Interindividual–Intergroup Discontinuity Reduction Through the Anticipation of Future Interaction

Chester A. Insko and John Schopler
University of North Carolina at Chapel Hill

Lowell Gaertner
Texas A&M University

Tim Wildschut, Robert Kozar, Brad Pinter, Eli J. Finkel, Donna M. Brazil,
Candy L. Cecil, and Matthew R. Montoya
University of North Carolina at Chapel Hill

Consistent with the role of a long-term perspective in reducing the tendency of intergroup relations to be more competitive than interindividual relations in the context of noncorrespondent outcomes, an experiment demonstrated that anticipated future interaction reduced intergroup but not interindividual competitiveness. Further results indicated that the effect was present only for groups composed of members high in abstractness (Openness–Intellect on the Big 5 Inventory and Intuition on the Myers–Briggs Type Inventory) who trusted their opponents.

A series of articles in the August 1998 *APA Monitor* describe a conference jointly sponsored by the American Psychological Association and the Canadian Psychological Association to establish a "new discipline of psychology" to study intergroup conflict, as illustrated by "the deadly wars of places like Bosnia, Cambodia and Rwanda that have claimed 30 million lives across the world and made refugees of another 45 million since 1990" (McGuire, 1998, p. 1). Research on interindividual–intergroup discontinuity (Insko et al., 1988, 1987, 1992, 1993, 1994; Insko, Schopler, Hoyle, Dardis, & Graetz, 1990; Insko et al., 1992, 1998; McCallum et al., 1985; Schopler et al., 1994, 1995, 1993; Schopler, Insko, Graetz, Drigotas, & Smith, 1991) has approached intergroup conflict by attempting to understand what differences between intergroup and interindividual relations could account for the fact that intergroup relations are sometimes more conflict prone. Three hypotheses, each one focusing on a different difference between interindividual and intergroup relations, have been suggested. The *schema-based distrust* (or *fear*) hypothesis is based on a person's tendency to distrust other groups more than other individuals. The *social support for shared self-interest* (or

greed) hypothesis is based on the fact that group members can provide each other with social support for immediate self-interest, in contrast to the lack of such social support available to individuals. The *identifiability hypothesis* is based on the person's assumption that in an interindividual, as opposed to an intergroup, relationship, his or her self-interested behavior will be more obviously identified.

Most, but not all, of the previously referenced studies contrasting interindividual and intergroup behavior were conducted with a matrix game (typically a prisoner's dilemma game; PDG) in which communication between players was allowed. These studies were conducted in a suite in which individuals or groups were located in different "home" rooms that were connected to a central room. After examining a version of a PDG matrix provided for a given trial, individuals or group representatives (or, in some instances, entire groups) went to the central room to discuss possible action with their opponent (or opponents) and then returned to their home rooms, where they made a choice. In the groups condition, the choice was made by the group as a whole. The final decision was recorded on a form, carried back to the central room, and given to the experimenter. The experimenter announced the decisions of the two individuals or groups and distributed the money that had been earned. Although there were a few studies involving just one trial, typically the procedure was repeated for 10 trials.

All of the previously referenced studies were laboratory studies using some kind of matrix. However, two nonlaboratory studies have been completed in which matrices were not used (Pemberton, Insko, & Schopler, 1996). In these studies, undergraduates kept 7-day diaries in which they recorded their interindividual and intergroup experiences. In agreement with the experimental studies using matrices, these nonlaboratory studies found that intergroup interactions were experienced as more competitive, or less cooperative, than were interindividual interactions.

Discontinuity Reduction Through a Shift From a Short-Term to a Long-Term Orientation

An analysis regarding the reduction of intergroup conflict in the context of a PDG (see Figure 1) can be succinctly stated. It is important to note that on any one trial, each player is better off competing if the other player cooperates and is also better off competing if the other player competes. Consider the column player. No matter what choice the row player makes, the column player will receive higher outcomes by competing (choosing Y). Thus, from the standpoint of maximizing outcomes on the immediate trial, the optimal choice is the competitive choice. From the standpoint of maximizing outcomes across a number of trials, however, the situation may change. If the row player, like the column player, maximizes short-term outcomes by competing, the result is that both players will receive the outcomes in the lower right-hand (competitive–competitive) cell, and outcomes across a number of trials will not be maximized. Thus, purely from the standpoint of maximizing longer term outcomes, both players should be motivated to shift away from mutual competition to mutual cooperation. However, the shift from mutual competition to mutual cooperation obviously requires trust that the other player will cooperate. For the well-known commons dilemma (Hardin, 1968), of which the PDG is a binary model, the long-term advantage of mutual cooperation together with mutual trust is easy to recognize.

We believe that in many situations, the preceding account applies more obviously to intergroup than to interindividual relations. Because in a one-trial situation, individuals tend to be less competitive than groups do, there is less opportunity for further reduction in competitiveness with a shift to anticipated future trials. A primary basis for the generally lower rate of competitiveness between individuals is that individuals are more concerned than are group members with not acting in a self-interested and greedy manner. As suggested by the greed and identifiability hypotheses, there are two possible reasons for this difference. First, group members provide each other with social support for acting on immediate self-interest. Second, groups provide a degree of ano-
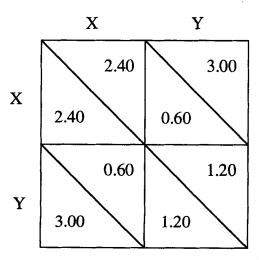
nymity for not appearing personally self-interested. Of course, there are instances, as in a business or bargaining relationship, in which it is acceptable and even normative for individuals to act in a self-interested manner. Also, our research focuses on a situation in which there is communication between individuals and between groups, and previous research (Insko et al., 1993) has demonstrated that the lesser competitiveness of individuals than groups is more apparent with than without communication. Communication decreases distrust between individuals more than between groups.

In a frequently cited review of the gaming literature, Pruitt and Kimmel (1977) described a goal-expectation theory that shares some similarity to the previously described perspective on long-term consequences. It is important to note, however, that although goal-expectation theory is concerned with the behavior of individuals who may or may not communicate, our perspective relates to the difference between groups and individuals that do communicate. Still, the perspectives do share some obvious similarities. According to Pruitt and Kimmel, "short-range thinking ordinarily leads to noncooperation in the PD" (p. 375), and "cooperative behavior usually results from long-range thinking" (p. 375). Furthermore, they argued that three perceptions link long-term thinking with mutual cooperation. These three perceptions are "(a) perceived dependence on the other (i.e., a recognition of the importance of the other's cooperation); (b) pessimism about the likelihood that the other can be exploited (i.e., that he will cooperate unilaterally for any period of time); and (c) insight into the necessity of cooperating with the other in order to achieve his cooperation" (p. 375). Pruitt and Kimmel noted that the second and third of these perceptions "amount to a recognition that the dyad must choose between mutual cooperation and mutual noncooperation and that the former is preferable to the latter" (p. 375). Finally, Pruitt and Kimmel pointed out that "the goal of achieving mutual cooperation is insufficient" and "must be accompanied by an *expectation that the other will cooperate*" (p. 375). Pruitt and Kimmel thus used the word *expectation* in the same way that we use *trust*.[1]

In his book *The Evolution of Cooperation*, Axelrod (1984) also argued for the importance of a long-term orientation in reducing intergroup conflict.[2] Axelrod noted that the social situation confronting the Allied and German troops during World War I was described accurately by the PDG (see p. 75) and, furthermore, that in sector after sector of the front lines, the troops ceased to fight with each other, despite orders to the contrary by the commanding

	X	Y
X	2.40 / 2.40	3.00 / 0.60
Y	0.60 / 3.00	1.20 / 1.20

Figure 1. Prisoner's dilemma game matrix used in the groups condition of the experiment.

[1] Our use of the term *trust* is consistent with Deutsch (1958): "An individual may be said to have trust in the occurrence of an event if he expects its occurrence and his expectations lead to behavior which he perceives to have greater negative consequences if the expectation is not confirmed than positive motivational consequences if it is confirmed" (p. 266). Kelley and Thibaut (1978) similarly referred to trust in the context of matrix choices as involving "assurance of not being exploited or abandoned" (p. 232). Although both *expectancy* and *trust* can be applied to the assumption that the opponent will respond cooperatively, *expectancy* has a broader meaning that may, for example, apply to the weather or to the future behavior of others that will have minimal impact on the self.

[2] Perhaps the earliest reference to the long-term benefit of cooperation on the PDG is Luce and Raiffa's (1957) prediction that repeated play of the PDG will result in "unarticulated collusion" on the cooperative choice because of "knowledge that the situation will be repeated and reprisals are

officers. For example, the troops shelled only certain safe targets at certain predictable times of the day. Axelrod's interpretation of the troops' behavior is that the permanence of the front lines led to an enlarging of the "shadow of the future" (p. 126) or to an understanding of the long-term mutual benefits of reciprocal cooperation. According to Axelrod, "what made this mutual restraint possible was the static nature of trench warfare, where the small units faced each other for extended periods of time" (p. 21).

Insko et al. (1998) noted that a further characteristic of the troops' behavior was that the firing between sides appeared to be more successive than simultaneous and also that the behavior, if not strictly *tit for tat* (or reciprocal), was very much like tit for tat. Insko et al. (1998) argued that both successive turn-taking and tit for tat responding should facilitate the shift from the immediate present to anticipated future consequences. One experiment demonstrated that the discontinuity effect (and intergroup competitiveness) was reduced by having groups or individuals play against a group of confederates or a single confederate who followed a tit for tat strategy. A second experiment demonstrated a similar (though descriptively smaller) reduction when responding was successive rather than simultaneous. Furthermore, both experiments obtained questionnaire evidence indicating that the reductions were associated with an increased anticipation of future consequences.[3]

But what about trust? Although neither successive responding nor tit for tat responding directly affect trust, they do have effects on approximate functional equivalents. It is important to note that successive responding with strict turn taking guarantees the opportunity to verify the opponent's choice on every other trial, and tit for tat implies predictability of the opponent's behavior. Of course, with a sufficient number of trials, trust might develop.[4]

The present research has two foci. One of these, as described in greater depth later in the article, relates to individual differences. The other tests the role of anticipated future interaction, consistent with Axelrod's (1984) assertion that it was the permanence of the World War I front lines that facilitated the shift to a long-term orientation and the cessation of hostilities. In all conditions of the experiment, both groups and individuals played only one trial. However, there was a manipulation as to whether the groups and individuals did or did not anticipate playing additional trials.

We expect that the participants will have less of a long-term orientation when they anticipate only one trial than when they anticipate additional trials. That is perfectly straightforward. What is perhaps less obvious is why the anticipation of playing multiple trials should lead to less distrust than does the anticipation of playing only one trial. Such an effect should occur to the extent

that there is recognition of the mutual benefit of long-term cooperation. Also, anticipated contact could, in itself, produce assumed mutual trust. It is important to note that the effect is relative to what occurs when participants anticipate playing only one trial followed by the breaking of contact.

Anticipation of the Future as a Tendency to Think Abstractly

What about a possible role for individual differences in the tendency to consider future consequences? One possibility relates to individual differences in the tendency to think abstractly. We believe that consideration of the future involves more abstract thinking than does consideration of the here and now. As an illustration, one may recall Axelrod's (1984) reference to the "shadow of the future" (p. 126).

