Mind Games: The Mental Representation of Conflict

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Perception and misperception play a pivotal role in conflict and negotiation. We introduce a framework that explains how people think about their outcome interdependence in conflict and negotiation and how their views shape their behavior. Seven studies show that people's mental representations of conflict are predictably constrained to a small set of possibilities with important behavioral and social consequences. Studies 1 and 2 found that, when prompted to represent a conflict in matrix form, more than 70% of the people created 1 of 4 archetypal mixed-motive games (out of 576 possibilities): Maximizing Difference, Assurance, Chicken, and Prisoner's Dilemma. Study 3 demonstrated that these mental representations relate in predictable ways to negotiators' fixed-pie perceptions. Studies 4–6 showed that these mental representations shape individuals' behavior and interactions with others, including cooperation, perspective taking, and use of deception in negotiation, and through them, conflict's outcomes. Study 7 found that the games that people think they are playing influence how their counterparts see them, as well as their counterparts' negotiation expectations. Overall, the findings document noteworthy regularities in people's mental representations of outcome interdependence in conflict and illustrate that 4 archetypal games can encapsulate fundamental psychological processes that emerge repeatedly in conflict and negotiation.

Keywords: conflict, negotiation, mental representations, outcome interdependence, mixed-motive games

Outcome interdependence—the compatibility or incompatibility of people's interests and goals—is a defining element of conflict situations (Bornstein, 2003; De Dreu, 2010). Indeed, influential theoretical approaches to conflict, including interdependence theory (Kelley & Thibaut, 1978) and game theory (Luce & Raiffa, 1957), rely on systematic and nuanced variations of the parties' outcome interdependence to analyze and study social interactions. Although there is considerable consensus that outcome interdependence is a critical feature of social interactions and that subjective perceptions play a pivotal role in shaping the course and outcomes of conflicts (Deutsch, 1973; Jervis, 1976; Ross & Ward, 1996), research at the intersection of these two key observations is sparse: Little is known about individuals' subjective perceptions of their outcome interdependence.

The current research investigates individuals' subjective perceptions of their outcome interdependence, as well as the behavioral and social consequences of these perceptions, with a particular focus on dyadic negotiation. We first identify a small set of interdependence structures that seem to have psychological prominence in people's minds when they think about conflict and negotiation situations. Then we investigate the consequences of these conflict perceptions by studying how particular outcome interdependence perceptions affect negotiator behavior and, ultimately, a conflict's outcomes. Thus, this article addresses two important questions: (a) What games do people think they are playing?[1] and (b) What are the behavioral consequences of viewing conflict in terms of a particular game?

From Matrix Transformations to Functional Construal

Researchers often use matrix games—abstract representations of interactions that include a set of players, the strategies available to each player, and the payoffs that are associated with their actions—to study conflict (Camerer, 2003; Plott & Smith, 2008). Although researchers commonly recognize that "how competitors define the game may be more important than the moves they make within the game" (Bazerman, Curhan, Moore, & Valley, 2000, p. 286), research in behavioral game theory typically has focused on the decisions that individuals and groups make within a given game rather than on how players define the game, plausibly because economics has traditionally been more interested in action than in cognition (cf. Chou, McConnell, Nagel, & Plott, 2009; Devetag & Warglien, 2008).

Previous research emanating from interdependence theory, however, has investigated individuals' tendencies to mentally transform exogenously determined payoff matrices (i.e., the objective, "given" matrices) and make their decisions upon the new, "effective" matrices (Kelley et al., 2003; Kelley & Thibaut, 1978). For

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[1] This question is considered one of the top 10 open research questions in behavioral game theory (Camerer, 2003, p. 474).

example, research on the Prisoner's Dilemma game suggests that strangers sometimes cooperate because they mentally transform their interaction from a competitive to a cooperative game in which both parties can benefit from mutual cooperation (Devetag & Warglien, 2008; Kiyonari, Tanida, & Yamagishi, 2000; Mc-Clintock & Liebrand, 1988).

The current research builds on previous work on matrix transformations in four ways. First, we formulate specific predictions about the *content* of people's mental representations. Put differently, we predict that many people's perceptions of their outcome interdependence in conflict will converge to a small set of specific, theoretically archetypal payoff structures, a novel prediction in this literature. Second, we identify a different underlying *cognitive process* than the one hypothesized by previous work on matrix transformations. Research on matrix transformations uses the "given matrix" as the point of departure and outlines how decision makers' social preferences (McClintock & Liebrand, 1988) or cognitive abilities (Devetag & Warglien, 2008) lead them to transform the action–outcome contingencies in their minds. In contrast, our model does not assume the existence of an objective, exogenously determined outcome matrix. Instead, we contend that in many interactions the "true" or "objective" nature of the situation is unknown, ambiguous, or ill defined (Rubinstein, 1991; Tenbrunsel & Northcraft, 2009). Accordingly, individuals must rely on either internal cues (e.g., their motivations and beliefs; Halevy, Chou, & Murnighan, 2011; Halevy, Sagiv, Roccas, & Bornstein, 2006) or contextual cues (Kay, Wheeler, Bargh, & Ross, 2004; Liberman, Samuels, & Ross, 2004; Smeesters, Wheeler, & Kay, 2010) to construe outcome interdependence in their minds.

