean square error of approximation (RMSEA) = .05 (90% CI = 00, .10). All but two paths were significant, the exceptions being the path from own-set entitativity to max own and the path from max own to competition.

Alternative models. We tested two alternative models (MacCallum, 2002). The first alternative model treated choice as antecedent to own-set and other-set entitativity. The proposed sequence thus matched the order in which dependent variables were assessed. This model examined the possibility that perceived entitativity and subsequent choice reasons were post-hoc rationalizations of choice. The second alternative model was identical to the Figure 1 model but added paths from other-set entitativity to max rel and max own, and from own-set entitativity to fear. This model thus tested the possibility that other-set entitativity can produce greed in addition to fear, and that own-set entitativity can produce fear in addition to greed. Results showed that the first alternative model had poor fit ($\chi^2[11, N = 250] = 122.24$, $p < .001$; SRMR = .21; CFI = .64; RMSEA = .20). The second alternative model, although it had good fit ($\chi^2[6, N = 250] = 9.31$, $p = .157$; SRMR = .05; CFI = .99; RMSEA = .05), did not significantly improve fit when compared to the more parsimonious Figure 1 model ($\Delta\chi^2[3, N = 250] = 5.66$, $p = .129$). We therefore retained the theory-driven Figure 1 model.

Discussion

Experiment 1 investigated whether common fate (as induced by a majority-vote) and proximity (as induced by being seated in the same room) can make two sets of individuals interact with each other in the competitive manner that is characteristic of group-on-group interactions. Results revealed that only common fate increased competition and that its effect was not contingent upon proximity. Experiment 1 also provided evidence consistent with the possibility that common fate is linked to competitiveness via perceptions of other-set entitativity and subsequent fear, and via perceptions of own-set entitativity and subsequent greed. The path via other-set entitativity and fear provides support for the postulated importance of a negative outgroup schema in producing the discontinuity effect (Insko, Kirchner, Pinter, Efaw, & Wildschut, 2005; Insko & Schopler, 1998, Pemberton et al., 1996; Wildschut, Insko, & Pinter, 2004). We regard this as important evidence for what was previously assumed but not empirically tested. The path via own-set entitativity and max rel is consistent with various explanations of the discontinuity effect that emphasize the importance of perceived group

membership in producing greed. The postulated role of perceived group membership is founded on the idea that group membership: provides a cloak of anonymity (Schopler, Insko, Drigotas, Wieselquist, Pemberton, & Cox, 1995); provides a potential source of social support for competitiveness (Insko, Schopler, Hoyle, Dardis, & Graetz, 1990; Schopler, Insko, Graetz, Drigotas, Smith, & Dahl, 1993; Wildschut, Insko, & Gaertner, 2002); makes salient a norm of group interest (Cohen, Montoya, & Insko, 2006; Pinter, Insko, Wildschut, Kirchner, Montoya, & Wolf, 2007); and enables people to rationalize competitiveness as being enacted for the sake of the group (Pinter & Wildschut, 2012). Despite the fact that each of these explanations assigns an important role to perceived own-set entitativity, this assumed role was previously not empirically tested.

Whereas prior research has found that the discontinuity effect is mediated by both a concern for maximizing outcomes in absolute terms (max own) and concern for maximizing outcomes in relative terms (max rel) (Wildschut & Insko, 2007), Experiment 1 found evidence only for a link between max rel and competitiveness when both were tested simultaneously. We return to this issue in the General Discussion but briefly note that evidence for the mediating role of max own stems from studies in which group members made public choices, which means that their choices could be identified by the other ingroup members (e.g., Insko et al., 2001). In the present experiment, this condition was not met because participants' choices always remained private.

Experiment 1 has at least one critical limitation. In keeping with previous research, we administered the experimental manipulations to both 3-person sets (Insko et al. 1987; Insko et al. 1988; Wildschut et al., 2001). Whereas this facilitates the integration of Experiment 1 findings into the existing literature, it also prevented us from simultaneously manipulating all three Campbell indices, because manipulating similarity among participants within each set would produce a complexity regarding the similarity between sets. The complexity arises because one cannot assign each set to the same level of within-set similarity (low vs. high) and hold between-set similarity constant at the same time.[3] Manipulating common fate and proximity for both sets

also confounds the levels of common fate and proximity for other-set and own-set. The high correlation between perceived other-set and own-set entitativity underscores this point, $r(250) = .78$, $p < .001$. We assume that own-set entitativity and subsequent greed flowed from own-set common fate, and that other-set entitativity and subsequent fear flowed from other-side common fate, but Experiment 1 cannot test this assumption. Related to this, the collinearity between other-set and own-set entitativity may distort conclusions regarding which (if either) of the two is redundant with respect to the other. Experiment 2 addressed these issues by manipulating all three Wertheimer-Campbell indices only for one of the two 3-person sets (referred to as targets). We thus implemented the Wertheimer-Campbell perspective in which there are observers of a number of targets who vary in terms of their common fate, proximity, and similarity.

Experiment 2

We considered separately the implications for observers and targets of manipulating the Wertheimer-Campbell indices among targets.

Observers

We examined the following key questions: First, how do the Wertheimer-Campbell indices affect competition; are observers more competitive when they interact with targets possessing greater degrees of common fate, proximity, and similarity (or combinations thereof)? Second, how do the indices affect perceived other-set entitativity; do observers perceive more other-set entitativity when targets possess greater degrees of common fate, proximity, and similarity? Third, how do the indices influence reasons for choice; do observers become more fearful when targets possess greater degrees of common fate, proximity, and similarity? Finally, can the indices be linked to competition via increased other-set entitativity (i.e., observers' perception that they are interacting with a group) and subsequent fear?