We assessed the predisposition to think abstractly by using the Sensing–Intuition (SN) scale of the Myers–Briggs Type Inventory (Myers, McCauley, Quenk, & Hammer, 1998) and the Openness–Intellect scale of the five-factor model, or the Big Five Inventory (John, Donahue, & Kentle, 1991). The Myers–Briggs Type Inventory was inspired by Jung's (1923) theory of psychological type. Jung put major emphasis on the importance of perception, by which he meant "all the ways of becoming aware of things, people, events or ideas" (Myers et al., 1998, p. 24). He distinguished between two types of perception: sensing and intuition. According to Myers et al., "because the senses can bring to awareness only

---

[3] Esser and Komorita (1975) advanced a somewhat different perspective. They found that a reciprocal strategy was most effective in a bargaining situation and hypothesized that this was the case, as stated by Komorita and Esser (1975), "not because subjects were inhibited in exploiting the other but because they resented and refused to be intimidated by the unfairness of an opponent who did not reciprocate concessions" (p. 699). (See also Komorita, Hilty, & Parks, 1991.) It is important to note that this "attribution of fairness" interpretation denies a role for perceived likelihood of exploitation and that Pruitt and Kimmel explicitly listed such a perception as one of the crucial determiners of long-term thinking (see the second, perception in the preceding list from Pruitt & Kimmel). In a follow-up investigation, Komorita and Esser (1975), however, modified, or revised, the fairness interpretation to better account for some interesting data obtained from a bargaining study in which they unconfounded concession reciprocation (0%, 50%, or 100%) from nonconcession reciprocation (also 0%, 50%, or 100%). They noted that the fairness interpretation alone could not account for the fact that 100% of the reciprocated concessions and 0% of the reciprocated nonconcessions did not produce the maximum number of agreements. Komorita and Esser interpreted this result as consistent with some results obtained by Shure, Meeker, and Hansford (1965) that indicated that "subjects who were convinced of the opponent's cooperative orientation were very likely to exploit this vulnerability" (p. 705). Thus, the difficulty, or the impossibility, of exploiting a tit for tat opponent and, by implication, the importance of thinking ahead again enters the picture. We agree with Pruitt and Kimmel's assertion that "a perception that the other is fair is tantamount to an expectation that he will cooperate" (p. 380).

[4] The Insko et al. (1998) data do descriptively indicate that the usual greater distrust of groups than individuals was not present in the tit for tat condition, whereas it was present in the other conditions. Although it is not reported in the published article, a test of the interaction involving a contrast of the tit for tat condition with the mean of the other conditions was marginal, $p < .054$.

---

possible" (p. 101). Other references to the possible benefit of long-term cooperation are Taylor (1976), updated in Taylor (1987), and also Ridley (1996). Taylor argued that the long-term benefit of voluntary cooperation in PDG and commons dilemma situations undercuts the argument for governmental or state coercion. Although less mathematically developed, Ridley (1996) made an analogous argument regarding the desirability of "a massive disassembling of the public bureaucracy" (p. 264). Ridley developed his argument in the context of the biological survival value of long-term cooperation as a means of coping with PDG and commons dilemma situations.

what is occurring in the present moment, persons oriented toward Sensing tend to focus on the immediate experiences available to their five senses" (p. 24). On the other hand, Myers et al. indicated that that intuition is less concrete and "permits perception beyond what is visible to the senses, including possible future events" (p. 24). They characterized people who prefer intuition as "imaginative, theoretical, abstract, future oriented, and original" (p. 24). Myers et al. further stated that "focusing on the present (S) gives people who prefer the Sensing function less time for focusing on the future (N); focusing on the concrete (S) gives them less energy for focusing on the abstract (N); focusing on practical applications (S) gives them less interest in the theoretical issues (N); and focusing on reality (S) gives them less time for focusing on the imaginary or fanciful (N)" (p. 27). The distinction between sensing and intuition has an interesting parallel with the classic epistemological disagreement between the British empiricists (Locke, Berkeley, and Hume) and the Continental rationalists (Descartes, Leibniz, and Spinoza) regarding whether knowledge is acquired through the senses or through deduction (Russell, 1945, pp. 557–674).[5]

Digman (1996) characterized the five-factor solution as having been repeatedly found in over 60 years of factor-analytic studies. The Big Five thus has more obvious empirical roots than does the more theoretically oriented Myers–Briggs. Still, McCrae and Costa (1989) have found that four of the Big Five scales (Extraversion, Openness–Intellect, Agreeableness, and Conscientiousness) are correlated with the conceptually similar Myers–Briggs scales (Extraversion, Sensing–Intuition, Thinking–Feeling, and Judging–Perception, or JP). For our purposes, the important relationship is between Openness–Intellect and Sensing–Intuition. For these scales, McCrae and Costa found quite respectable correlations of .72 for men and .69 for women.

One may recall Pruitt and Kimmel's (1977) previously described argument that long-term thinking involves the "recognition that the dyad must choose between mutual cooperation and mutual noncooperation and that the former is preferable to the latter" (p. 375). This is the kind of recognition that should occur more readily to persons who are prone to think abstractly. There are, however, qualifications. First, the tendency for abstract thinkers to be more cooperative should occur only if there is the anticipation of more than one trial. Second, this tendency should occur only if there is trust in the opponent's cooperative intent. Third, this tendency for abstract thinkers to be more cooperative should be more apparent for groups than for individuals. These assumptions lead to the prediction of a quadruple interaction: Groups Versus Individuals × Multiple Trials Versus Single Trial × Trust × Abstractness. The tendency of groups to be less competitive should be most apparent when multiple trials are expected and when the groups are composed of abstract thinkers who trust their opponents.

However, why should an individual difference in the tendency to think abstractly manifest itself more obviously in a group context? Superficially, that such should be the case appears paradoxical. Certainly there are situations in which individual behavior is influenced by individual predispositions. Still, there is evidence that some individual predispositions are magnified when behavior occurs in the context of other like-minded individuals. After reviewing the literature dealing with groups as information processors, Hinsz, Tindale, and Vollrath (1997) concluded that "groups appear to exaggerate the tendencies of information processing that

occur among individuals" (p. 49). They described this exaggeration as either accentuation or attenuation: "If individual members tend to process information with particular errors, biases, themes, dimensions, or features, then groups often accentuate this tendency," but "if some information-processing tendency is uncommon among the members, groups typically further attenuate this uncommon tendency during processing" (pp. 54–55). Hinsz et al. furthermore related accentuation and attenuation to "strong majority influence" and "weak minority influence," respectively (p. 55). Tindale, Smith, Thomas, Filkins, and Sheffey (1996) had previously described such effects by referring to the impact of "shared representations." More recently, Tindale and Kameda (2000) introduced the term social sharedness to include not just shared "cognitions and cognitive processes" but also "attitudes, motives, norms, identities, ethnicities, etc." (p. 124).

Because the tendency to think abstractly or concretely is one dimension of information processing, the connection between Hinsz et al.'s (1997) characterization of information processing in groups and our situation is fairly direct. Insofar as the individual-differences variable has an impact on information processing, we find it plausible that majority–minority influence processes operate in a group decision-making context so as to magnify the impact of an individual tendency present in a majority of the group members. The extent to which this is also true for traits less obviously related to information processing, such as extraversion, is an open question. Certainly, conformity pressures are present, but such pressure might not be magnified by the necessity of evaluating information to make a decision.

It is important to note, however, that our situation is not just a comparison of a group with a lone individual but rather a comparison of group-on-group interaction with one-on-one interaction. Some individual tendencies, such as the tendency to think abstractly, may be overridden in the context of one-on-one interaction by the tendency of individuals to avoid appearing selfish. Thus, there is still a further reason why an effect of abstractness may be more clearly revealed in a group (or group-on-group) context.

What about an additional assessment of the tendency to consider future consequences? The previously described study of simultaneous versus successive responding (Insko et al., 1998) obtained some preliminary data from the Consideration of Future Consequences (CFC) Scale (Strathman, Gleicher, Boninger, & Edwards, 1994).[6] Although the scale was administered to only a small subsample of the participants, the data indicate that the tendency of groups to be more competitive than individuals was present only for those groups and individuals who scored lower on the scale. However, this difference was not present in the first 2 (of 10) trials,

---

[5] There is a similar parallel between Jung's (1923) extraversion–introversion distinction and the materialism/realism–idealism/subjectivism distinction. Likewise, there is a parallel between Jung's (1923) thinking–feeling distinction and the analogous distinction between some ethical theories. These parallels with philosophical thought in epistemology, metaphysics, and ethics give Jung's delineation of individual differences in sensing–intuition, extraversion–introversion, and feeling–thinking added credibility.

[6] An example of one item on the CFC is "I consider how things might be in the future, and try to influence those things with my day to day behavior" (Strathman et al., 1994, p. 752).

and the present experiment involves only 1 trial. Furthermore, as reported in Table 1, the present data reveal that CFC did not correlate significantly with Openness–Intellect or with SN but did correlate significantly with Conscientiousness and with JP. The pattern of correlations of CFC with the Big Five variables replicates the similar results of Strathman et al. (1994).

According to Myers et al. (1998), judging individuals possess a "natural sense of closure and organization" (p. 264), whereas perceiving individuals prefer "flexibility and spontaneity" (p. 6). Thus, the correlation of CFC with JP and with Conscientiousness implies that CFC may be related to a concern for orderliness rather than to a tendency to reason abstractly. Consistent with the results of McCrae and Costa (1989), the data presented in Table 1 indicate that the Conscientiousness dimension of the Big Five and the JP dimension of the Myers–Briggs are significantly correlated (individual-level $r = .61$; session-level $r = .60$). Possibly, then, the Insko et al. (1998) finding that by the third trial, high-CFC groups became more uniformly cooperative may have been due to a preference for orderliness and a dislike of unpredictability rather than to a tendency to think abstractly. Perhaps the concern with unpredictability became more salient after the initial trials. This interpretation, however, is not tested by the present data.

Our original intent was to use the first factor from a principal components analysis of the CFC, SN, and Openness–Intellect scales as the measure of abstractness. However, because the CFC Scale does not correlate with the other two scales, we proceed with the combination of the SN and Openness–Intellect scales.

Two Models and Three Predictions

The current research design involves two models. The first model includes gender of participants (all-male sessions or all-female sessions) and the experimentally manipulated variables of groups versus individuals and anticipated single trial versus multiple trials. The second model retains the experimentally manipulated variables of groups versus individuals and anticipated single

trial versus multiple trials and adds two assessment variables, trust and abstractness. For the first model, there are two predictions for competitiveness. These are a main effect for groups versus individuals, such that groups are more competitive than individuals, and a double interaction between groups versus individuals and trial, such that the tendency for groups to be more competitive is less apparent with anticipated multiple trials than with an anticipated single trial.

For the second model, there is a third prediction. This is a qualification of the preceding double interaction by trust and abstractness. The tendency with anticipated multiple trials for groups to be less competitive should be most apparent for groups composed of abstract thinking members who trust their opponents.

There is an obvious methodological reason for distinguishing between the models. Because the first model includes manipulated variables (groups vs. individuals and anticipated single trial vs. multiple trials), confirmation of the double-interaction prediction between these variables would provide evidence for causal sequence. Beyond this methodological concern, testing of the second model would provide evidence for the moderation of the double interaction in the first model by both trust and abstractness.

An important assumption in our conceptualization of abstractness as a moderator variable is that it is uncorrelated with the other predictors and with choice behavior (cf. Baron & Kenny, 1986, p. 1174). Abstractness was measured 1 week prior to the experimental sessions and should therefore not be correlated with the manipulated variables of individuals versus groups and anticipated single versus multiple trials. Furthermore, we know of no particular reason why abstract individuals should be more or less trusting and cooperative than are nonabstract individuals. This is something that can be examined with the data.