Third, research on matrix transformations has focused on explaining how particular social motivations produce local changes in a given payoff structure. In contrast, we take a broader perspective and identify a set of psychologically prominent payoff structures that people commonly apply to make sense of their social interactions. Finally, whereas matrix transformations are sometime seen as reflecting motivationally biased, excessive, or improper information processing (i.e., "playing the wrong game"; Devetag & Warglien, 2008), we see the subjective construal of outcome interdependence as an *essentially functional* process that lets decision makers define the nature of their interaction for themselves and then determine an appropriate course of action given their definition and their goals (Kreps, 1990; Weber, Kopelman, & Messick, 2004).

A few studies have investigated subjective construals of outcome interdependence in real-world conflicts from this approach. Plous (1985), for instance, asked U.S. senators to depict the U.S. and the U.S.S.R.'s outcome interdependence in the nuclear arms race by filling in the numbers in an empty payoff matrix. Unsurprisingly, many U.S. senators created game matrices depicting the United States as more cooperative than the U.S.S.R. Similarly, Halevy et al. (2006) assessed individuals' perceptions of outcome interdependence in the Israeli–Palestinian conflict by asking them to evaluate three paragraph-long descriptions, each depicting the conflict in terms of one of three different games. They found that endorsements of the different games were associated in predictable ways with respondents' conflict-related attitudes and behaviors, including their national identification, right-wing authoritarianism, in-group bias, and voting behavior. In addition, respondents' per-

ceptions of the conflict changed as their motivations (e.g., security needs) changed.

Plous (1985) and Halevy et al. (2006) showed that people can conceptualize real-world, ongoing intergroup conflicts as matrix games. They also showed that different people often perceive the same conflict as different games and that their perceptions of outcome interdependence are predictably related to their basic needs and motivations as well as to their worldviews and political attitudes (Halevy, Chou, & Murnighan, 2011). The present research extends this work by systematically studying whether particular interdependence structures have psychological prominence in people's minds and how seeing conflict in terms of a particular game affects the process and outcome of conflict.

What Games Do People Think They Are Playing?

People have a natural need to make sense of their interactions, as well as a natural tendency to simplify, which leads them to form fairly straightforward mental representations of their social interactions (Abelson, 1981; Carroll, Bazerman, & Maury, 1988; March & Simon, 1958). Consistent with the view of people as "cognitive misers" (S. T. Fiske & Taylor, 1991), we suggest that socially functional mental representations tend to be simplified abstractions of social interactions. Therefore, the current research focuses on "the simplest of all games . . . those which involve exactly two players, each of whom has exactly two available strategies" (Rapoport & Guyer, 1966, p. 203). In each of these 2×2 games, the combination of the parties' choices leads to four possible outcomes that can be rank ordered on a 4-point scale from most to least desirable (Colman, 1995).

This approach produces a possible set of 576 2×2 games, of which 78 are nonequivalent (Rapoport & Guyer, 1966, p. 203). Although this set is large, we predict that many individuals' perceptions will converge to a much smaller set of psychologically meaningful games. This prediction results from three assumptions about people's cognitive and social preferences when they think about outcome interdependence.

First, we assume that people have a strong taste for symmetry. Both natural and human-made objects tend to be symmetric (Freyd & Tversky, 1984; Reber, 2002), and symmetric faces (Rhodes, Proffitt, Grady, & Sumich, 1998) and pieces of art (Humphrey, 1997; Reber, Schwartz, & Winkielman, 2004) are seen as more attractive, partly because symmetry increases processing fluency (Reber et al., 2004). This suggests that, in terms of payoff structures, people will expect that the same *behavior–outcome contingencies* will apply to themselves and to their counterparts. Thus, we predict that people will view their conflicts and negotiations as disproportionately symmetric (cf. Devetag & Warglien, 2008),[2] decreasing the set of nonequivalent games from 78 to 12 (Rapoport, 1967; Rapoport & Guyer, 1966).

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[2] The assumed preference for symmetry exists at a high level of abstraction (cooperation vs. competition) rather than at the level of concrete actions; the concrete behaviors that constitute cooperation or competition might differ for the two parties. Thus, in Halevy et al. (2006), "cooperation" was operationalized as withdrawal from the occupied territories for the Israeli side and as ending of the violent hostilities for the Palestinian side.

Second, we assume that people usually prefer their partners to cooperate rather than compete (defect). This assumption is supported by multiple studies showing that people are willing to pay a cost to punish uncooperative counterparts (Fehr & Gachter, 2000, 2002). Thus, we expect that most people's mental representations of conflict are ones in which (a) mutual cooperation results in better outcomes for them than cooperating while their counterpart defects and (b) defecting while their counterpart cooperates results in better outcomes for them than mutual defection. This assumption further decreases the number of nonequivalent games from 12 to six.