Targets

For targets, we examined a set of parallel questions: First, how do the indices affect competition; are targets more competitive when they possess greater degrees of common fate, proximity, and similarity (or combinations thereof)? Second, how do the indices affect perceived

own-set entitativity; do targets perceive more own-set entitativity when they possess greater degrees of common fate, proximity, and similarity? Third, how do the indices influence reasons for choice; do targets become greedier when they possess greater degrees of common fate, proximity, and similarity? Finally, can the indices be linked to competition via increased own-set entitativity (i.e., targets' perception that they are acting as a group) and subsequent greed?

Method

Participants and design. One hundred and seventy-four female University of North Carolina at Chapel Hill undergraduates participated for course credit. We recruited only female participants because Experiment 1 found no significant interaction effects involving gender (although we acknowledge that Experiment 1 did not examine similarity) and previous studies of the discontinuity effect have not found reliable gender effects. The experiment used a Common Fate x Proximity x Similarity between-participants design. The common fate and proximity manipulations were identical to Experiment 1 but were administered to targets only. We manipulated similarity among targets by informing them that they either shared or did not share the same artistic preference.

Procedure. Participants signed informed consent forms and drew numbered cards (1-6) to determine their room assignment. We then told participants that their artistic preferences would be assessed. The artistic-preference task was adapted from Tajfel, Billig, Bundy, and Flament (1971, Experiment 2), and provided the basis for the similarity manipulation (see below). Participants were seated in a central area within the laboratory suite and viewed pairs of slides depicting unidentified paintings (by Paul Klee, Wassily Kandinsky, and Franz Marc) and indicated their preference by circling either "Left" or "Right" on a sheet of paper. The experimenter collected the sheets and supposedly tallied the preferences.

Following the artistic-preference task, participants were assigned to their rooms according to the cards they had drawn earlier. The 3-person sets were seated on opposite sides of the laboratory and each participant was yoked to a person in the other set for the purpose of the PDG interaction. The proximity manipulation was identical to Experiment 1 but was

administered only to one of the two sets. We refer to participants in this set as targets. Participants in the other set were always sequestered in separate rooms on the opposite side of the suite. We refer to participants in this set as observers.

Next, participants received a copy of the PDG matrix (see Experiment 1) and instructions relevant to the common fate manipulation. The common fate manipulation was also identical to Experiment 1 but was only administered to targets. Observers always made individual choices. Participants next received information relevant to the similarity manipulation. As a cover story, the experimenter told participants that people are often more comfortable interacting when they know something about each other. Accordingly, participants were given a card displaying a blueprint of the experimental suite with indicated artistic preferences. In the *low-similarity* condition, target preferences were all different. Note that, whereas Tajfel et al.'s (1971) original artistic-preference task involved only paintings by Klee and Kandinsky, we added a third artist (Franz Marc) so that we could credibly inform targets in the low similarity condition that each person in their set had a different artistic preference. In the *high-similarity* condition, target preferences were all identical. Observer preferences were always indicated as "no strong preference." It is important to recognize that the similarity manipulation involved similarity among the targets only and not similarity among the yoked targets and observers. We also emphasize that observers were aware of the level of common fate, similarity, and proximity among targets.

Participants were told that they would interact for one trial with the person to whom they were yoked. They then practiced using the PDG and had their exercises corrected by the experimenter. Before beginning the PDG trial, participants sent a note to their opponent, which we replaced surreptitiously with prepared notes (see Experiment 1). After receiving the supposed note from their opponent, participants recorded a PDG choice and then completed a questionnaire assessing perceptions of entitativity and choice reasons. As in Experiment 1, participants first rated the perceived entitativity of both sets of participants. These ratings yielded reliable composite measures of own-set entitativity ($\alpha = .90$) and other-set entitativity ($\alpha = .89$).

Reflecting the fact that the Wertheimer-Campbell indices were manipulated only for targets, the correlation between other-set and own-set entitativity was much lower than in Experiment 1, $r(173) = .06$, $p = .452$.

With the exception of fear, choice reasons were assessed with the same items as in Experiment 1. To assess fear, we reverted to items used in previous research (e.g., Cohen et al., 2006; Pinter et al., 2007): "I did not trust the other person," and "I wanted to defend myself against the other person's actions." We did so because we were concerned that, although sensitive to fear flowing from other-set entitativity (footnote 2), the items used in Experiment 1 leave little room for detecting fear flowing from other sources, thereby perhaps rendering the link between other-set entitativity and fear somewhat tautological. Reliability alphas for the five 2-item composites exceeded .64. The final part of the questionnaire was a check of the similarity manipulation. Participants indicated whether targets had the same or different artistic preferences. Ninety-three percent of participants recalled this information correctly (6% incorrectly recalled that targets were similar and 1% incorrectly recalled that targets were dissimilar).

Analytic strategy. Each experimental session involved six participants, with three participants being randomly assigned to the role of target and three being assigned to the role of observer. Accordingly, role (target vs. observer) could be regarded as an additional between-subjects variable. It is important to reiterate, however, that the Wertheimer-Campbell indices were only manipulated for targets. This creates data-analytic complexities when role is included in a full factorial analysis. We found that separate analyses for observers and targets provided the clearest insight into our findings. The analyses for observers offered insight into how observers are influenced by perceiving targets possessing varying degrees of common fate, proximity, and similarity. The analyses for targets offered insight into how targets are influenced by possessing varying degrees of common fate, proximity, and similarity. Participants did not communicate with other persons in either set (exchanged notes were standardized) and, hence, participants were treated as independent observations.