There is, however, a complexity relating to the role of trust. A key theoretical justification for the predicted double interaction in the first model is the assumption that anticipation of future trials may lead to recognition of the mutual advantage of mutual trust

Table 1

Correlations Among the Consideration of Future Consequences Scale (CFC), Big Five, and Meyers–Briggs Type Inventory for Individual-Level and Session-Level Data

| Scales | 1 | Big Five | | | | | Myers–Briggs | | | |
		2	3	4	5	6	7	8	9	10
1. CFC	—	.06	.53*	.14	.14	.00	.08	.44*	.10	−.02
2. Open	.10	—	−.06	.23	−.16	−.22	−.72*	−.40*	.10	.12
3. Cons	.43*	−.08	—	.14	.42*	−.26*	.26*	.60*	.08	−.03
4. Extra	.02	.15*	.12*	—	.16	−.39*	−.21	−.07	.85*	−.16
5. Agree	.10	.05	.24*	.13*	—	−.21	.22	.22	.19	−.45*
6. Neur	.02	−.13*	−.16*	−.25*	−.28*	—	.04	.14	−.28*	−.21
7. SN	.05	−.69*	.29*	−.09	.01	.08	—	.48*	−.14	.07
8. JP	.40*	−.31*	.61*	−.05	.02	.13*	.49*	—	−.12	−.05
9. EI	−.03	.09	.07	.82*	.18*	−.19*	−.09	−.09	—	−.22
10. TF	.05	−.05	.04	−.10	−.46*	−.10	.19*	.12*	−.18*	—

Note. Alphas for individual level data were .84 for CFC, .85 for Open, .83 for Cons, .89 for Extra, .82 for Agree, .83 for Neur, .92 for SN, .94 for JP, .91 for EI, and .90 for TF. Sample size ranged from 867 to 942 observations for individual-level data. The sample size for the session level data was 151 observations. Individual-level data appear below the diagonal, and session-level data appear above it. Open = Openness–Intellect; Cons = Conscientiousness; Extra = Extraversion; Agree = Agreeableness; Neur = Neuroticism; SN = Sensing–Intuition; JP = Judging–Perception; EI = Extraversion–Intraversion; TF = Thinking–Feeling.
* Bonferroni adjusted $p < .05$ (Bonferroni adjustment = .05/45 = .0011), ignoring the lack of independence.

and also that anticipated contact may, in itself, lead to assumed mutual trust. As previously stated, we believe that in many situations, this account applies more obviously to intergroup than to interindividual relations. It is important to note, however, that because the double interaction in the first model could be produced by some nontrust-related process (e.g., attempted avoidance of the unpleasantness of future conflict), it is theoretically important that the reduced competitiveness of groups anticipating multiple trials be mediated by trust. Thus, within the context of the first model, we conceptualize trust as a mediator of the Predicted Groups Versus Individuals × Anticipated Single Versus Multiple Trials double interaction.

If the anticipation of future trials produces trust, would it not be sufficient to enter abstractness along with the manipulated variables of groups versus individuals and anticipated single versus multiple trials in the second model? Although we do predict that the anticipation of future trials increases trust, we do not expect this association to be perfect. It is quite plausible that some individuals and groups will distrust their opponent despite the fact that future trials are anticipated. Because of such ambiguity, we consider it important to include an explicit assessment of trust as a moderator variable in the second model.

Method

Participants

Nine hundred forty-two undergraduates participated in an initial personality-testing session for partial course credit in an introductory psychology course. Of this number, 872 completed all items on all instruments, and 562 participants (210 men and 352 women) returned for a subsequent experimental session. Of the 562, 8 participants from four individual sessions did not complete the trust assessments until after learning of the opponent's choice and thus could not be included in all analyses.

Independent Variables

The design included four independent variables: groups versus individuals, anticipated single trial versus multiple trials, trust, and abstractness. The first two of these factors were manipulated, and the last two were assessed. Groups versus individuals was manipulated by varying whether the session involved interaction between two groups or between two individuals. Single trial versus multiple trials was manipulated by varying whether the participants expected only one trial or more than one trial. All participants were tested for only one trial. Trust of the opponent was assessed by having participants indicate the likelihood (0–100%) that the other person (or group) would select the cooperative versus the competitive choice. Abstractness was assessed by taking the first component from a principal components analysis of the Openness–Intellect Scale and SN Scale administered during the initial session.

Procedure

The initial testing session occurred approximately 1 week before the main experimental session. During the initial session, the participants filled out a number of instruments, including the Myers–Briggs Type Inventory (Myers et al., 1998), the Big Five Inventory (Benet-Martinez & John, 1998; John et al., 1991), and the CFC Scale (Strathman et al., 1994). On completion of the testing, we attempted to schedule each participant for one of the subsequent experimental sessions.

On their arrival to the second session, participants drew index cards to determine with whom they would interact and their room assignments. Three rooms on one side of the suite were labeled with an A, and the three rooms on the other side of the suite were labeled with a B. In the groups condition, three participants were assigned to one A room, and three participants were assigned to one B room. In the individuals condition, participants were assigned to separate rooms. Participants were informed that they would be interacting with the person (or group of persons) immediately across from them.

As in previous discontinuity research, participants received explicit instructions regarding the choice combinations in the PDG matrix, were tested individually concerning their understanding of the matrix, and had their tests corrected individually by the experimenter. Following the correction of the exercises, participants (as groups or individuals) played two practice trials on the PDG with the experimenter. For these practice trials, the payoffs were points, not money, and the experimenter selected X (the cooperative choice) on the first trial and Y (the competitive choice) on the second trial. The practice matrix was identical to the one on which the participants had been trained and to the one used on the actual trial. The group payoff values are presented in Figure 1. (The individual payoff values were divided by 3.) Participants in the single-trial condition were informed that they would interact on the PDG for a single trial, and participants in the multiple-trials condition were informed that they would interact on the PDG for six to eight trials. All participants interacted for a single trial.

The actual trial followed a sequence dictated by tape-recorded messages. Following the message "Look at your sheet," participants had 1 min to look over the matrix and think about their X or Y choice. Following the message "Meet in the middle," individuals or group representatives met in the center room for 1 min to discuss the matrix. Groups were informed that any member could serve as the representative. Following the message "Make a decision," the individuals or group representatives returned to their home rooms and had 1 min to record an X (cooperative) or Y (competitive) choice. Following the message "Turn in your decisions," the experimenter collected the decisions and administered the trust measure. After collecting the trust assessment, the experimenter allocated each individual or group the appropriate amount of money, indicated the choice of the other group or individual, and administered the remaining postexperimental questionnaire. As in all previous research, terms such as *game, cooperation,* and *competition* were never used. After they completed the final questionnaire, the participants were debriefed and dismissed.

Dependent Variables

Competitive behavior. The main dependent variable was the proportion of competitive choices made by the two individuals or groups. The proportion of competitive choices could vary from 0/2 to 1/2 to 2/2.

Trust. Participants indicated the likelihood (0–100%) that the other person (or group) chose X and Y, respectively. The likelihood ratings for the X and Y choices had to sum to 100. In the initial (Model 1) analysis with the two manipulated variables, trust, or expectancy of choosing X, was treated as a dependent variable and potential mediator. In the subsequent (Model 2) analysis, trust was treated as an additional independent variable along with abstractness.

In the context of the subsequent analysis in which trust was conceived of as an independent variable, there is a legitimate argument for measuring trust immediately before rather than immediately after the individual's or group's own choice. There are, however, two problems with measuring trust before the choice. First, intruding the assessment on the group discussion or on individual thought might have focused particular attention on trust and thus have influenced the choice. This potential problem could have been investigated with a manipulation of order of assessment. Second, even though there is no difficulty in knowing when an explicit choice is recorded in writing, there is a very real problem of knowing when group discussion or individual thought has approached but not achieved a deci-

sion and, thus, when the trust assessment should optimally occur. This problem could not have been addressed with a manipulation of order. This problem is analogous to the well-recognized dilemma in the dissonance literature of knowing whether spreading of the alternatives occurs before or after the choice (Mann, Janis, & Chaplin, 1969).

Reasons for choosing X or Y. The first question asked the participants to state the reasons for their choice (X or Y). Three judges coded the open-ended responses for the following: concern for maximizing relative outcomes (max rel; e.g., "We chose Y to make more money than the other side"), concern for maximizing one's own outcomes (max own; e.g., "We chose Y to make as much money as possible"), concern for joint outcomes (max joint; e.g., "We chose X so both sides could maximize their profits"), concern for minimizing the difference between outcomes (min diff; e.g., "We chose X so both sides could earn the same amount"), concern for long-term outcomes (long-term; e.g., "We could earn the most by choosing X on every trial"), trust (e.g., "We chose X because they said they would choose X as well"), distrust (e.g., "We didn't think they would keep their word about choosing X"), uncertainty (e.g., "They may choose either X or Y"), deceit (e.g., "We chose X to throw the other group off track and then go for the better outcome"), and commitment (e.g., "We agreed to choose X"). The intraclass correlations with the Spearman–Brown correction among the three judges were as follows: max rel = .64; max own = .95; max joint = .95; min diff = .94; long-term = .71; trust = .81; distrust = .94; uncertainty = .95; deceit = 1.00; commitment = .22. Open-ended statements relating to trust, deceit, and commitment occurred so rarely, however, that the data do not merit analysis.

Perceived categorization. The second assessment on the questionnaire asked participants to indicate whether they thought of the introductory psychology students participating in the session as one group, two groups, or separate individuals (S. L. Gaertner, Mann, Murrell, & Dovidio, 1989). The two-groups option was omitted for individuals. The derived score was the proportion of participants in each interaction who chose each of the three (or two) options.

Trial manipulation check and thoughts about previous session. The final questions asked participants to indicate with *yes* or *no* whether they expected there to be further trials and whether during the current session they had thought about the questions asked during the previous session.

Unit of Analysis

Because the responses of participants who interact are not independent, the unit of analysis, or observation, is the session. Thus, for the questionnaire data, the unit of analysis for the individuals and groups conditions combine the responses of the 2 persons and 6 group members, respectively. The number of observations were as follows: 29 for multiple-trials groups, 36 for single-trial groups, 41 for multiple-trials individuals, and 45 for single-trial individuals. For the analyses involving trust, there were four fewer observations for multiple-trials individuals.[7]

Results

Correlational Results: Abstract Reasoning

Table 1 contains the correlation matrix for the Big Five scales, the four Meyers–Briggs scales, and the CFC Scale. The correlations below the diagonal are for individuals, and the correlations above the diagonal are for sessions (averaging individuals within sessions). It is important to note that the two methods of calculating correlations produced descriptively similar results. The table indicates which correlations would be significant at the Bonferroni-adjusted $p < .05$ if the observations were independent.

As previously indicated, our original intention was to use the first principal component of a principal components analysis of the Openness–Intellect dimension of the Big Five, the SN dimension

of the Meyers–Briggs, and the CFC as our measure of a tendency to think abstractly. However, although the Openness–Intellect dimension of the Big Five and the SN dimension of the Meyers–Briggs correlated strongly (individual-level $r = -.69$; session-level $r = -.72$), neither Openness–Intellect nor SN correlated significantly with CFC (Openness–Intellect individual-level $r = .10$, session-level $r = .06$, and SN individual-level $r = .05$, session-level $r = .08$; see Table 1). Consequently, for our measure of abstractness, we took the first principal component of a principal components analysis of just Openness–Intellect and SN (which is mathematically equivalent to a sum of the responses to the two scales).[8] All analyses were conducted using the session-level index. This index was created by averaging across participants the scores for Openness–Intellect and for SN and then adding the components. The Spearman–Brown reliability of the combined index is .84 for the session-level data.