Finally, we assume that there will be (at least some) correspondence between the games that scholars and lay people see as psychologically compelling. This assumption is consistent with research showing that lay theories of conflict often correspond closely to scholarly theories of conflict (Cargile, Bradac, & Cole, 2006; Levy, Chiu, & Hong, 2006). Of the six remaining games, four have been named and studied by researchers. Thus, our third assumption reduces the number of games from six to four. These four games are the Maximizing Difference, Assurance (also called Trust and Stag-Hunt), Chicken, and Prisoner's Dilemma games. We propose that these games will have psychological prominence in individuals' minds as they think about outcome interdependence. Accordingly, we test the hypothesis that, when prompted to represent their conflicts in a matrix form, individuals will tend to disproportionately create these four games.[3]

The Maximizing Difference, Assurance, Chicken, and Prisoner's Dilemma Games

As detailed accounts of these games are readily available elsewhere (Bornstein & Gilula, 2003; Colman, 1995; Kelley et al., 2003; Marwell, Ratcliff, & Schmitt, 1969; Skyrms, 2004), we limit the current discussion to their main characteristics. Table 1 presents the payoff structure of these four games.

Maximizing Difference games model relatively benign interactions in which the dominant (i.e., unconditionally optimal) strategy, which yields the best outcome regardless of the other party's choice, is to always cooperate. The only reason to compete in this game is to harm one's counterpart, because reducing the counterpart's payoff also reduces one's own. Assurance games represent mild conflicts in which the only reason to compete is to defend against a competitive counterpart; the optimal strategy in Assurance games is to mimic the counterpart's expected strategy, and mutual cooperation gives both parties their best outcomes. Chicken games model tougher conflicts that allow risky brinkmanship: Either party can maximize his or her outcomes by competing when the counterpart cooperates, yet mutual competition gives both parties their worst outcomes. The optimal strategy in Chicken is to do the opposite of one's counterpart. Finally, Prisoner's Dilemma games model cutthroat interactions in which the dominant strategy is to compete, thereby maximizing one's own payoff, reducing the risk of exploitation, and minimizing the counterpart's payoff; competition does not, however, maximize joint gain.[4]

All four payoff structures are mixed-motive games—they model interactions in which the parties have both diverging and converging interests (Schelling, 1980). Prisoner's Dilemma and Chicken, however, are commonly recognized as more competitive than Assurance and Maximizing Difference. Indeed, one main reason

Table 1

The Maximizing Difference, Assurance, Chicken, and Prisoner's Dilemma Games

		Player II	
Player	Strategy	Cooperate	Defect (compete)
Maximizing Difference			
Player I	Cooperate	4, 4	2, 3
	Defect (compete)	3, 2	1, 1
Assurance			
Player I	Cooperate	4, 4	1, 3
	Defect (compete)	3, 1	2, 2
Chicken			
Player I	Cooperate	3, 3	2, 4
	Defect (compete)	4, 2	1, 1
Prisoner's Dilemma			
Player I	Cooperate	3, 3	1, 4
	Defect (compete)	4, 1	2, 2

Note. Entries in the table represent payoffs on an ordinal scale; higher numbers denote more desirable outcomes. In each cell, the number on the left is the payoff to the row player, and the number on the right is the payoff to the column player.

why the former two games have been studied more extensively is that the latter two games are game-theoretically "trivial": They allow both parties to maximize their outcomes simultaneously and are thus less conflictual (Colman, 1995; Rapoport, 1967). However, the fact that these games are simple from a game-theoretic standpoint suggests that they may be particularly attractive as mental representations of social interactions (Devetag & Warglien, 2008).

As a set, these four games cover a wide range of strategic and psychological possibilities (see Table 2). Specifically, they exhibit important differences on four key dimensions: (a) the correspondence of the parties' outcomes (i.e., goal compatibility, which is

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[3] We recognize that, under certain conditions, people might deviate from these social and cognitive preferences, which may lead them to create other payoff structures. For example, in a parent–child conflict, the parent might see the child's defiance as indicative of independence and hence more desirable than mindless cooperation. Indeed, games like Hero and Battle of the Sexes are often used to model close interpersonal relationships. Similarly, individuals who face highly asymmetric conflicts, for example, a dispute between government and individuals, might represent their interaction with an asymmetric payoff structure (especially when they are motivated to be accurate). In-group favoritism might similarly push perceivers away from symmetric mental representations. This is potentially why the U.S. senators created an asymmetric game in which the United States played the relatively benign Assurance game and the U.S.S.R. played the more contentious Prisoner's Dilemma game (Plous, 1985).

[4] This analysis applies to one-shot interactions. Although many conflicts and negotiations involve repeated interactions, one-shot, single-interaction games can capture the critical issues that people face as they formulate their mental representations of conflict (Halevy et al., 2006). In addition, people often focus on a single round, treating each iteration of a repeated game as an isolated unit, even in repeated interactions (Camerer, 2003).

Table 2

Key Strategic and Psychological Properties of the One-Shot Maximizing Difference, Assurance, Chicken, and Prisoner's Dilemma Games

Property	Maximizing Difference	Assurance	Chicken	Prisoner's Dilemma
Correspondence of outcomes	Highly positive	Moderately positive	Moderately positive	Highly negative
Competition motivated by:	Aggression	Self-protection	Self-promotion	Aggression, self-protection, and self-promotion
Best strategy (for max own)	Always cooperate	Do the same as the counterpart	Do the opposite of the counterpart	Always compete
Equilibria (stable solution)	Mutual cooperation	Mutual cooperation and competition	Unilateral cooperation/competition	Mutual competition

considered "the single most important property of any matrix"; Kelley & Thibaut, 1978, p. 117); (b) the parties' motivations for acting competitively; (c) the optimal strategy for maximizing one's outcomes; and (d) how conflicts end or stabilize.