Results for Observers

Competition. We entered observer competition into a Common Fate x Proximity x Similarity logistic regression analysis. Relevant means are presented in Table 2. The analysis revealed significant main effects for common fate, $\chi^2(1, N = 87) = 4.96$, $p = .026$, and proximity, $\chi^2(1, N = 87) = 5.23$, $p = .022$. Observers were more competitive when target common fate was high (compared to low) and when target proximity was high (compared to low). The proximity main effect was qualified by a significant Proximity x Similarity interaction, $\chi^2(1, N = 87) = 5.42$, $p = .020$. The interaction indicated that high (compared to low) target proximity increased observer competition when target similarity was low, $\chi^2(1, N = 42) = 8.49$, $p = .004$, but not when target similarity was high, $\chi^2(1, N = 45) = 0.00$, $p = .970$. None of the other effects in the model were statistically significant.

Perceived entitativity. We entered perceived other-set (target) entitativity in a Common Fate x Proximity x Similarity ANOVA (Table 2). Results revealed significant main effects for common fate, $F(1, 78) = 15.72$, $p < .001$, and proximity, $F(1, 78) = 15.43$, $p < .001$. Observers perceived greater target entitativity when target common fate was high (compared to low) and when target proximity was high (compared to low). Analyses further revealed a marginal Common Fate x Proximity x Similarity interaction, $F(1, 78) = 3.84$, $p = .054$. The descriptive pattern indicated that the tendency for high (compared to low) common fate to increase other-set entitativity was accentuated when similarity was high and proximity low ($M_{\text{low common fate}} = 3.39$ vs. $M_{\text{high common fate}} = 5.17$), and when proximity was high and similarity low ($M_{\text{low common fate}} = 1.96$ vs. $M_{\text{high common fate}} = 4.28$). That is, similarity and proximity accentuated the common fate effect on other-set entitativity, but these catalytic effects of similarity and proximity were not additive. Indeed, the descriptive pattern indicates that common fate was rendered less important when high similarity and high proximity were juxtaposed ($M_{\text{low common fate}} = 4.00$ vs. $M_{\text{high common fate}} = 4.50$).

An ANOVA of own-set (observer) entitativity revealed no significant effects (Table 2). This is not surprising considering that the indices were manipulated only for targets.

Choice reasons. We entered choice reasons in Common Fate x Proximity x Similarity ANOVAs (Table 2). Results revealed only a significant main effect of common fate on fear, $F(1, 78) = 5.92$, $p = .017$. Observers reported greater fear when target common fate was high (compared to low).

Path analyses. For observers, there were parallel main effects of target common fate on (1) competition, (2) other-set (target) entitativity, and (3) fear. Neither proximity nor similarity produced an equally consistent results pattern. We therefore focused path analyses on common fate. As in Experiment 1, we tested path analyses using Proc CALIS in SAS 9.22 with WLS estimation.

The path model for observers tested an extended chain in which target common fate was linked to observer competition via other-set (target) entitativity and fear (Figure 2). Model fit was good, $\chi^2(3, N = 87) = 5.09$, $p = .165$; SRMR = .076; CFI = .95; RMSEA = .09 (90% CI = 00, .22).[4] These findings are consistent with the possibility that target common fate increases observer competition because it leads observers to perceive targets as a group, which in turn creates fear. In the PDG, it is rational to compete when the other side is perceived as a threat.

Results for Targets

Competition. We entered target competition into a Common Fate x Proximity x Similarity logistic regression analysis. Relevant means are presented in Table 3. We found a significant main effect of common fate only, $\chi^2(1, N = 87) = 8.26$, $p = .004$. Targets were more competitive when common fate was high (compared to low).

Perceived entitativity. We entered perceived own-set (target) entitativity into a Common Fate x Proximity x Similarity ANOVA (Table 3). There were significant main effects for common fate, $F(1, 79) = 10.67$, $p = .002$, and proximity, $F(1, 79) = 7.42$, $p = .008$. Own-set entitativity was higher when common fate was high (compared to low) and when proximity was high (compared to low).

A Common Fate x Proximity x Similarity ANOVA of perceived other-set (observer) entitativity revealed a significant main effect of proximity only, $F(1, 79) = 7.10$, $p = .009$.

Targets perceived other-set (observer) entitativity as lower when target proximity was high than when it was low. This finding may reflect a contrast effect, such that targets used own-set entitativity as a frame of reference for judging other-set entitativity.

Choice reasons. Common Fate x Proximity x Similarity ANOVAs of choice reasons revealed only a significant main effect of common fate on max rel, $F(1, 78) = 9.53$, $p = .003$. Targets expressed greater concern for maximizing relative outcomes when common fate was high than when it was low (Table 3).

Path analyses. For targets, there were parallel main effects of common fate on (1) competition, (2) own-set entitativity, and (3) max rel. Neither proximity nor similarity produced an equally consistent results pattern. We therefore again focused our path analyses on common fate. The path model tested an extended chain in which target common fate was linked to target competition by own-set (target) entitativity and max rel. All path coefficients were significant but model fit was poor, $\chi^2(3, N = 86) = 8.97$, $p = .030$; SRMR = .11; CFI = .87, RMSEA =.15 (90% CI = .04, .27). Model fit was significantly improved by adding a direct path from common fate to max rel, $\Delta\chi^2(1, N = 86) = 4.35$, $p = .037$ (Figure 3). The fit of the modified model was good, $\chi^2(2, N = 86) = 4.62$, $p = .099$; SRMR = .06, CFI = .95, RMSEA = .12 (90% CI = .00, .28). These findings are consistent with the possibility that target common fate increases target competition because it leads targets to perceive themselves as part of a group, which in turn increases greed. In a single-trial PDG, greed dictates competition (Insko et al, 2001). In addition, there was a direct path from target common fate to max rel that was not mediated by own-set entitativity.