Trial Manipulation Check

We entered the proportion of participants in each session who indicated that they expected further trials into a 2 (gender) × 2 (groups vs. individuals) × 2 (trial) analysis of variance (ANOVA). Only the trial main effect was significant, $F(1, 137) = 387.77, p < .01$. In the single-trial sessions, 17% of the participants expected further trials, and in the multiple-trial sessions, 95% expected further trials.

We also analyzed the data by adding abstractness and trust to the model. The former variable, abstractness, was centered (Aiken & West, 1991) and derived, as described previously, by summing the session-level means for the Openness–Intellect Scale of the Big Five and the SN Scale of the Meyers–Briggs. We followed two different approaches to the assessment of trust. One approach was to categorize the trust variable as high or low according to whether the session mean was high, above 50%, or low, 50% or less. Given that the participants were faced with making a binary (X or Y) choice, there is reason to believe that a cut point of more than 50% trust is meaningful. The other approach was to center the trust variable and treat it as a regressor (i.e., continuous independent variable), just as we did with abstractness.

We analyzed the manipulation check data with a 2 (groups vs. individuals) × 2 (expected single trial vs. multiple trials) × 2 (low trust vs. high trust) × Abstractness model, with abstractness

---

[7] Because hierarchical linear modeling (HLM) is suitable for the analysis of hierarchically structured data sets, it offers an alternative approach to the analysis of our data. In our case, the hierarchy consists of two players (either individuals or groups) nested within sessions. In terms of HLM, the session is the upper level unit and the player is the lower level unit. We analyzed our data using HLM, treating the player instead of the session as the unit of analysis. The lack of independence between players within a session was controlled by specifying session as a random effect (Bryk & Raudenbush, 1992). The HLM analyses produced results comparable to those reported in this article. We chose to report the analyses that treat session as unit of analysis because they correspond conceptually to our theoretical focus, which has been on understanding differences between interindividual and intergroup behavior rather than differences between individual and group behavior (see Insko & Schopler, 1998).

[8] Testing a model that used CFC and trust along with the manipulated variables of groups versus individuals and trial revealed no significant or marginally significant effects involving CFC.

treated as a regressor. Again, only the trial main effect was significant, $F(1, 129) = 219.97$, $p < .01$. The same result was obtained when trust was treated as a regressor, $F(1, 129) = 254.09$, $p < .01$. These analyses indicate that we successfully manipulated the expectation of a single trial versus multiple trials.

Abstractness and Trust

Consistent with the assumption that abstract individuals are no more or less trusting than are nonabstract individuals, the correlation between trust and abstractness was .006.

Thoughts About the Previous Session

Analyses of the proportion of participants in a session who reported that they thought about the personality-testing session during the main experimental sessions revealed no significant effects, whether or not trust (as categorical variable or regressor) and abstractness were included in the model. The grand mean for all cells was .27.

First Model: Discontinuity as a Function of the Anticipation of Future Interaction

We entered the proportion of competitive choices into a 2 (gender) × 2 (groups vs. individuals) × 2 (trial) ANOVA. A main effect for gender indicated that men ($M = 0.33$) competed more than did women ($M = 0.21$), $F(1, 143) = 4.83$, $p < .05$. Consistent with the first prediction, a main effect for groups versus individuals indicated that groups ($M = 0.43$) competed more than did individuals ($M = 0.13$), $F(1, 143) = 30.86$, $p < .01$. A main effect for trial indicated that participants competed more when anticipating a single trial ($M = 0.32$) than when anticipating multiple trials ($M = 0.18$), $F(1, 143) = 6.19$, $p < .05$. Consistent with the second prediction, there was a significant Groups Versus Individuals × Trial Interaction, $F(1, 143) = 5.50$, $p < .05$ (see Table 2). Although groups competed significantly more than did individuals with the anticipation of both a single trial (groups $M = 0.56$, and individuals $M = 0.13$), $F(1, 143) = 35.30$, $p < .01$, and multiple trials (groups $M = 0.28$, and individuals $M = 0.12$), $F(1, 143) = 4.62$, $p < .05$, the difference between groups and individuals was smaller when anticipating multiple trials than when anticipating a single trial. Alternatively, the interaction could be viewed as a larger trial effect for groups than for individuals. Whereas groups competed less when anticipating multiple trials than a single trial, $F(1, 143) = 10.02$, $p < .01$, the comparable difference for individuals was not significant, $F(1, 143) = 0.01$, $p < .91$. No other effects were significant. The anticipation of multiple trials reduced the discontinuity effect by decreasing in-

tergroup competition. These results are further explored later in this article in the context of the second model, which includes trust and abstractness (see Table 3).

First Model: Trust as a Function of the Anticipation of Future Interaction

The fact that the anticipation of multiple trials reduced competitiveness, particularly for groups, is consistent with theory only to the extent that the trial manipulation also affected trust, or expectancy of choosing X. Analysis of the opponent's anticipated choice with the three-factor model produced a significant main effect for trial, $F(1, 139) = 17.96$, $p < .01$, a significant main effect for groups versus individuals, $F(1, 139) = 30.15$, $p < .01$, and a significant Trial × Groups Versus Individuals interaction, $F(1, 139) = 6.17$, $p < .05$.[9] The means for the expectancy of the opponent making the cooperative choice are 70.11 for groups anticipating multiple trials, 47.24 for groups anticipating a single trial, 80.54 for individuals anticipating multiple trials, and 76.03 for individuals anticipating a single trial. The simple effect of groups versus individuals was significant both for anticipated multiple trials, $F(1, 139) = 4.00$, $p < .05$, and for an anticipated single trial, $F(1, 139) = 36.54$, $p < .01$. However, whereas the simple effect of trial was significant for groups, $F(1, 139) = 19.69$, $p < .01$, it was not significant for individuals, $F(1, 139) = 1.81$, $p = .18$. Anticipating multiple trials increased trust for groups but not for individuals—however, the tendency for less trust between groups than between individuals remained significant even with multiple trials.

Second Model: The Role of Abstract Thinking and Trust

The third prediction was that the tendency toward reduced intergroup competitiveness in the context of anticipated multiple trials would be particularly apparent for groups composed of abstract-thinking members who trusted the opponent to reciprocate their cooperative choice. To test this hypothesis, we entered the proportion of competitive choices into a 2 (groups vs. individuals) × 2 (trial) × 2 (trust) × Abstractness ANOVA with abstractness treated as a regressor.

Consistent with our prediction, there was a significant Groups Versus Individuals × Trial × Trust × Abstractness interaction, $F(1, 131) = 8.40$, $p < .01$. The quadruple interaction was also significant when analyzed with trust treated as a regressor, $F(1, 131) = 8.74$, $p < .01$.[10] Predicted means for the interaction are shown in Table 3. These predicted means were conditioned on values of one standard deviation above and below the mean of the

---

[9] Four individual sessions, in which expectancy was measured after the feedback indicating the other individual's choice, were dropped, reducing denominator degrees of freedom by four.

[10] Two further questions can be asked regarding the quadruple interaction. The first question concerns what happens when Openness–Intellect and SN are tested separately. For the analyses in which trust was treated as a categorical variable, the quadruple interaction was nonsignificant for Openness–Intellect, $F(1, 131) = 1.75$, $p < .188$, but significant for SN, $F(1, 131) = 8.83$, $p < .01$. For the analyses in which trust was treated as a regressor, the quadruple interaction was significant for both Openness–Intellect, $F(1, 131) = 4.08$, $p < .05$, and for SN, $F(1, 131) = 8.69$, $p < .01$.

Table 2

Mean Proportion of Competitive Choices as a Function of Groups Versus Individuals and Expected Single Trial Versus Expected Multiple Trials

Trial	Individuals	Groups
Expect single	.13	.56
Expect multiple	.12	.28

Table 3

Predicted Mean Proportions of Competitive Choices as a Function of Groups Versus Individuals, Expected Single Trial Versus Multiple Trials, Trust, and Abstractness

	Individuals				Groups			
	Low abstractness		High abstractness		Low abstractness		High abstractness	
Trial	Low trust	High trust	Low trust	High trust	Low trust	High trust	Low trust	High trust
Single	.62	.03	.52	.02	.88	.14	.73	.40
Multiple	.81	.07	.44	.01	.29	.26	.90	.07

Note. The predicted means were conditioned at values of one standard deviation above and below the mean of abstractness (Aiken & West, 1991). The competition values are the proportion of competitive responses in a session.

regressor, abstractness (Aiken & West, 1991). We decomposed the quadruple interaction by examining the Trial × Trust × Abstractness interaction separately for individuals and for groups. For individuals, the only significant effects were the trust main effect, $F(1, 131) = 60.38, p < .01$, and the abstractness main effect, $F(1, 131) = 3.99, p < .05$. Individuals who anticipated a competitive opponent (low trust) competed more than did individuals who anticipated a cooperative opponent (high trust). Additionally, individuals became more competitive as their level of abstractness decreased.

For groups, the Trial × Trust × Abstractness interaction was significant, $F(1, 131) = 8.66, p < .01$. Using regression procedures outlined by Aiken and West (1991), we decomposed the triple interaction by examining the Trust × Trial interaction separately for groups whose members were low or high in abstractness. For high-abstractness groups, the Trial × Trust interaction was significant, $F(1, 131) = 4.56, p < .05$, indicating a greater tendency for high trust to be associated with reduced competitiveness for expected multiple trials (low-trust $M = 0.90$, high-trust $M = 0.07$) than for an expected single trial (low-trust $M = 0.73$, high-trust $M = 0.40$). In both instances, however, the trust associations were significant, $F(1, 131) = 22.02, p < .01$, for multiple trials, and $F(1, 131) = 4.43, p < .05$, for a single trial. Testing the simple effects in the other direction, across rows, indicates that with high trust, expected multiple trials were associated with less competitiveness than was an expected single trial (multiple-trials $M = 0.07$, single-trial $M = 0.40$), $F(1, 131) = 4.32, p < .05$,

whereas the same comparison with low trust was not significant. The low mean of 0.07 is gratifying, because it supports the initial expectation that competitiveness for groups would be reduced when the groups were composed of high-abstract members who anticipated multiple trials and who trusted the other group to reciprocate the cooperative response. It is also noteworthy that the discontinuity effect, the difference between groups and individuals, was not significant for participants high in abstractness and trust, $F(1, 131) = 0.39, p < .54$, whereas the discontinuity effects were significant for each of the other high-abstract conditions.

One may recall Pruitt and Kimmel's (1977) argument that long-range thinking leads to the "recognition that the dyad must choose between mutual cooperation and mutual noncooperation and that the former is preferable to the later" (p. 375) but that for cooperation to occur such recognition must be accompanied by an expectation that cooperation will be reciprocated. The low mean, indicating only 7% competitive responses with expected multiple trials and high trust, is consistent with this argument, although the effect only occurred with groups and then only with groups whose members were prone to think abstractly—as Pruitt and Kimmel obviously thought.