As noted in Table 2, the parties' goals are most compatible in Maximizing Difference games, most incompatible in Prisoner's Dilemma games, and moderately incompatible in Chicken and Assurance games. The payoffs create a single reason to compete in three of the four games: self-protection (fear/distrust) in Assurance, self-promotion (greed/exploitation) in Chicken, and an aggressive desire to harm one's counterpart in Maximizing Difference. In Prisoner's Dilemma, any or all of these motives can encourage competition (Bornstein, Mingelrin, & Rutte, 1996; Miller & Holmes, 1975). The four games also capture an array of optimal strategies: mimic your counterpart (Assurance), do the opposite of your counterpart (Chicken), always cooperate (Maximizing Difference), and always compete (Prisoner's Dilemma). Finally, the four games have different equilibria (i.e., stable outcomes that give neither party an incentive to deviate unilaterally): Mutual cooperation and mutual competition are both equilibria in Assurance; the two asymmetric outcomes that result when one party competes and the other cooperates are both equilibria in Chicken; and Maximizing Difference and Prisoner's Dilemma each have a single equilibrium—mutual cooperation in the former and mutual competition in the latter.

We suggest that these four games, which capture profoundly different views of conflict, provide psychologically compelling answers to critical questions that surface when people think about conflict and their best behavioral responses to it. Thus, our "perceptual convergence hypothesis" predicts that many people will use one of these four games to characterize the outcome interdependence in their conflicts.

Behavioral and Social Consequences of People's Mental Representations

Perceptions of outcome interdependence are important because they affect people's subsequent thinking and behavior. We propose that, because people have a strong need for consistency (Abelson et al., 1968), their mental representation of their conflict will influence their behavior in conflicts and negotiations (Liberman et al., 2004; Weber et al., 2004). Put differently, people's actions will

depend on the games they think they are playing (Camerer, 2003; Kelley et al., 2003; Sebenius, 1992; Thompson & Hastie, 1990).

We expect that people's behaviors will not only be consistent with their construal of the situation but that they will also be functional in the sense that they will allow individuals to effectively pursue their interaction goals. Thus, people tend to act in ways that they believe will produce better rather than worse outcomes—given how they define the situation and their utilities in it (Devetag & Warglien, 2008; McClintock & Liebrand, 1988; Rubinstein, 1991). Kreps (1990) presented a similar argument, suggesting a decision maker first "builds a model of his choice problem" and then "finds his 'optimal' choice of action within the framework of this model and acts accordingly" (p. 155).

The current research tests predictions for three types of behavioral outcomes. Specifically, we predicted that the games people think that they are playing will have a causal effect on their tendency to cooperate in matrix games, to adapt their actions to their counterpart's views of the interaction, and to use deception in both distributive and integrative negotiations. We also predicted that the games that people think they are playing will affect their counterparts' negotiation expectations and how their counterparts see them. Since our specific hypotheses vary across these different dependent variables, we discuss each of them separately as we introduce each study.

Research Overview

This article presents seven studies in two sections to test our predictions concerning (a) people's mental representations of conflict and (b) their behavioral and social consequences. Studies 1 and 2 assess the games that people think that they are playing when they negotiate. These studies used different samples and procedures to test our perceptual convergence hypothesis, that is, that many people will view their conflicts and negotiations as Maximizing Difference, Assurance, Chicken, and Prisoner's Dilemma games. Study 3 investigated how endorsements of these games relate to fixed-pie perceptions, that is, people's tendency to view a negotiation as strictly competitive (zero sum).

Studies 4, 5, and 6 investigated the behavioral consequences of people's mental representations of conflict. Study 4 focused on the tendency to adapt one's behavior to fit the counterpart's view of the interaction. Studies 5 and 6 investigated how negotiators'

mental representations influenced their use of deceptive tactics in ultimatum bargaining (Study 5) and multi-issue negotiations (Study 6). Finally, Study 7 investigated how the games that negotiators think they are playing affect how their counterparts see them (e.g., on the dimension of interpersonal warmth) and their expectations for the negotiation (e.g., the perceived likelihood of reaching an agreement). Thus, it explored the possibility that conflict perceptions can also shape the process and outcomes of conflict indirectly, by influencing interaction partners' perceptions and expectations.

Study 1: Perceptual Convergence

Study 1 assessed individuals' perceptions of outcome interdependence in dyadic negotiations. As noted, using an ordinal scale to depict the parties' outcomes leads to 576 2×2 games (Rapoport & Guyer, 1966). Thus, if individuals create payoff matrices in a completely random fashion, the expected relative frequency of each game is 1/576 (0.0017). In contrast, our perceptual convergence hypothesis predicts that people will create four of these games—Maximizing Difference, Assurance, Chicken, and Prisoner's Dilemma—much more frequently.

Method

Participants.   One hundred sixty Hebrew University students (~60% female) participated for course credit.