Discussion

The parallel effects of common fate (as induced by a majority vote) on observer and target competitiveness provide a conceptual replication of Experiment 1 and further underscore the importance of common fate for producing the discontinuity effect. For targets, common fate was the only Campbell index to increase competitiveness. For observers, common fate also increased competitiveness but, in addition, competitiveness was increased by high (compared to

low) target proximity when target similarity was low (but not when it was high). This proximity effect at low similarity is at odds with previous research indicating that proximity alone did not significantly increase competitiveness (Insko et al., 1987, 1988; Wildschut et al., 2001) and with the absence of a significant proximity effect in Experiment 1. It is not clear why high (compared to low) target proximity increased competition only when target similarity was low, and then only for observers.[5]

Consistent with Campbell's (1958) speculation, both common fate and proximity increased other-set entitativity for observers and own-set entitativity for targets. Similarity, however, did not significantly increase either. Clearly, then, Experiment 2 did not support Campbell's speculation that proximity is "less essential … as a cue for entity" (p. 22) than similarity. The absence of main effects for similarity stands in contrast to the documented effects of manipulated similarity on the perceived entitativity of humanoid figures ("Greebles"; Dasgupta, Banaji, & Abelson, 1999). We suspect that similarity more readily induces perceived entitativity in humanoid figures because they differ on few other physical dimensions. Sets of humans, however, are inherently more diverse and this "noise" in human aggregates may drown out similarity on a single dimension (e.g., artistic preferences). Future research should investigate other, less minimal, instantiations of similarity to determine whether similarity has more impact on entitativity when it is based on more diagnostic characteristics of a person's personality, character, values, or motives.

It is possible that similarity may increase the salience of commonness, or agreement, and thus imply the possibility of common fate. Campbell (1958) himself alluded to the possibility that similarity primarily acts in service of common fate: "…an observed similarity dimension may provide a hypothesized grouping which is then tested for intragroup homogeneity on various dimensions of common fate. (p. 21)." If this is true for both similarity and proximity, common fate really is the primary determinant of entitativity. We develop this point further in the General Discussion.

Common fate increased other-set (target) entitativity for observers and own-set (target) entitativity for targets. These findings replicated conceptually the parallel effects of common fate on other-set and own-set entitativity in Experiment 1. However, whereas Experiment 1 found no significant proximity effects, Experiment 2 found proximity effects on both other-set (target) entitativity for observers and own-set (target) entitativity for targets. What could account for this difference? One possibility is that proximity effects were stronger in Experiment 2 because, when targets were in the same room, observers were sequestered in separate rooms, whereas no such contrast occurred in Experiment 1. Indeed, we found some concrete evidence for the idea that participants used own-set proximity as a frame of reference for judging other-set entitativity. The Wertheimer-Campbell indices were not manipulated for observers but, nonetheless, high (compared to low) target proximity decreased targets' ratings of other-set (observer) entitativity.

The path analyses were consistent with the fear and greed perspective (Schopler & Insko, 1992; Wildschut & Insko, 2007) and corroborated the Figure 1 model of Experiment 1. For observers, the Figure 2 model is a chain from common fate to other-set entitativity (i.e., the perception that one is interacting with a group) to fear to competition. For targets, the Figure 3 model is a chain from common fate to own-set entitativity (i.e., the perception that one is acting as a group) to max rel to competition. The role for max rel suggests that own-set entitativity promotes a self-relevant concern with being superior. For targets, there was also a direct effect of common fate on max rel. We did not anticipate this result but there is nonetheless a straightforward explanation. With high (compared to low) common fate, the common choice of all three targets was determined by a majority vote. This afforded each target some degree of anonymity irrespective of perceived own-set entitativity (as when casting a vote in an election). According to the identifiability explanation of the discontinuity effect, such anonymity increases greed, as previously demonstrated by Schopler et al. (1995).

We do wish to clearly acknowledge that since outgroup entitativity, ingroup entitativity, fear, and greed were measured and not directly manipulated, support for the proposed causal-

serial links is "circumstantial." All we can legitimately conclude is that the obtained evidence is *consistent with the possibility* that the proposed causal links actually exist.

General Discussion

Campbell's (1958) influential analysis has generated diverse lines of inquiry into the causes and consequences of entitativity. We identified three strands of research that were most relevant to our present purposes. The first strand has examined how different properties of social groupings explain variation in perceived entitativity. The second strand has examined the effect of entitativity on in-group bias and intergroup discrimination. The third strand examined the role of a consensus rule in producing the discontinuity effect and a shift in perceived entitativity. The key objective of the present experiments was to weave together these separate strands and, by so doing, answer a set of important questions that cannot be addressed by each isolated line of inquiry. This work fills an important gap in the social-dilemma literature by shedding light on the motivational and behavioral consequences of entitativity cues in social dilemmas.

In two experiments, we manipulated independently the Wertheimer-Campbell indices and examined their respective roles in producing competitiveness. We then tested theory-based process models to examine whether the indices could be linked to competitiveness via perceptions of entitativity and choice reasons. In Experiment 1, common fate (as induced by a majority vote) and proximity (as induced by being seated in the same room) were manipulated for both 3-person sets. We found that only common fate increased competitiveness, irrespective of proximity. Path analyses were consistent with the idea that common fate is linked with competitiveness via other-set entitativity and subsequent fear, and via own-set entitativity and subsequent greed. However, because common fate was manipulated for both 3-person sets, the effects of other-set and own-set common fate were confounded. To address this limitation, Experiment 2 manipulated the Campbell indices for one 3-person set only (targets). Participants in the other 3-person set were sequestered in separate rooms (observers). Results provided further evidence for the role of common fate in producing competitiveness. Observers as well as targets were more competitive when targets shared (versus did not share) common fate. Path

analyses for observers supported the idea that other-set common fate was linked with competitiveness via other-set entitativity and subsequent fear. Path analyses for targets supported the prediction that own-set common fate was linked with competitiveness via own-set entitativity and subsequent greed. To summarize, both experiments (1) identified an important role for common fate as a determinant of competitiveness and (2) provided evidence for a double dissociation (Teuber, 1955), such that other-set entitativity predicted increased competitiveness via fear (but not greed) and own-set entitativity predicted increased competitiveness via greed (but not fear).