For groups composed of members who were prone to think concretely, there was also a significant double interaction, $F(1, 131) = 7.89, p < .01$, but a double interaction indicating an opposite tendency for trust to be more negatively associated with competitiveness for an anticipated single trial (low-trust $M = 0.88$, high-trust $M = 0.14$) than for anticipated multiple trials (low-trust $M = 0.29$, high-trust $M = 0.26$). The simple effect for trust with a single trial was significant, $F(1, 131) = 27.49, p < .01$, whereas the simple effect with multiple trials was not significant, $F(1, 131) = 0.02, p < .91$. We had anticipated that the double-interaction pattern we observed for high-abstract groups would be weaker for low-abstract, or concrete, groups, but a complete reversal is a surprise. If the participants' only concern is to maximize their own outcomes, then trust should have no effect on competitiveness with an anticipated single trial but should have a determining effect with anticipated multiple trials. High-abstract groups did show a trust effect for an expected single trial, but this effect was weaker than the one that occurred for anticipated multiple trials. On the other hand, low-abstract groups showed a trust effect for an anticipated single trial but no trust effect for anticipated multiple trials.

The effect was descriptively stronger with SN. We suspect that one possible advantage of the SN scale is that the forced-choice items require more careful judgments than do the 7-point ratings used by the Openness–Intellect scale. The second question concerns what happens when gender is added to the four-factor model. With such a model, the predicted quadruple interaction was not qualified by gender, $F(1, 115) = .097, p < .33$, with trust as a categorical variable, and $F(1, 115) = .031, p < .86$, with trust as a regressor. The quadruple interaction was significant with trust as a categorical variable, $F(1, 115) = 5.16, p < .05$, and marginal with trust as a regressor, $F(1, 115) = 3.60, p < .06$. There were no significant effects involving gender when trust was treated as a categorical variable, and there was one lower order gender interaction when trust was treated as a regressor. By not adding gender to the four-factor model, we increase degrees of freedom and power.

Members of low-abstract groups appeared not to understand that reciprocation with anticipated multiple trials was functional, whereas reciprocation with an anticipated single trial was not functional. Why should this have been the case? One possibility is that these participants were mainly concerned with reciprocation and fairness. However, if this was true for an anticipated single trial, why was it not also true for anticipated multiple trials? With an anticipated single trial, perhaps the participants were guided by a simple reciprocation tendency. In the context of anticipated multiple trials, although they understood that the situation was more complex, perhaps they did not think through the implication of the complexity. On the other hand, it should be noted that, consistent with the trust main effect for the individual data, low-abstract individuals who anticipated multiple trials did show a trust effect (low-trust $M = 0.81$, high-trust $M = 0.07$). The total pattern of results suggests that low-abstract persons generally reciprocate anticipated responses, except in a group context with anticipated multiple trials.[11]

Our initial thinking about groups with anticipated multiple trials has focused primarily on an expected low level of competition with high abstractness and high trust, and, indeed, there was only 7% competitive responding in this cell—the lowest percentage for all of the 8 group cells. On the other hand, with high abstractness and low trust, there was 90% competitive responding—the highest percentage of all 16 cells. High-abstract groups were obviously not necessarily pacifistic.[12]

Some readers may wonder why, despite repeated past findings of moderately low levels of competitiveness between individuals, there are individual cells in Table 3 with fairly high levels of competitiveness. It is important to note, however, that these are generally cells in which trust is low, and, as indicated previously, an analysis of just the individual data revealed a main effect for trust. The relatively low levels of competitiveness that were observed in the past can be attributed partially to the fact that individuals are more prone than are groups to trust their opponents. For the present data, the number of individual sessions with trust above 50% or at or below 50% are 68 and 14, respectively, whereas the comparable frequencies for group sessions are 39 and 26. This tendency toward more trust between individuals than between groups was significant, $\chi^2(1; N = 147) = 10.02, p < .01$ (consistent with the previously reported main effect of groups vs. individuals on rated expectancy of choosing X). The data imply that individuals who do not trust others will compete.

One final observation deserves comment. The 16 cell means in Table 3 allow for eight comparisons of groups and individuals. Seven of the eight comparisons indicate a descriptive tendency for higher group means. In one instance, however (low abstractness, low trust, and multiple trials), the individual mean (0.81) was higher than the group mean (0.29), and an unplanned test of this difference, $F(1, 131) = 5.05$, had a p value of .03. Because this is a post hoc comparison, the significance level should be regarded with caution. However, the relative novelty of this directional reversal compared with other cells in the design (and past research) may be noteworthy. This reversed discontinuity effect is associated with the previously described tendency, in the context of anticipated multiple trials, for low-abstract groups not to be significantly influenced by trust, whereas low-abstract individuals show a strong trust, or reciprocation, tendency.

First Model: Reasons for Choosing X or Y in the Context of a Model Not Including Trust and Abstractness

Analyses of the open-ended responses with a model that included groups versus individuals, trial, and gender resulted in significant main effects of groups versus individuals for distrust, $F(1, 143) = 32.23, p < .01$; for uncertainty, $F(1, 143) = 29.22, p < .01$; for max own, $F(1, 143) = 29.22, p < .01$; for max joint, $F(1, 143) = 26.64, p < .01$; for min diff, $F(1, 143) = 10.04, p < .01$; and for long-term consequences, $F(1, 143) = 4.39, p < .05$. On the one hand, there were more responses related to distrust for groups ($M = 0.12$) than for individuals ($M = 0.02$), more responses related to uncertainty for groups ($M = 0.13$) than for individuals ($M = 0.04$), and more responses related to max own for groups ($M = 0.38$) than for individuals ($M = 0.11$). On the other hand, there were more responses related to max joint for individuals ($M = 0.66$) than for groups ($M = 0.37$), more responses related to min diff for individuals ($M = 0.49$) than for groups ($M = 0.33$), and more responses related to long-term consequences for individuals ($M = 0.13$) than for groups ($M = 0.06$).

The responses related to long-term consequences also revealed a main effect for trial (as described later in the context of the four-factor model) and a significant Groups Versus Individuals × Trial interaction, $F(1, 143) = 4.26, p < .05$. The tendency for individuals to make more statements related to long-term consequences than did groups was greater with anticipated multiple trials (individual $M = 0.26$ vs. group $M = 0.13$) than with an anticipated single trial (individual $M = 0.01$ vs. group $M = 0.00$).[13]

---

[11] An alternative approach to characterizing the triple interaction for groups is to test the trust and abstractness effects separately for a single trial and multiple trials. With an anticipated single trial, the only significant effect was the trust main effect, $F(1, 131) = 45.59, p < .01$. Groups whose members anticipated a competitive opponent (low trust) competed more than did groups whose members anticipated a cooperative opponent (high trust). With anticipated multiple trials, on the other hand, there was a significant Abstractness × Trust interaction, $F(1, 131) = 2.43, p < .02$. In the context of anticipated multiple trials, trust had a stronger negative relationship with competitiveness for groups high in abstractness (low-trust $M = 0.90$, high-trust $M = 0.07$) than for groups low in abstractness (low-trust $M = 0.29$, high-trust $M = 0.26$).

[12] Although qualified by the quadruple interaction, there were two other significant effects: a Groups Versus Individuals × Abstractness interaction, $F(1, 131) = 4.74, p < .05$, with trust as a categorical variable, and $F(1, 131) = 7.56, p < .01$, with trust as a regressor, and a Trial × Trust × Abstractness interaction, $F(1, 131) = 4.15, p < .05$, with trust as a categorical variable, and $F(1, 131) = 4.44, p < .05$, with trust as a regressor. The more interesting of these, the Groups Versus Individuals × Abstractness interaction indicates a tendency for high-abstract groups to be more competitive than high-abstract individuals relative to a near zero difference for low-abstract groups and individuals.

[13] Of less interest is the fact that there were also significant trial main effects for max own, max joint, min diff, and uncertainty as well as a more interesting trial main effect for distrust (paralleling the previously described result for trust, or expectancy of cooperating). Significant or marginal Groups Versus Individuals × Trial interactions occurred for max rel, $F(1, 143) = 4.75, p < .05$; for uncertainty, $F(1, 143) = 3.09, p < .08$; for max own, $F(1, 143) = 4.39, p < .07$; and for min diff, $F(1, 143) =$

Mediational Analyses: The Groups Versus Individuals Main Effect

The preceding results relating to coded reasons for choosing Y or X provide circumstantial support for our three hypotheses concerning the basis of the discontinuity effect. The fact that the group participants were more likely to make distrust and uncertainty statements is consistent with the fear hypothesis. The fact that the group participants were more likely to make max own statements and less likely to make min diff statements is consistent with the greed hypothesis. Also, the tendency of individuals to make more min dif statements and fewer max own statements is consistent with the identifiability hypothesis. Beyond these interpretations, the finding that individuals were more likely to make long-term-consequences statements is consistent with a fourth hypothesis for explaining the discontinuity effect—the hypothesis that groups are less likely than individuals to consider the reciprocal consequences of their choices.

The parallel effects of the groups versus individuals main effect on competitiveness and on various possible mediators satisfy two of Baron and Kenny's (1986) four tests for mediation. Given these results, it is reasonable to report the third and fourth tests. It is important to note, however, that a problem with interpreting the results of such tests is that the open-ended assessment of reasons for making the competitive or cooperative choice was taken after the choice. This problem is particularly acute when, as in most discontinuity research, there are multiple trials but is nonetheless present when, as in the present case, there is only one trial. A further problem is that unless the variables are measured with perfect reliability, there is the possibility that sources of error variances common to the variables may produce a spurious direct regression between the variables. Still, Baron and Kenny's tests do provide a way of putting hypotheses at risk, and for that reason they are at least suggestive. The tests are probably most informative when a potential mediator fails to meet one or more of the required criteria.

The third test for mediation is that there be a significant regression of competitiveness on the proposed mediator. We simultaneously entered distrust, uncertainty, max own, max joint, min diff, and long-term consequences into the model including gender, groups versus individuals, and trial factors. The results indicated significant regressions of competitiveness on all of the possible mediators except one, long-term consequences, $F(1, 137) = 2.27$, $p < .135$. We interpret this result as inconsistent with the possibility that groups' lesser concern with long-term consequences is responsible for their greater competitiveness.

The fourth test requires a reduction in the groups versus individuals main effect on competitiveness when a mediator is held constant in an analysis of covariance (ANCOVA). An ANCOVA assumes homogeneity of regression, and the test failed for both

max joint, $F(1, 135) = 25.92$, $p < .01$, and min diff, $F(1, 135) = 13.52$, $p < .01$.[14] This reduces the number of possible mediators that can be tested to three: uncertainty, distrust, and max own. As reported previously, without any covariates in the model, the test of the groups versus individuals main effect was significant, $F(1, 143) = 30.86$, $p < .0001$. When uncertainty was used as a covariate, the main effect was only slightly reduced, $F(1, 142) = 25.38$, $p < .0001$. When distrust was used as a covariate, the main effect was more markedly reduced, although still significant, $F(1, 142) = 9.01$, $p < .003$. The reduction was significant, $z = 4.18$, $p < .01$. When max own was used as a covariate, the main effect became nonsignificant but marginal, $F(1, 142) = 2.84$, $p < .09$. Again, the reduction was significant, $z = 5.18$, $p < .01$. When both distrust and max own were used as covariates, the main effect was reduced even further, $F(1, 141) = 0.61$, $p < .436$. These results are consistent with the possibility that the discontinuity effect is mediated partially by distrust and partially by max own. The minimal reduction in the effect with uncertainty as a covariate suggests that the distrust has to be explicit.

Again, it is important to note that these results could have been produced by the effect of competitiveness on the supposed mediators rather than by the reverse. Thus, after the fact, the participants who competed could have mentioned distrust and max own as an explanation for the competitive response. In general, however, we feel that this is less plausible for max own than for distrust. The reason is that max own is more obviously self-serving than is distrust. Mentioning max own after the choice is an obvious confession of self-interest.