Materials and procedure.   As part of a class exercise, the participants received instructions and background materials for an eight-issue negotiation task involving the representatives of two companies that wanted to establish a joint venture (Halevy, 2008). The participants had 15 min to review the materials and prepare for their negotiation. The participants also received an empty payoff matrix and were asked to indicate their perceptions of their outcome interdependence using an ordinal scale ranging from 1 (*worst outcome*) to 4 (*best outcome*; see Appendix). Thus, we asked participants to think of their upcoming interaction as a 2×2 game (two parties, each facing two alternatives) and specify how they viewed its payoff structure. The experiment ended after they completed this task.

Results and Discussion

Overall, 72% of the participants created one of the four hypothesized games, significantly above chance rate (i.e., four out of a possible 576 games), $\chi^2(1) > 1,000$, $p < .001$. The participants created the Maximizing Difference (23%), Assurance (18%), Chicken (9%), and Prisoner's Dilemma (22%) games at rates significantly greater than chance, and these were the only games created at rates higher than chance (i.e., games such as Leader, Battle of the Sexes, and Hero, for instance, were either never created or were created only infrequently). These findings support our perceptual convergence hypothesis and indicate that a small set of psychologically compelling mixed-motive games can adequately capture many individuals' mental representations of their outcome interdependence in negotiation.

Study 2: Perceptual Convergence Across Situations

Study 1 used a specific multi-issue negotiation task as a stimulus. Study 2 was designed to test the perceptual convergence

effect in a much less specific situation, with a different sample. Thus, in Study 2 we asked participants to think about any dyadic (two-person) negotiation that came to their mind and then to complete our measure of perceived outcome interdependence. Since different participants naturally thought about different interactions, Study 2 was a strong test of our perceptual convergence hypothesis.

Method

Participants.   Seventy-two Northwestern University students participated in exchange for $8 (58.6% female; mean age = 19.7 years, SD = 1.2; 85% indicated that they had never taken a course in game theory). They arrived at the laboratory in cohorts of 6–12 and were each seated in a private cubicle.

Materials and procedure.   As in Study 1, Study 2's participants filled in a blank, 2×2 payoff matrix to depict their perceptions of outcome interdependence; unlike in Study 1, we asked them to think about two-party negotiation situations in general. Thus, instead of specifying a particular negotiation and asking them about it, we asked them to think about "any dyadic negotiation."

Results and Discussion

Consistent with our perceptual convergence hypothesis and replicating the results of Study 1, 80% of the participants in Study 2 created one of the four games, significantly above chance rate ($\chi^2 > 1,000$, $p < .001$). As in Study 1, the participants created the Maximizing Difference (29%), Assurance (6%), Chicken (13%), and Prisoner's Dilemma (32%) games at rates significantly above chance, and no other game was created at above a chance rate. Thus, the perceptual utility of these four games recurred in two cultures (Israel in Study 1, the United States in Study 2), as well as with different stimuli. Similar findings also emerged with other samples and contexts.[5,6] Thus, these findings suggest that these four games have archetypal status in individuals' minds.

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[5] Similar results were also obtained with a sample of 70 master of business administration (MBA) students at Northwestern University's Kellogg School of Management who completed Study 2's measures twice, at the start (T1) and after 8 weeks (T2) of an elective course on negotiation that presented a variety of game theoretic exercises. Participants' responses varied minimally across the two administrations: Nearly three fourths of them created one of the four archetypal games each time (T1 = 74%, T2 = 73%): Maximizing Difference (T1 = 24%, T2 = 21%); Assurance (T1 = 10%, T2 = 7%); Chicken (T1 = 16%, T2 = 18%); Prisoner's Dilemma (T1 = 24%, T2 = 27%).

[6] Although people are quite comfortable applying an economic perspective to their exchange relationships (e.g., business negotiations), many people are reluctant to apply an economic perspective to their close relationships (e.g., marriage), because doing so violates moral principles as well as society's normative code (A. P. Fiske & Tetlock, 1997; Tetlock, Kristel, Elson, Green, & Lerner, 2000). We tested the prediction that the parties' relationship would moderate the perceptual convergence effect in a study with 171 Northwestern University students who were randomly assigned to four relationship conditions (communal sharing/marriage,

Study 3: Mixed-Motive Games, Fixed-Pie Perceptions, or Both?

Studies 1 and 2 found that most people created one of four games that represent distinct interdependence structures. The fact that all four games are mixed motive in nature stands in contrast to previous research findings on fixed-pie perceptions, that is, the tendency to assume that negotiation counterparts' interests are diametrically opposed (De Dreu, Koole, & Steinel, 2000; Thompson & Hastie, 1990). In Study 3, we explored the possibility that the same cognitive processes drive both the perceptual convergence to these four games and the fixed-pie perceptions that have surfaced in previous negotiation research.

A strong self-focus characterizes most social judgments (Cadinu & Rothbart, 1996; Heider, 1958). Thus, individuals often perceive a false consensus, believing that other people share their own views and preferences (Ross, Greene, & House, 1977). These kinds of egocentric social perceptions have been documented in various contexts, including bargaining (Kelley & Stahelski, 1970; Miller & Holmes, 1975). We suggest that these self-anchoring tendencies and individuals' strong preferences for symmetry (Humphrey, 1997; Reber et al., 2004; Rhodes et al., 1998) may drive both fixed-pie perceptions and the perceptual convergence observed in Studies 1 and 2.