Something we did not expect was the finding in both experiments that, whereas max rel was an important link in the chain that connected own-set common fate to competitiveness, the other greed-related reason—max own—was not. This pattern of results is significant from a basic theoretical viewpoint because max own represents the concern with the tangible economic outcomes emphasized by realistic conflict theory (Campbell, 1965) and max rel represents the concern with relativistic social comparisons emphasized by social identity theory (Tajfel & Turner, 1979). However, we caution that prior evidence for the mediating role of max own in producing the discontinuity effect stems primarily from studies in which group members made choices that were public within the ingroup (e.g., Insko et al., 2001) and that this condition was not met in the present experiment. Public (compared to private) responding matters because it strengthens normative social influence (Deutsch & Gerard, 1955). Increased normative social influence, in turn, accentuates the difference between, on the one hand, norms governing interindividual interactions that emphasize fairness and trust (Cohen et al., 2010) and, on the other hand, norms governing intergroup interactions that emphasize concern for absolute ingroup outcomes or max own. Wildschut et al. (2002, Experiment 3) found that group members were more competitive when they believed that their PDG choice would be made public to the ingroup than when they believed that their choice would remain private. This effect of public (versus private) responding on competition was mediated by max own.

Campbell's Assumed Primacy of Common Fate

Campbell's (1958) insight into the factors contributing to entitativity in social aggregates emphasized the importance of common fate relative to the remaining factors. Throughout the history of discontinuity research this idea has been indirectly supported through the requirement of consensus decision-making rules to define group membership. The present experiments have addressed the idea of decision-making as common fate in a more direct way than has been done in most discontinuity research. Rather than having participants in a social aggregate discuss options and arrive at a consensus, we imposed a simple majority-vote rule involving no intra-group interaction or discussion. The majority-vote decision rule made the group members "move together" toward a common choice. This enforcement of common fate in decision-making increased competitiveness, irrespective of the other Campbell indices. Neither of the other indices consistently showed the same main effect on competition. The present findings are thus consistent with Campbell's (1958) emphasis on the particular importance of common fate as a determinant of entitativity.

The important role of common fate in producing intergroup competition is especially interesting in light of minimal-groups research in the social categorization tradition (e.g., Tajfel et al., 1971), which generally manipulates similarity rather than common fate. The current findings suggest that minimal-group effects may be stronger to the extent that the groups are formed on the basis of common fate rather than similar categorization. Our findings show that a key determinant of when a minimal group will act competitively in an intergroup interaction is whether they move together toward a common choice.

At least a partial basis for the importance of common fate may be the particular sensitivity of the visual system to movement or change. There is an obvious evolutionary advantage in the detection of movement as an indication of potential danger or potential advantage. Campbell (1958) did not directly say, but may have assumed that common fate has more obvious consequences than similarity or proximity. Such an interpretation is implied by his speculation that similarity acts in the service of common fate by providing a "hypothesized

grouping" (p. 21) that can be tested by considering possible implications. Consider the introductory example of the boulders on the side of a mountain. In this example a landslide (common fate) has more obvious consequences for the mountaineer peering up from the valley below than does the color of the boulders (similarity). However, color might not be the only cue for similarity among the boulders. Consider, for instance, similarity arising from the fact that only some of the boulders are precariously perched. Such a grouping has more obvious implications for a landslide than does a grouping of the boulders according to color. Campbell seemingly believed in the primacy of common fate because he believed that similarity might imply possible common-fate like consequences. Consistent with this idea, Alter and Darley (2009) showed that people who are perceived to be similar in appearance attract collective treatment.

Campbell (1958) did not directly differentiate among different types of similarity, but appears to have had a mundane-realism concept of similarity as relating to, for example, agreement in attitude toward sports, food, or art. We followed his example and the example of countless prior studies by manipulating similarity regarding artistic preferences (Tajfel et al., 1971). That is not to say that by implementing a standard manipulation of similarity we were relying on something of little interest. The colored slides of artists paintings that we used are quite striking and to our eyes beautiful. Furthermore, research shows that individuals automatically develop ingroup liking based on similarity in artistic preferences (Ashburn-Nardo, Voils, & Monteith, 2001). We, however, acknowledge that one could compare various types of similarities in terms of their indirectly implied consequences. One could, for example, contrast similarity of university affiliation with some other type of similarity. Similarity of university affiliation would not indicate whether the three targets would choose to cooperate or to compete. Yet, university affiliation appears more closely related to coordinated action than is artistic preference. One could also vary the procedures for structuring proximity, for example, by seating the participants back to back or in some other formation. We again relied on a mundane-realism concept of proximity, but that is not to deny that there are other possibilities.