The most definitive conclusion of the analyses is the fact that a concern with long-term consequences does not appear to be a mediator of the discontinuity effect.[15] On the other hand, the previously described significant quadruple interaction for choice does imply that the anticipated presence or absence of future interaction is a moderator of the discontinuity effect.

Second Model: Reasons for Choosing X or Y That Tracked the Quadruple Interaction

We entered the coded categories for the participants' reasons for making a cooperative or competitive choice into separate 2 (groups vs. individuals) × 2 (trial) × 2 (trust) × Abstractness analyses. Concern for maximizing one's own outcomes (max own) tracked the choice behavior. There was a significant quadruple interaction for max own with trust as a categorical variable, $F(1, 131) = 6.20$, $p < .02$, and for trust as a regressor, $F(1, 131) = 9.55$, $p < .01$. Predicted means for max own are presented in Table 4. Parallel to the analyses of the choice data, we decomposed the quadruple interaction for the max own data by examining the Trial × Trust × Abstractness factors separately for individuals and groups. These

---

4.39, $p < .05$. For max rel, the significant interaction related to a larger mean for groups in the single-trial condition ($M = 0.04$) than the multiple-trials condition ($M = 0.01$), and the opposite pattern was shown for individuals ($M = 0.01$ vs. $M = 0.02$). For min diff, the significant interaction related to a larger mean for individuals in the single-trial condition ($M = 0.59$) than in the multiple-trials condition ($M = 0.37$), relative to the small difference for groups ($M = 0.34$ vs. $M = 0.32$).

[14] The test for heterogeneity of regression (the interaction with groups vs. individuals) was also significant for the explicit rating of trust, or expectancy of choosing X.

[15] With long-term consequences as a covariate, the discontinuity effect, $F(1, 142) = 29.23$, $p < .0001$, was minimally reduced.

Table 4

Predicted Mean Proportions of Max-Own Statements as a Function of Groups Versus Individuals, Expected Single Trial Versus Multiple Trials, Trust, and Abstractness

	Individuals				Groups			
	Low abstractness		High abstractness		Low abstractness		High abstractness	
Trial	Low trust	High trust	Low trust	High trust	Low trust	High trust	Low trust	High trust
Single	.38	.06	.45	.08	.69	.12	.60	.39
Multiple	.37	.08	.19	.01	.18	.14	.77	.11

Note. The predicted means were conditioned at values of one standard deviation above and below the mean of abstractness (Aiken & West, 1991). The max-own values are the proportion of participants in a session who expressed concern with maximizing their own outcomes for the prisoner's dilemma game choice.

analyses revealed approximately the same results as did the analyses of the choice data.[16]

Mediational–Moderational Analyses: The Quadruple Interaction

A mediational analysis satisfied all four of Baron and Kenny's (1986) tests for mediation of the quadruple interaction by max own.[17] However, there is a problem. The problem relates to the fact that there was significant heterogeneity of regression. Testing a five-factor model that added max own to the four factors of the second model revealed a significant five-factor interaction both with trust treated as a regressor, $F(1, 115) = 6.64, p < .0112$, and with trust treated as a categorical variable, $F(1, 115) = 10.49, p < .0016$. There are at least two reasons for being cautious about such a model. First, inclusion of max own in the second model produces a complex five-factor model in which we may not have a sufficient number of observations to credibly test the required 31 effects (Stevens, 1996, pp. 123–127). Second, the high negative correlation between trust and max own ($r = -.666$) makes the orthogonal separation of trust and max own problematic. (The correlations of abstractness with trust and max own were low; rs of .006 and .003, respectively.) On the other hand, the problem of the negative correlation between trust and max own is somewhat less problematic when trust is treated as a categorical variable ($r = -.456$), and the five-factor analysis with trust as a categorical variable produced the descriptively larger F. Furthermore, when we apply the conservative Bonferroni correction ($.05/31 = .0016129$), the F for the interaction with the more valid categorical treatment of trust remains significant. We are inclined to take the interaction seriously and, therefore, doubt the validity of the mediational analysis.

The test for heterogeneity of regression indicates that the regression of competitiveness on max own differed across the cells. But what was the pattern of differing regressions? Whereas some five-factor interactions may be descriptively complex, this one followed an intuitively plausible pattern. The previously described quadruple interaction was present for high max own, $F(1, 115) = 14.41, p < .01$, with trust treated as a categorical variable, and $F(1, 115) = 9.32, p < .01$ with trust treated as a regressor, and absent for low max own, $F(1, 115) = 1.56, p < .21$, with trust treated as a categorical variable, and $F(1, 115) = 0.42, p < .51$, with trust treated as a regressor. The tendency for abstractly oriented groups to compete with low trust and cooperate with high

trust when future trials were anticipated relative to a smaller such trust difference when future trials were not anticipated was greater for those group members reporting a high concern with maximizing outcomes. To the extent that the data do not provide legitimate evidence for mediation of the quadruple interaction by max own,

[16] Among individuals, only the main effect of trust was significant, $F(1, 131) = 18.40, p < .01$. Individuals who anticipated a competitive opponent (low trust) made more max own statements than did individuals who anticipated a cooperative opponent (high trust). Except for the lack of an abstractness main effect, the max own results for individuals parallel the choice effects for individuals. For groups, the Trial × Trust × Abstractness interaction was significant for max own, $F(1, 131) = 6.51, p < .02$. We decomposed this triple interaction by examining the Trial × Trust interaction separately for high- and low-abstract groups. For high-abstract groups, the interaction was significant, $F(1, 131) = 3.58, p < .05$, indicating a greater tendency for trust to be negatively associated with max own for expected multiple trials (low-trust $M = 0.77$, high-trust $M = 0.11$) than for an expected single trial (low-trust $M = 0.60$, high-trust $M = 0.39$). The trust effect was significant, $F(1, 131) = 15.91, p < .01$, for multiple trials and nonsignificant, $F(1, 131) = 2.13, p < .15$, for a single trial. These results approximately parallel the results for choice behavior. For groups composed of members who are prone to think concretely, there was also a significant double interaction, $F(1, 131) = 7.89, p < .01$, but a double interaction indicating an opposite tendency for trust to be more strongly associated with max own for an anticipated single trial (low-trust $M = 0.69$, high-trust $M = 0.12$) than for anticipated multiple trials (low-trust $M = 0.18$, high-trust $M = 0.14$). The simple effect for trust with a single trial was significant, $F(1, 131) = 18.68, p < .01$, whereas the simple effect with multiple trials was not significant, $F(1, 131) = 0.03, p < .88$. As with the choice data, we again saw the unexpected double interaction pattern in which trust had a stronger relationship for an anticipated single trial than for anticipated multiple trials.

[17] The preceding results indicating a quadruple interaction for both max own and competitiveness satisfy two of Baron and Kenny's (1986) tests for mediation. The third test is for the regression of competitiveness on max own. This regression was significant, $F(1, 130) = 168.23, p < .01$. The fourth test is for a possible reduction in the quadruple interaction for competitiveness if max own is used as a covariate. As reported previously, without the covariate, the quadruple interaction effect for competitiveness was significant, $F(1, 131) = 8.74, p < .0037$. With the max own covariate, the quadruple interaction effect for competitiveness became nonsignificant, $F(1, 130) = 0.85, p < .357$. The reduction was significant, $z = 3.06, p < .01$. A similar reduction occurred when trust was treated as a categorical variable, $z = 2.98, p < .01$.

the data do provide consistent evidence with the possibility of moderation of the quadruple interaction by max own. We recognize that this is a judgment call, but we believe that the data are more consistent with the possibility of max-own moderation than with the possibility of max-own mediation.

Other Four-Factor Results Relating to Reasons for Choosing X or Y

Of the other results from the coded open-ended responses, two merit special attention. One is the failure to obtain a significant quadruple interaction for anticipated long-term consequences of one's own choice. The only significant effect for long-term consequences was the main effect for trial, $F(1, 131) = 13.86, p < .01$, with trust as a categorical variable, and $F(1, 131) = 17.32, p < .01$, with trust as a regressor. Persons who anticipated multiple trials mentioned long-term consequences more frequently $(M = 0.20)$ than did persons who anticipated a single trial $(M = 0.01)$. This result serves as an additional manipulation check for trial that is less direct than the previously reported manipulation check. That is reassuring, of course, but we had expected a quadruple interaction paralleling the choice data, and that did not occur. This failure can be contrasted with the fact that max own did reveal a quadruple interaction paralleling the choice data. The total pattern of results implies that the participants were outcome oriented but not process oriented. It is important to note that when participants were led to expect additional trials, only 20% of them made reference to long-term consequences in their open-ended responses.

The other noteworthy result from the four-factor analysis of the open-ended responses is the main effect of trust on uncertainty, $F(1, 131) = 29.46, p < .01$, with trust as a categorical variable, and $F(1, 131) = 23.48, p < .01$, with trust as a regressor. Persons who expected their partner to compete (i.e., people with low trust) mentioned uncertainty more frequently $(M = 0.20)$ than did persons who expected their partner to cooperate $(M = 0.02)$. The direction of this result makes clear that uncertainty corresponded with the expectation of competition and not with the expectation of cooperation.[18]

Perceived Categorization

Participants in the individuals condition were asked whether they thought of the students in the session as one group or separate individuals. A 2 (categorization) × 2 (trial) × 2 (trust) × 2 (abstractness) mixed analysis with type of categorization as a 2-level within-subject factor revealed only a main effect for categorization with trust as a categorical variable, $F(1, 70) = 25.54, p < .01$, and with trust as a regressor, $F(1, 131) = 37.76, p < .01$. A greater proportion of participants in the individuals sessions categorized the session as being made up of separate individuals $(M = 0.72)$ than as consisting of one group $(M = 0.28)$.

Participants in the groups condition were asked whether they thought of the students in the session as two groups, one group, or separate individuals. A 3 (categorization) × 2 (trial) × 2 (trust) × Abstractness mixed analysis with type of categorization as a 3-level within-subject factor revealed a significant main effect for categorization with trust as a categorical variable, $F(2, 53) = 34.36, p < .01$, and with trust as a regressor, $F(2,$

53) $= 32.72, p < .01$. We examined the main effect with comparisons planned from previous research (Insko et al., 1998). The mean proportion of the two-groups representation $(M = 0.63)$ was significantly greater than that for the combined mean of the one-group $(M = 0.18)$ and separate-individuals representations $(M = 0.19)$, $F(1, 54) = 69.93, p < .01$, and the latter representations did not differ, $F(1, 54) = 0.10, p = 0.75$.

Subsequent analyses were separately conducted on the two-groups, one-group, and separate-individuals representations. The noteworthy result from these analyses was a significant effect of trust on the two-groups representation, $F(1, 54) = 4.86, p < .05$, with trust as a categorical variable, and $F(1, 54) = 5.91, p < .05$, with trust as a regressor. The two-groups representation was stronger for groups that anticipated a competitive opponent $(M = 0.76)$ than for groups that anticipated a cooperative opponent $(M = 0.55)$. This relationship between trust and categorization suggests the interesting possibility that the tendency to perceive two separate groups partially determines distrust.

Other Possible Models: Abstractness Without Trust and Trust Without Abstractness

The preceding results were presented in the context of two models: a first model that included, in addition to gender, the manipulated variables of groups versus individuals and trial, and a second model that added the two assessed variables of trust and abstractness. The reason for adding trust and abstractness to the first model is that by adding both variables, we are able to conduct a definitive test of the interaction (or moderation) of trust by abstractness. However, why is that the case?