Fixed-pie perceptions emerge when individuals assume that what is important to them is equally important to their counterpart, that is, that their gains lead to their counterpart's losses, and vice versa. Studies 1 and 2's observations suggest that people construct symmetric games with behavior–outcome contingencies that apply to them and to their interaction partners. Thus, egocentric projections may be contributing to both the fixed-pie bias and the perceptual convergence effect. At the same time, because fixed-pie perceptions reflect competitiveness, we expected that a tendency toward fixed-pie perceptions would correlate with endorsements of the Prisoner's Dilemma and Chicken games more than with endorsements of the Assurance and Maximizing Difference games.

To tap the relationship between fixed-pie perceptions and people's use of the four games to characterize their conflicts, Study 3's participants engaged in two tasks—they first completed a measure of fixed-pie perceptions and then they indicated how much they endorsed each of the four games as representative of their conflict. This method differed from the method employed in Studies 1 and 2, which identified a single game that was most characteristic of a person's views, by assessing how much people thought that each of the four games captured their outcome interdependence. Study 3 also provided an opportunity to differentiate between individu-

als' characterizations of their conflict and their social value orientation (Van Lange, Otten, De Bruin, & Joireman, 1997), a trait measure that research on fixed-pie perceptions (De Dreu et al., 2000) has used to assess respondents' resource allocation preferences.

Method

Participants. Sixty Stanford University students (63% female; mean age = 21 years, SD = 3.5) were recruited from a large subject pool to participate in a study about negotiation perceptions; each received an $8 participation fee. Participants arrived at the laboratory individually, were each seated in a private cubicle, and received written instructions.

Materials and procedure. We adopted De Dreu et al.'s (2000) procedure. All of the participants first completed a standard measure of social value orientation, which asked them to make nine hypothetical allocation decisions that indicated how much they were motivated to maximize their absolute outcomes, their relative outcomes vis-à-vis a counterpart, or joint outcomes (Van Lange et al., 1997). Participants were then asked to assume that they were interested in purchasing a new car and that their negotiation with the seller focused on four issues: interest rate, stereo equipment, warrantee, and delivery. They received background information and a detailed payoff schedule for the buyer's role. Unknown to the participants, the seller's and the buyer's interests were opposed on all four issues, but the relative importance of different issues differed across the two roles, allowing for mutually beneficial trade-offs on two integrative issues, interest rates and warrantee.

Participants then completed a previously used measure of fixed-pie perceptions (De Dreu et al., 2000; Thompson & Hastie, 1990): They each received an empty profit schedule for the seller (i.e., the different possible agreements were listed without their value for the seller) and were asked to fill in the number of points they thought the seller would get for each of the possible agreements. Fixed-pie perceptions were calculated by subtracting the number of points assigned to the seller in each of the two integrative issues (interest rate and warrantee) from the number of points in participants' own profit schedule. An absolute difference score of zero would indicate that a participant had a perfect fixed-pie perception. For ease of interpretation, however, we reverse-coded responses so that higher scores would indicate a stronger fixed-pie bias.

Participants subsequently indicated on 5-point scales (1 = *not at all*, 5 = *very much*) how much they thought that their car-buying negotiation had an underlying structure of a Maximizing Difference, Chicken, Assurance, or Prisoner's Dilemma game (one item per game). We used the same payoff matrices depicted in Table 1 with one exception—we replaced the numeric ranks (1, 2, 3, 4) with verbal labels (worst outcome, poor outcome, good outcome, and best outcome, respectively). Participants then responded to several demographic questions and were paid and dismissed.

Results and Discussion

Forty-four of the 60 participants (73%) showed a perfect fixed-pie bias, assuming that the seller assigned exactly the same weights as they did to the different issues, with directly opposing preferences on each issue. As expected, fixed-pie perceptions correlated

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authority ranking/supervisor–subordinate, equality matching/neighbors, and market pricing/manufacturer–retailer; A. P. Fiske, 1992). Participants completed the same task as in Studies 1 and 2, with context-specific behavior–outcome contingencies. Participants in all four conditions created the four archetypal games at well above a chance rate: communal sharing: 38%; authority ranking: 52%; equality matching: 82%; and market pricing: 77%. However, as expected, they created these games significantly more frequently in the latter two than in the former two conditions (79% vs. 45%), $\chi^2(1) = 21.19$, $p < .001$. Thus, the nature of a relationship is an important boundary condition for the perceptual convergence effect, with the four archetypal games capturing perceptions of conflict primarily in exchange relationships.

positively with endorsement of the Prisoner's Dilemma ($r = .33$, $p = .01$) and Chicken games ($r = .27$, $p = .04$) but not with endorsement of the less contentious Assurance ($r = .01$, ns) and Maximizing Difference games ($r = -.06$, ns; see Table 3). Like previous research, fixed-pie perceptions were unrelated to social value orientations (De Dreu et al., 2000). Endorsements of the four archetypal games were also unrelated to social value orientations (see Table 3). Thus, these data document an association between fixed-pie perceptions and endorsement of two of the four archetypal games that was not apparent for social value orientations; they also indicate that our measure of game endorsements and the standard measure of social value orientations are distinct.