Experiments 1 and 2 have highlighted the importance of common fate, but it is clear that the full extent of that importance is yet to be fully explored. An important direction for future research is to test whether other inductions of common fate also increase intergroup competition. Our experiments manipulated common fate via a majority-vote requirement. However, Campbell (1958) suggested that common fate is a broad construct that can be instantiated in a variety of ways (see also Lickel et al., 2000). For example, common fate might be instantiated by synchronous physical movement. Prior research has shown that synchronous movement increases the perceived entitativity of a 2-person set (Lakens, 2010) as well as cooperation within groups (Wiltermuth & Heath, 2009), so an interesting hypothesis to test is whether synchrony also increases competition between groups, and whether this is due to own-set and/or other-set synchrony. Suffice it to say, other instantiations of common fate, proximity, and similarity might have produced different conclusions regarding their relative impact on competition versus cooperation. Campbell would have been the first to admit that future research should test the validity of the current results using alternative manipulations of the Wertheimer-Campbell indices (see Campbell & Fiske, 1959). Such future research could also examine the generalizability of findings across gender (which we accomplished only in Experiment 1) and different experimental procedures (e.g., by exploring whether findings are influenced by giving participants a [bogus] cooperative note from the other player).

Regardless of whether future research will support the primacy of common fate, the current experiments clearly demonstrated that the presence of a majority-vote rule increased competition in the PDG. Why did this instantiation of common fate produce such consistent results on competition? As discussed above, the majority-vote manipulation was linked to competitiveness via perceptions of other-set entitativity and subsequent fear, and via perceptions of own-set entitativity and subsequent greed. In addition, Experiment 2 revealed an unanticipated path for targets from the majority-vote manipulation to competition via max rel that was not mediated by own-set entitativity (Figure 3). We propose that the majority vote afforded targets some degree of anonymity irrespective of perceived own-set entitativity (as when casting a vote

in an election). According to the identifiability explanation of the discontinuity effect, such anonymity increases greed (Schopler et al., 1995). The fact that this particular path from the majority-vote manipulation to competition was not mediated by own-set entitativity suggests that it is unique to this specific instantiation of common fate.

Implications for Understanding Interindividual and Intergroup Competition

The present two experiments provided evidence that common fate (as induced by a majority vote) can alter the perceived entitativity of own and other side, and that these perceptions are significantly related to competition and reported reasons for competition. Whereas prior discontinuity experiments have examined the motivational underpinnings of intergroup competition—namely, fear and greed (Wildschut & Insko, 2007)—the present research adopted a broader view by also considering the perceptual factors related to fear, greed, and competition. By documenting how perceptual and motivational factors operate in concert with intergroup behavior, the current work fills an important gap in the social-dilemma literature as it relates to intergroup conflict and cooperation. Additionally, our findings extend prior evidence for the importance of a consensus rule or 'procedural interdependence' in producing both the discontinuity effect and a shift in perceived entitativity (Insko et al., 1987; Insko et al. 1988; Wildschut et al., 2001). An important distinction between the consensus rule used in prior studies and the majority rule used here is that achieving consensus requires intragroup interaction whereas voting does not. The present findings thus identified more minimal conditions for the discontinuity effect.

Broader Implications for Organizations

Within organizations (especially large ones), groups of people interact to make decisions, negotiate, and allocate resources. Employees in a research and development department, for example, may need to negotiate with employees from a finance department regarding budgetary constraints. What determines whether these intergroup interactions will be characterized by cooperative versus competitive behavior? The results of the current experiments, like previous experiments on interindividual-intergroup discontinuity (Wildschut et al., 2003) suggest that fear

and greed play a central role in determining the course these interactions will take. This begs the question: what elicits fear and greed in intergroup interactions? Our findings suggest that fear and greed flow from perceptions of entitativity, and entitativity perceptions, in turn, are strongly influenced by the group's decision-making rule—whether group members' choices are aggregated following a simple majority rule. On the basis of these results, we would advise managers and employees to be mindful of the decision rules they employ in organizational settings. Inter-departmental cooperation within organizations can be undermined by decision-making rules, like majority-vote, that increase greed within a particular group (or department) and decrease trust from other groups.

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Footnotes

[1] According to interdependence theory (Kelley & Thibaut, 1978), greed refers to maximizing self-interest in both absolute terms (max own) and relative to another person or group (max rel).

[2] The fear assessment implemented here departed from previous research (e.g., Cohen, Montoya, & Insko, 2006; Pinter et al., 2007) and therefore requires some explanation. The items used in the present study were: "I did not trust the other person because they were part of a group" and "I did not trust the other person because they were not on my side," $r(250) = .65$, $p < .0001$. In previous research, we used the items: "I did not trust the other person" and "I wanted to defend myself against the other person's actions." We revised the fear items because we wanted specifically to assess fear stemming from perceived other-set entitativity (i.e., the perception that one is interacting with another group).

[3] This problem becomes apparent when one considers comparing a situation where participants are informed that own-set members all prefer different artists and other-set members also all prefer different artists with a situation where participants are informed that own-set members all prefer the same artist and other-set members also all prefer the same artist.

[4] RMSEA values for the observer (Figure 2) and target (Figure 3) models were relatively high but note that RMSEA values can be misleading when degrees of freedom are low and sample size is not large, as was the case for these models (Bollen & Long, 1993; Kenny, 2010). For both models, the other fit indices all indicate good fit and the RMSEA 90% CI included 0.

[5] We can offer some very tentative speculation that the Proximity x Similarity interaction for observers was at least partially based on a concern unmediated by entitativity. Note that this was done in the Figure 3 model in which we postulated that own-set common fate had a direct effect on max rel that was unmediated by own-set entitativity. So what is the speculation? In the low-similarity condition, when the targets were grouped together in the same space the dissimilarities among them may have made the circumstances appear sufficiently strange to

suggest the avoidance of cooperative relations. Whatever is responsible for the Proximity x Similarity interaction for competition, there is no significant evidence that it was mediated by entitativity, and was, of course, only significant for observers.