One may consider a possible model in which we add just abstractness to the first model variables. Testing this model revealed no significant effects involving abstractness. Because trust was not in the model and abstractness only functions in combination with trust, it could be argued that the lack of effects for abstractness is understandable. It is important to note, however, that the analysis of trust by the first model revealed three significant effects for trust: the main effect of groups versus individuals, the main effect of trial, and the Groups Versus Individuals × Trial interaction. Therefore, it is possible that abstractness could have interacted with one or more of these three ANOVA effects, but that did not happen. Why not? We believe that the reason is that the trust variance was partitioned into three pieces (one piece for each significant effect), and thus the only definitive way to test for an interaction of abstractness with trust was to include an explicit trust variable. That, of course, is what we did in the second model, and this model, indeed, resulted in a significant quadruple interaction involving abstractness.

What happened to the Groups Versus Individuals × Trial interaction for competitive choices when abstractness was used as a covariate? As indicated previously, without a covariate, the interaction was significant, $F(1, 143) = 5.50, p < .0204$. When

---

[18] The remaining effects also involved the trust variable. Trust, for example, had significant (and descriptively large) main effects on max rel, max own, max joint, min dif (equality or fairness), and distrust. The main effect of trust on long-term consequences was not significant, $F(1, 131) = 2.68, p < .12$, for trust as a categorical variable, and $F(1, 131) = 2.21, p < .14$, for trust as a regressor.

abstractness was used as a covariate, the interaction was minimally altered, $F(1, 142) = 5.48, p < .0207$. Furthermore, consistent with our assumption that abstractness would not be related to choice behavior, the regression of competitive choices on abstractness was not significant, $F(1, 142) = 1.62, p < .20$. The total pattern of results is consistent with the possibility that abstractness played a moderating but not a mediating role on the tendency toward reduced competitiveness in groups when future trials were anticipated.

What about a model in which trust but not abstractness is added to the first model variables? With such a model, the interaction (or moderation) of the Groups Versus Individuals × Trial double interaction by trust was nonsignificant but marginal, $F(1, 131) = 3.05, p < .083.$[19] When trust (expectancy of choosing X) was used as a covariate, the interaction became nonsignificant, $F(1, 138) = 0.36, p < .5478$, and the reduction was significant, $z = 2.44, p < .05$. Furthermore, the regression of competitive choices on trust was significant, $F(1, 138) = 138.75, p < .01$. These results are consistent with the possibility that trust mediated the effect of the double interaction on competitiveness.

An Overall Interpretation

The total pattern of results from the previous analyses is consistent with the possibility that trust and abstractness jointly moderated the reduced tendency of groups to compete in the context of anticipated future trials. Within the context of the first model, trust also operated as a mediator of this effect. Although we regard this conclusion as plausible, we again emphasize than any such conclusion is rendered uncertain by measurement error and by uncertainty regarding causal sequence.

Such uncertainty increases even further when we consider how to integrate the preceding speculation with the results of the mediational–moderational analyses of the second, or four-factor, model. This analysis produced results that suggest that the quadruple interaction (indicating that the double interaction was only evident for abstract thinkers who trusted their opponents) was moderated by max own, or a concern with maximizing outcomes. Possibly, max own and trust were related in a feedback loop, such that in the context of anticipated future trials there was a recognition of the implication of trust for maximizing outcomes and the requirement of trust for maximizing outcomes. The data are consistent with the possibility that it was the abstractly oriented group members who were particularly inclined to recognize the interrelationship between trust and max own.

Discussion

First Model

The data from the present experiment were primarily examined from the perspective of two different models. The first model included the manipulated variables of groups versus individuals and trial (an anticipated single trial vs. anticipated multiple trials) as well as gender of participants. The results were consistent with the first prediction of greater competitiveness between groups than between individuals and with the second prediction that the tendency of groups to be more competitive than individuals would be

smaller with anticipated multiple trials than with an anticipated single trial.

First prediction. Confirmation of the first prediction is, of course, a replication of the interindividual–intergroup discontinuity effect that has been repeatedly found in the past. What is novel is that the mediational analysis provided suggestive support for the role of distrust and max own in the production of the discontinuity effect. A mediational role for distrust is assumed by the fear hypothesis. The fear hypothesis accounts for the discontinuity effect in terms of the greater fear or distrust between groups than between individuals. A mediational role for max own is assumed by the greed and identifiability hypotheses. The greed hypothesis accounts for the discontinuity effect in terms of the group-based social support for responding in terms of immediate self-interest. The identifiability hypothesis accounts for the discontinuity effect in terms of the assumed greater identifiability of individuals for self-interested behavior. As indicated previously, however, the mediational results could have been produced by competitiveness affecting distrust and max own or by a feedback loop between competitiveness and either distrust and max own or both distrust and max own.

Perhaps the most definitive result of the mediational analysis was the failure of long-term consequences to pass all of the Baron and Kenny (1986) tests. The current data are not consistent with the possibility that the greater tendency of individuals than groups to cooperate is due to the greater tendency of individuals than group members to consider long-term consequences.

Second prediction. Confirmation of the second prediction is consistent with the assumption that the anticipation of future interaction can lead to a reduction in the greater competitiveness of groups than of individuals. Previous research (Insko et al., 1998) had investigated a shift from immediate present to anticipated future consequences by demonstrating that the discontinuity effect was reduced through interaction with a tit for tat opponent and also by responding with successive turn-taking. Some might argue that the present approach of manipulating whether further trials were anticipated is a more direct approach to the problem. From our perspective, these are all different approaches to achieving a similar shift to anticipated future consequences.

Whatever the approach to shifting attention from the immediate situation to anticipated future consequences, our theoretical perspective only predicts a decrease in competitiveness if there is an associated increase in trust. If the opponent is expected to compete, the adaptive response is to compete both in the immediate present and in the future. Although tit for tat and successive responding do not directly produce trust, they do produce approximate functional

---

[19] Another approach to this interaction is with the open-ended measure of distrust. However, the presence of cells with no coded distrust measure prevented testing of the Distrust × Groups Versus Individuals × Trial interaction. Given that the amount of distrust for individuals was low, it is not surprising that there would be some individual cells with no open-ended mention of distrust. It is important to note that this problem did not occur when the individual cells were collapsed in the mediational analysis of the groups versus individuals main effect. We recognize that it is somewhat awkward that the open-ended assessment of distrust was used in the mediational analysis of the main effect of groups versus individuals and that the trust (expectancy of choosing X) rating was used in the mediational analysis of the Groups Versus Individuals × Trial interaction.

equivalents that may eventually result in trust. As previously indicated, successive responding with strict turn taking guarantees the opportunity to verify the opponent's choice on every other trial, and tit for tat, or strict reciprocation, implies predictability of the opponent's behavior. But what about the present manipulation of whether or not more than one trial was anticipated? We predicted that the anticipation of more than one trial would produce an increase in trust, and that, in fact, occurred. The basis for the prediction was the assumption that with additional trials, participants might recognize that mutual trust could produce mutual benefit and also that anticipated contact could, in itself, produce assumed mutual trust.

We acknowledge that the anticipation of more than one trial might have reduced competitiveness through some nontrust-related process—for example, an attempt to avoid the unpleasantness of conflict. Recognition of this possibility makes clear the reason it is important to have investigated a possible mediational role for trust in the predicted double interaction of the first model.

The present findings relate only to anticipated interaction beyond a first trial. What should happen with actual extended interaction? It is, of course, obvious that extended interaction is no panacea for reducing intergroup conflict. On the other hand, it could well be that under some circumstances, extended conflict can indeed be associated with the recognition that mutual trust could produce mutual benefit. One may recall Axelrod's (1984) trench warfare example from World War I. Further possible examples occurred in the interaction of Israel's Prime Minister Begin and Egypt's Mubarak at Camp David and in the several interactions of Ronald Reagan and Mikhail Gorbachev, and we may see beginnings of the recognized mutual benefit of mutual trust in Northern Ireland and in Palestine. It is important to note that the Thirty Years War did finally end (at the Peace of Westphalia), and not because either side was defeated. We find it plausible that in the face of protracted conflict, group members might come to appreciate the importance of mutual trust, both for their own welfare and for the welfare of their children and grandchildren.

Second Model and Third Prediction

The second model includes the assessments of trust and abstractness in addition to the manipulated factors of the first model. For this model, we predicted that the reduced tendency for groups to be more competitive than individuals when more than one trial was anticipated would be particularly apparent for groups composed of abstract members who trusted their opponent. This third prediction was confirmed. It is important to note that the prediction was not that groups with abstract members would always be cooperative but rather that the cooperative tendency would only occur if multiple trials were anticipated and if the opponent was trusted. Confirmation of this prediction is an example of construct validation (Cronbach & Meehl, 1955). The fact that the reduction in competitiveness for high-abstract group members occurred when future trials were anticipated and when the opponent was trusted is evidence that the assessment of abstractness was indeed a measure of the participants' tendency to think through the consequences of future interaction.

Our initial orientation was to focus on the reduction of group competitiveness for high-abstract group members who trusted their opponent when future trials were anticipated. Indeed, in that cell,

competitiveness was only 7% (see Table 3). However, in the adjacent cell with low trust, competitiveness was 90%—the highest percentage in all the cells. Such results suggest that the high-abstract group members who did not trust their opponents recognized that they were in a future struggle and responded accordingly. High-abstract group members are not pacifistic but tactical.

The preceding interpretation assumes that the quadruple interaction for competitiveness was driven by a tendency to maximize outcomes—a tendency that is manifested more obviously in a group context, because of the social support and personal anonymity associated with such a context. Indeed, the five-factor model including max own produced results consistent with the possibility that the quadruple interaction for competitiveness was primarily manifested by the participants who reported a tendency to maximize their own outcomes.

The preceding pattern of results relies on the assumption that trust can be an important determinant of competitiveness. But what accounts for trust? An interesting possibility for explaining, or partially explaining, variability in trust relates to perceived categorization. Although categorization in the individuals condition was not significantly related to trust, categorization in the groups condition was significantly related to trust. Those group members who trusted the other group were less inclined to perceive the 6 participants as two separate groups. Of course, our results were correlational and, thus, ambiguous as to causal sequence. However, the assumption of a category to trust causal sequence is consistent with L. Gaertner and Insko's (2000) experimental finding that participants expected a greater allocation of money (on multiple alternative matrices) when the allocator was a member of the same artistic-preference category than when he or she was a member of a different artistic-preference category.

An interesting issue has to do with the extent to which trust in our situation is similar to trust as it has been discussed in the recent literature on close relationships—for example, Holmes and Rempel (1989) and Wieselquist, Rusbult, Foster, and Agnew (1999). Actually, because these investigators relied on interdependence theory concepts (Kelley & Thibaut, 1978; Thibaut & Kelley, 1959), it is not surprising that we find much of their discussion compatible with our perspective. For example, the idea that trust grows out of a demonstrated willingness to take risks appears quite compatible with the idea that cooperation (a form of risk taking) and trust should increase with the anticipation of multiple trials. However, there are differences between trust in our situation and trust in the context of close relationships. It is important to note that our finding of increased cooperation and increased trust with anticipated multiple trials only occurred for groups. Clearly, it would be foolish to "push" the parallel between our situation and close relationships too far. A further example of dissimilarity relates to the Wieselquist et al. results, which indicate that over time, trust developed out of a cycle of mutually reinforcing commitment. We are uncertain whether it is appropriate to speak of commitment between groups. Of course, groups do make legal contracts with each other, and sometimes these relationships are of long-term duration. Whether enduring commitment in a nonlegal sense can exist between groups is an open question. In our situation, we did code the open-ended statements for commitment, defined as cooperation flowing from a mutual agreement to cooperate. However, such statements occurred with insufficient fre-

quency to merit analysis and, in any event, were certainly not characterized by the feelings of attachment associated with commitment in the context of a close interpersonal relationship.