Studies 1–3 found that perceptions of outcome interdependence tend to converge to a small set of mixed-motive games. Studies 4–7 investigated the consequences of seeing conflict and negotiation through the lens of a particular game; we investigated how negotiators' mental representations of their outcome interdependence shape their behaviors and, through them, conflict's outcomes.

Study 4: Cooperation and Perspective Taking in Bargaining Games

Study 3 highlighted certain similarities between the Prisoner's Dilemma and Chicken games on the one hand and the Assurance and Maximizing Difference games on the other. Because of their different strategic and psychological properties, however, we expected that the Chicken and Prisoner's Dilemma games would lead to different bargaining behaviors, as would the Assurance and Maximizing Difference games. Thus, Studies 4–6 focused on the differential effects of perceived payoff structures on important negotiation behaviors, including cooperation, perspective taking, and deception.

As noted, cooperation is the unconditionally best strategy in Maximizing Difference games; thus, individuals who see conflict as a Maximizing Difference game should be particularly cooperative, regardless of how their counterpart sees their interaction. Conversely, because competition is the unconditionally best strategy in Prisoner's Dilemma games, people who see conflict as Prisoner's Dilemma games should be particularly uncooperative, regardless of how their counterpart sees their interaction. In contrast, the best strategy in Assurance and Chicken games depends on the counterpart's expected behavior: In Assurance, players maximize their outcomes by imitating their counterpart; in Chicken, they maximize their outcomes by doing the opposite of what they expect their counterpart to do. This suggests that players in Assurance and Chicken games should be more sensitive to how their counterpart sees the interaction than players in Prisoner's Dilemma and Maximizing Difference games (Avrahami & Kareev, 2010; Carroll et al., 1988).

This analysis leads to two hypotheses. First, we predict that cooperation rates will decrease from Maximizing Difference to Assurance and Chicken to Prisoner's Dilemma games. Second, we predict that people will react more to changes in how their counterpart sees the interaction when they play Chicken and Assurance games and less when they play Prisoner's Dilemma and Maximizing Difference games.[7]

Method

Participants. One hundred twenty-eight Northwestern University students participated (66.4% female; mean age = 19.9 years, $SD = 1.3$; 87% indicated that they had never taken a game theory course). They received an \$8 show-up fee and could earn additional money based on their decisions and those of their randomly assigned counterpart.

Overview and design. One fourth of the participants were randomly assigned to play each of our four archetypal games. Because we were also interested in studying how changes in their counterpart's payoff structure would affect their bargaining behavior, we also manipulated their counterpart's payoff structure, using the same four games: Maximizing Difference, Assurance, Chicken, and Prisoner's Dilemma. Thus, we used a 4 (own game) × 4 (other's game) mixed-design, with participants' own payoffs as a between-subjects factor and their counterpart's payoffs as a within-subject factor.

All participants played four games. Their own payoffs were fixed (e.g., the row player half of the matrix game was always Chicken) but their counterparts' half of the payoff matrix (i.e., the column player's) changed from Maximizing Difference to Assurance to Chicken to Prisoner's Dilemma in randomized order. This design allowed us to observe participants' bargaining behavior in 16 different matrix games: the four archetypal games (Maximizing Difference, Assurance, Chicken, and Prisoner's Dilemma) plus 12 asymmetric games in which the row player's payoffs matched one of the four games (e.g., Chicken) and the column player's payoff structure matched another (e.g., Assurance).

Procedure. Participants arrived in groups of 10–14 and were each seated in a private cubicle. In each of their four games, they were the row player and their counterpart was the column player (see Table 1). In each game, they selected either the "A" or the "B" choice; the words *cooperation* or *competition* were never mentioned. They did not receive outcome feedback until they had made all four choices. They were told that, at the end of the study, the experimenter would randomly choose one of their four games and pay them based on their decision and the decision of their randomly assigned counterpart in that game. Their payoffs ranged from \$1 to \$4 in addition to their show-up fee.

Results

Cooperation rates. Consistent with our hypothesis, cooperation rates were highest (93%) in Maximizing Difference and lowest in Prisoner's Dilemma games (27%); they ranged from 40% to over 80% in Assurance and Chicken games. A series of chi-square analyses indicated that the effect of own payoff struc-

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[7] These predictions assume an *individualistic orientation*, that is, that "the outcomes of a given matrix can be treated as if they represent the utilities of an effective matrix that has been value-transformed" (McClintock & Liebrand, 1988, p. 399). We expect that either a prosocial orientation (when utility is the sum of one's own and another's numerical outcomes) or a competitive orientation (when utility is the difference between one's own numerical outcomes and the other's) would diminish some of the strategic differences between the Prisoner's Dilemma, Chicken, Assurance, and Maximizing Difference games and lead to different predictions (which can be obtained by applying the aforementioned transformation rules to the payoff matrices in Table 1).