Table 1. *Means (and Standard Deviations) for Proportion Competition, Perceived Entitativity, and Choice Reasons as a Function of Common Fate and Proximity in Experiment 1.*

	Low Common Fate		High Common Fate	
	Low Proximity	High Proximity	Low Proximity	High Proximity
Proportion competition	0.24 (0.43)	0.30 (0.46)	0.42 (0.49)	0.57 (0.50)
Perceived Entitativity				
Other-set entitativity	1.91 (1.32)	2.03 (1.27)	3.24 (1.75)	3.35 (1.84)
Own-set entitativity	1.84 (1.32)	1.87 (0.97)	3.05 (1.64)	3.17 (1.72)
Choice Reasons				
Max rel	2.52 (1.68)	2.49 (1.52)	2.87 (1.79)	3.48 (1.67)
Max own	5.03 (1.49)	5.03 (1.97)	5.24 (1.44)	5.82 (1.26)
Fear	2.10 (1.41)	2.08 (1.20)	2.63 (1.49)	3.11 (1.68)
Max joint	5.20 (1.81)	5.45 (1.90)	5.10 (1.98)	4.75 (1.84)
Min dif	4.52 (1.93)	4.68 (1.90)	4.35 (1.89)	4.15 (1.72)

Table 2. *Means (and Standard Deviations) for Proportion Competition, Perceived Entitativity, and Choice Reasons as a Function of Common Fate, Proximity, and Similarity in Experiment 2: Observers.*

	Low Common Fate				High Common Fate			
	Low Proximity		High Proximity		Low Proximity		High Proximity	
	Low Similarity	High Similarity	Low Similarity	High Similarity	Low Similarity	High Similarity	Low Similarity	High Similarity
Proportion competition	0.00 (0.00)	0.33 (0.47)	0.44 (0.50)	0.25 (0.43)	0.33 (0.47)	0.33 (0.47)	0.56 (0.50)	0.42 (0.49)
Perceived Entitativity								
Other-set entitativity	2.25 (1.91)	1.96 (0.69)	3.39 (1.60)	4.00 (1.91)	3.14 (1.10)	4.28 (2.06)	5.17 (1.15)	4.50 (1.77)
Own-set entitativity	2.38 (1.91)	1.67 (0.58)	2.06 (2.10)	1.50 (0.83)	2.32 (1.19)	3.11 (2.13)	1.89 (1.17)	1.88 (1.55)
Choice Reasons								
Max rel	1.71 (0.96)	2.29 (1.84)	2.17 (1.75)	1.79 (1.30)	1.73 (0.96)	2.17 (1.12)	2.22 (1.66)	2.21 (1.45)
Max own	4.33 (1.67)	4.79 (2.19)	4.22 (1.86)	4.75 (1.71)	4.45 (1.42)	4.83 (2.17)	5.94 (1.29)	4.58 (1.73)
Fear	1.92 (1.02)	2.42 (1.52)	3.50 (1.82)	2.13 (1.98)	3.82 (1.76)	3.00 (1.79)	3.22 (2.45)	3.75 (2.01)
Max joint	6.04 (1.42)	4.04 (1.99)	4.72 (2.25)	5.17 (1.92)	5.59 (1.66)	5.94 (1.53)	4.78 (2.02)	5.54 (1.72)
Min dif	5.29 (1.56)	3.75 (2.03)	3.67 (1.32)	4.00 (1.85)	4.86 (1.07)	5.50 (1.72)	4.17 (2.03)	4.79 (1.56)

Table 3. *Means (and Standard Deviations) for Proportion Competition, Perceived Entitativity, and Choice Reasons as a Function of Common Fate, Proximity, and Similarity in Experiment 2: Targets.*

	Low Common Fate				High Common Fate			
	Low Proximity		High Proximity		Low Proximity		High Proximity	
	Low Similarity	High Similarity	Low Similarity	High Similarity	Low Similarity	High Similarity	Low Similarity	High Similarity
Proportion competition	0.17 (0.38)	0.25 (0.43)	0.00 (0.00)	0.08 (0.27)	0.33 (0.47)	0.33 (0.47)	0.22 (0.41)	0.58 (0.49)
Perceived Entitativity								
Other-set entitativity	2.58 (1.14)	2.75 (2.17)	2.00 (1.39)	1.88 (1.05)	3.63 (1.90)	2.06 (1.21)	1.78 (0.83)	1.96 (1.39)
Own-set entitativity	2.08 (1.10)	2.79 (2.16)	2.94 (1.26)	2.58 (1.29)	3.17 (1.75)	2.72 (1.23)	4.11 (1.83)	4.75 (1.29)
Choice Reasons								
Max rel	1.54 (0.99)	1.92 (1.31)	1.56 (0.56)	1.58 (0.87)	2.29 (1.76)	2.44 (1.96)	2.44 (1.40)	3.42 (2.13)
Max own	4.83 (2.10)	4.58 (1.59)	4.31 (1.13)	4.29 (1.48)	4.21 (1.53)	5.22 (1.68)	4.28 (2.14)	5.67 (1.80)
Fear	2.71 (1.80)	3.17 (1.91)	2.78 (1.23)	2.42 (0.95)	2.83 (1.76)	3.06 (1.55)	2.06 (1.07)	4.00 (2.11)
Max joint	5.63 (1.88)	4.63 (2.07)	5.88 (1.09)	5.71 (1.96)	5.21 (1.85)	6.17 (0.75)	5.50 (2.19)	4.17 (1.95)
Min dif	4.33 (2.32)	4.08 (1.90)	5.33 (0.94)	4.29 (2.01)	4.63 (2.06)	4.33 (1.58)	4.50 (1.75)	4.00 (2.00)