One unexpected finding was that, whereas the open-ended assessment of reasons for the choice revealed that max own statements generally paralleled the choice results, statements related to long-term consequences did not parallel the choice results. Both max own statements and competitive choices followed a quadruple interaction pattern, but long-term consequences statements did not. The data suggest that the participants were more explicitly focused on outcome than on process.

The analysis of the open-ended responses related to long-term consequences did reveal main effects for groups versus individuals, trial, and the Groups Versus Individuals × Trial interaction. The interaction indicates that with anticipated multiple trials, individuals were more likely to make long-term consequences statements than were groups (26% vs. 13%), whereas no such difference occurred for an anticipated single trial (1% vs. 0%). These results are interesting, but the generally low percentages do indicate that most of the participants did not make statements explicitly relating to long-term consequences. Such low percentages suggest that Axelrod's (1984) characterization of the future as a "shadow" is particularly apt. We do find it ironic that the anticipation of future trials should have such an obvious impact on choices but that few participants made explicit reference to the future when given the opportunity to explain the reason for their choices.

Finally, further mediational analyses and investigation of other models suggested that trust functioned as a mediator and, in combination with abstractness, as a moderator and that abstractness and max own functioned only as moderators. Although we fully acknowledge that we are speculating beyond the evidence, we nonetheless believe that the data are consistent with the possibility that in the context of anticipated future trials, it was the abstractly oriented group members who better recognized the implication of the relationship between trust and maximizing outcomes for deciding between competitive and cooperative alternatives.

Despite some uncertainty regarding the appropriate mediational and moderational interpretation of the results, the present findings do provide evidence for the role of anticipated future interaction, the role of trust, the role of abstract, future-oriented thinking, and the role of outcome maximization. We also find it interesting that the behavioral implications of the personality assessments were more clearly revealed in a group setting, suggesting a possible new approach to investigating the consistency of personality and behavior.

References

Aiken, L., & West, S. (1991). *Multiple regression: Testing and interpreting interactions*. London: Sage.

Axelrod, R. (1984). *The evolution of cooperation*. New York: Basic Books.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173–1182.

Benet-Martinez, V., & John, O. P. (1998). Los Cinco Grandes across cultures and ethnic groups: Multitrait–multimethod analyses of the Big Five in Spanish and English. *Journal of Personality and Social Psychology, 75*, 729–750.

Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models*. Newbury Park: Sage.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 53*, 281–302.

Deutsch, M. (1958). Trust and suspicion. *Journal of Conflict Resolution, 2*, 265–279.

Digman, J. M. (1996). The curious history of the five-factor model. In J. S. Wiggins (Ed.), *The five-factor model of personality* (pp. 1–20). New York: Guilford.

Esser, J. K., & Komorita, S. S. (1975). Reciprocity and concession making in bargaining. *Journal of Personality and Social Psychology, 31*, 864–872.

Gaertner, L., & Insko, C. A. (2000). Intergroup discrimination in the minimal group paradigm: Categorization, reciprocation, or fear. *Journal of Personality and Social Psychology, 79*, 77–94.

Gaertner, S. L., Mann, J., Murrell, A., & Dovidio, J. R. (1989). Reducing intergroup bias: The benefits of recategorization. *Journal of Personality and Social Psychology, 57*, 239–249.

Hardin, G. (1968). The tragedy of the commons. *Science, 162*, 1243–1248.

Hinsz, V. B., Tindale, R. S., & Vollrath, D. A. (1997). The emerging conceptualization of groups as information processors. *Psychological Bulletin, 121*, 43–64.

Holmes, J. G., & Rempel, J. K. (1989). Trust in close relationships. In C. Hendrick (Ed.), *Review of personality and social psychology* (Vol. 10, pp. 261–284). London: Kingsley.

Insko, C. A., Hoyle, R. H., Pinkley, R. L., Hong, G., Slim, R., Dalton, G., Lin, Y., Ruffin, P. P., Dardis, G. J., Bernthal, P. R., & Schopler, J. (1988). Individual–group discontinuity: The role of a consensus rule. *Journal of Experimental Social Psychology, 24*, 505–519.

Insko, C. A., Pinkley, R. L., Harring, K., Holton, B., Hong, G., Krams, D. S., Hoyle, R. H., & Thibaut, J. (1987). Minimal conditions for real groups: Mere categorization or expectations of competitive between category behavior. *Representative Research in Social Psychology, 17*, 5–36.

Insko, C. A., & Schopler, J. (1998). Differential distrust of groups and individuals. In C. Sedikides, J. Schopler, & C. A. Insko (Eds.), *Intergroup cognition and intergroup behavior: Toward a closer union* (pp. 75–107). Hillsdale, NJ: Erlbaum.

Insko, C. A., Schopler, J., Drigotas, S. M., Graetz, K., Kennedy, J., Cox, C., & Bornstein, G. (1993). The role of communication in interindividual–intergroup discontinuity. *Journal of Conflict Resolution, 37*, 108–138.

Insko, C. A., Schopler, J., Graetz, K. A., Drigotas, S. M., Currey, D. P., Smith, S. L., Brazil, D. M., & Bornstein, G. (1994). Interindividual–intergroup discontinuity in the prisoner's dilemma game. *Journal of Conflict Resolution, 38*, 87–116.

Insko, C. A., Schopler, J., Hoyle, R. H., Dardis, G. J., & Graetz, K. A. (1990). Individual–group discontinuity as a function of fear and greed. *Journal of Personality and Social Psychology, 58*, 68–79.

Insko, C. A., Schopler, J., Kennedy, J. F., Dahl, K. R., Graetz, K. A., & Drigotas, S. M. (1992). Individual–group discontinuity from the differing perspectives of Campbell's realistic group conflict theory and Tajfel and Turner's social identity theory. *Social Psychology Quarterly, 55*, 272–291.

Insko, C. A., Schopler, J., Pemberton, M. B., Wieselquist, J., McIlraith, S., Currey, D. P., & Gaertner, L. (1998). Long-term outcome maximization and the reduction of interindividual–intergroup discontinuity. *Journal of Personality and Social Psychology, 75*, 695–710.

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The "Big Five" inventory—versions 4a and 54*. Berkely, CA: Institute of Personality Assessment and Research.

Jung, C. G. (1923). *Psychological types*. Princeton, NJ: Princeton University Press.

Kelley, H. H., & Thibaut, J. W. (1978). *Interpersonal relations*. New York: Wiley.

Komorita, S. S., & Esser, J. K. (1975). Frequency of reciprocated concessions in bargaining. *Journal of Personality and Social Psychology, 32,* 699–705.

Komorita, S. S., Hilty, C. D., & Parks, C. D. (1991). Reciprocation and cooperation in social dilemmas. *Journal of Conflict Resolution, 35,* 494–518.

Luce, R. D., & Raiffa, H. (1957). *Games and decisions: Introduction and critical survey*. New York: Wiley.

Mann, L., Janis, I. L., & Chaplin, R. (1969). Effects of anticipation of forthcoming information on predecisional processes. *Journal of Personality and Social Psychology, 56,* 241–270.

McCallum, D. M., Harring, K., Gilmore, R., Drenan, S., Chase, J., Insko, C. A., & Thibaut, J. (1985). Competition between groups and between individuals. *Journal of Experimental Social Psychology, 21,* 301–320.

McCrae, R. R., Costa, P. T., Jr. (1989). Reinterpreting the Myers–Briggs Type Indicator from the perspective of the five-factor model of personality. *Journal of Personality, 57,* 17–40.

McGuire, P. A. (1998, August). Historic conference focuses on creating a new discipline. *APA Monitor, 29,* 1, 15.

Myers, I. B., McCauley, M. H., Quenk, N. L., & Hammer, A. L. (1998). *MBTI manual*. (3rd ed.). Palo Alto, CA: Consulting Psychologists Press.

Pemberton, M. J., Insko, C. A., & Schopler, J. (1996). Memory for and experience of differential competitive behavior of individuals and groups. *Journal of Personality and Social Psychology, 71,* 953–966.

Pruitt, D. G., & Kimmel, M. J. (1977). Twenty years of experimental gaming: Critique, synthesis, and suggestions for the future. In M. R. Rosenzweig & L. W. Porter (Eds.), *Annual review of psychology* (Vol. 28, pp. 363–392). Palo Alto, CA: Annual Reviews.

Ridley, M. (1996). *The origins of virtue: Human instincts and the evolution of cooperation*. London: Penguin Press.

Russell, B. (1945). *A history of western philosophy*. New York: Simon and Schuster.

Schopler, J., Insko, C. A., Currey, D., Smith, S., Brazil, D. M., Riggins, T., Gaertner, L., & Kilpatrick, S. (1994). The survival of a cooperative tradition in the intergroup discontinuity context. *Motivation and Emotion, 18,* 301–315.

Schopler, J., Insko, C. A., Drigotas, S. M., Wieselquist, J., Pemberton, M., & Cox, C. (1995). The role of identifiability in the reduction of

interindividual–intergroup discontinuity. *Journal of Experimental Social Psychology, 31,* 553–574.

Schopler, J., Insko, C. A., Graetz, K. A., Drigotas, S. M., & Smith, V. A. (1991). The generality of the individual–group discontinuity effect: Variations in positivity–negativity of outcomes, players' relative power, and magnitude of outcomes. *Personality and Social Psychology Bulletin, 17,* 612–624.

Schopler, J., Insko, C. A., Graetz, K. A., Drigotas, S., Smith, V. A., & Dahl, K. (1993). Individual–group discontinuity: Further evidence for mediation by fear and greed. *Personality and Social Psychology Bulletin, 19,* 419–431.

Shure, G. H., Meeker, R. J., & Hansford, E. A. (1965). The effectiveness of pacifist strategies in bargaining games. *Journal of Conflict Resolution, 9,* 106–107.

Stevens, J. (1996). *Applied multivariate statistics for the social sciences*. Mahwah, NJ: Erlbaum.

Strathman, A., Gleicher, F., Boninger, D. S., & Edwards, C. S. (1994). The consideration of future consequences: Weighing immediate and distant outcomes of behavior. *Journal of Personality and Social Psychology, 66,* 742–752.

Taylor, M. (1976). *Anarchy and cooperation*. London: Wiley.

Taylor, M. (1987). *The possibility of cooperation*. Cambridge: Cambridge University Press.

Thibaut, J. W., & Kelley, H. H. (1959). *The social psychology of groups*. New York: Wiley.

Tindale, R. S., & Kameda, T. (2000). "Social sharedness" as a unifying theme for information processing in groups. *Group Processes & Intergroup Relations, 3,* 123–140.

Tindale, R. S., Smith, C. M., Thomas, L. S., Filkins, J., & Sheffey, S. (1996). Shared representations and asymmetric social influence processes in small groups. In F. Witte & J. Davis (Eds.), *Understanding group behavior: Consensual action by small groups* (pp. 81–103). New York: Erlbaum.

Wieselquist, J., Rusbult, C. E., Foster, C. A., & Agnew, C. R. (1999). Commitment, prorelationship behavior, and trust in close relationships. *Journal of Personality and Social Psychology, 77,* 942–966.