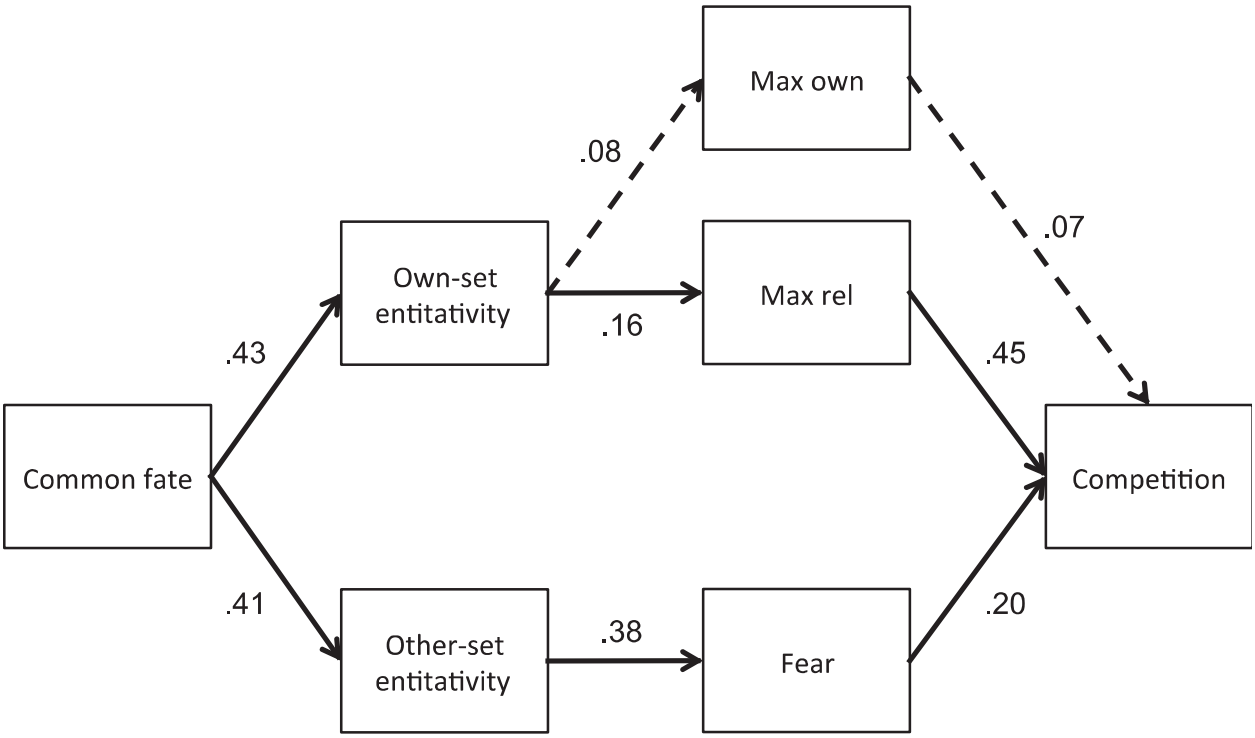


Figure 1. Path model linking common fate to competitiveness via perceived entitativity and choice reasons: Experiment 1. Solid arrows indicate statistically significant paths ($p < .05$). Path coefficients are standardized regression coefficients. Intercorrelations between own-set and other-set entitativity and between the three choice reasons were modeled by including correlated errors. To enhance figure clarity, these correlated errors are not displayed.

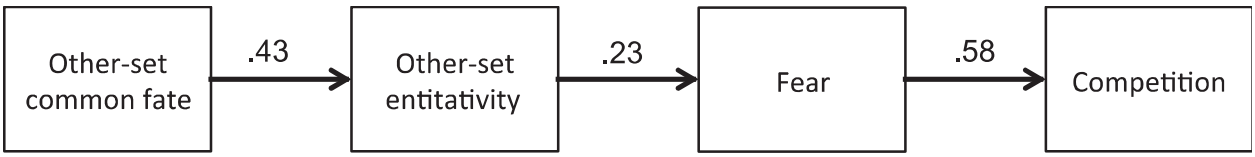


Figure 2. Path model linking common fate to competitiveness via other-set entitativity and fear: Observers in Experiment 2. Solid arrows indicate statistically significant paths ($p < .05$). Path coefficients are standardized regression coefficients.

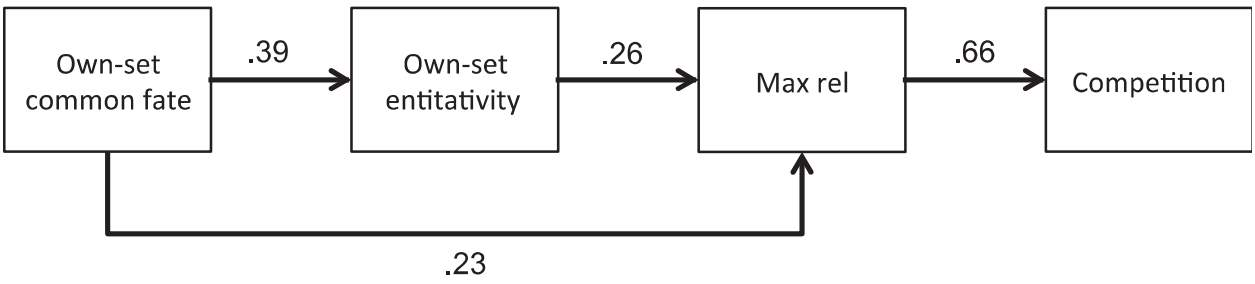


Figure 3. Path model linking common fate to competitiveness via own-set entitativity and max rel: Targets in Experiment 2. Solid arrows indicate statistically significant paths ($p < .05$). Path coefficients are standardized regression coefficients.