Table 3

Descriptive Statistics and Zero-Order Correlations Between Fixed-Pie Perceptions, Prosocial Motivation, and Endorsements of the Four Archetypal Mixed-Motive Games, Study 3

Variable	M (SD)	Fixed-pie perceptions[a]	Prosocial motivation[b]	Prisoner's Dilemma	Chicken	Assurance	Maximizing Difference
Fixed-pie perceptions[a]	1,543.33 (3,810.62)	—					
Prosocial motivation[b]	3.12 (3.85)	−.14	—				
Prisoner's Dilemma	3.64 (1.33)	.33**	−.21	—			
Chicken	3.40 (0.88)	.27*	−.16	.34**	—		
Assurance	3.40 (1.17)	.01	.15	.04	−.16	—	
Maximizing Difference	3.33 (1.25)	−.06	.10	−.41**	−.09	.33**	—

[a] Fixed-pie perceptions are coded such that higher scores reflect stronger fixed-pie perceptions. [b] The total number of prosocial choices made in the social value orientation measure.
* $p \leq .05$. ** $p \leq .01$.

ture on cooperation rates emerged for every possible counterpart payoff structure. Thus, participants' own payoff structure significantly influenced their cooperation rate regardless of whether their counterpart's payoff structure was represented as a Maximizing Difference, Assurance, Chicken, or Prisoner's Dilemma game, $\chi^2(4) > 25$, $p < .001$ for all (see Figure 1).

Strategic responsiveness. Also as predicted, individuals who played Assurance or Chicken games were significantly more likely to change their strategic choices when their counterpart's payoff structure changed than individuals who played either Maximizing Difference or Prisoner's Dilemma games: 48% of the former changed their strategy (at least once) across the four games and counterpart types compared to 28% of the latter, $\chi^2(1) = 8.14$, $p = .004$.

Discussion

These data indicate that cooperation rates were uniformly high when participants' own payoff structure was derived from the Maximizing Difference game and uniformly low when their payoff structure was derived from the Prisoner's Dilemma game. In both types of conflicts the participants paid little attention (or were

indifferent) to changes in their counterpart's payoffs. In contrast, when their payoff structure was derived from the Assurance game, cooperation rates decreased monotonically as their counterpart's payoffs changed from Maximizing Difference to Assurance to Chicken to a Prisoner's Dilemma game. Thus, it appears that people strived to maximize joint gains when their counterpart's payoff structure allowed mutually beneficial cooperation but tried to avoid exploitation when they faced a counterpart whose payoff structure was derived from either the Chicken or Prisoner's Dilemma game. Finally, when participants' own payoff structure was derived from the Chicken game, their cooperation rates gradually increased as their opponents' payoffs became more competitive, peaking when their counterpart's payoffs were derived from the Prisoner's Dilemma game. (This makes strategic sense because players in a Chicken game who expect their counterpart to defect should cooperate unilaterally to maximize their outcomes.)

These findings are consistent with our strategic analysis of these games and show that subscribing to different perceptions about the nature of outcome interdependence in conflict can have important implications for two types of behaviors—cooperation and adaptability (i.e., perspective taking; Galinsky, Maddux, Gilin, & White,
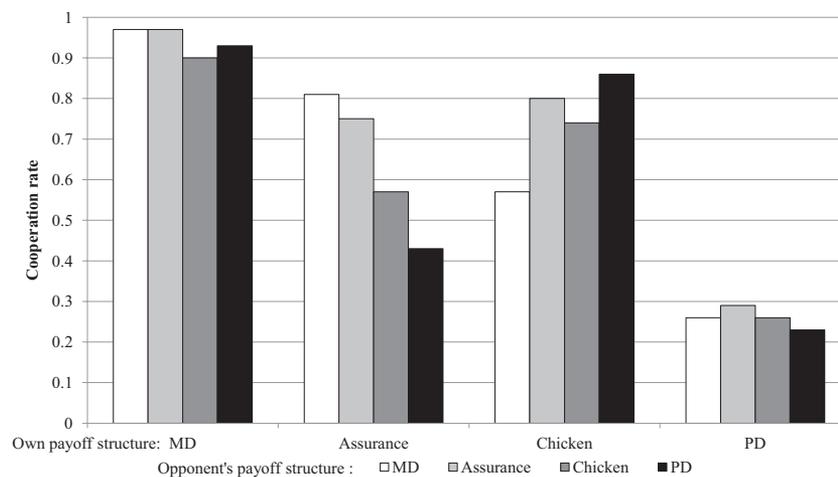
Figure 1. Mean cooperation rate as a function of one's own and the opponent's payoff structures, Study 4. MD = Maximizing Differences; PD = Prisoner's Dilemma.

2008). The data show also that it is important to distinguish between the Maximizing Difference and Assurance games as possible mental representations of conflict, as well as between the Chicken and Prisoner's Dilemma games, because they can give rise to very different patterns of behavior.

One limitation of Study 4 is that it treated payoff matrices at face value, without measuring or assessing participants' mental representations of their interaction. Although this study illustrated that different payoff structures can produce different patterns of bargaining behavior, it is unclear how participants viewed their interactions. The pattern of findings suggests that participants treated the numbers in the payoff matrices as we did when we used an individualistic orientation to derive our predictions for the four games. Nonetheless, in subsequent studies we directly measured (Study 5) or manipulated (Study 6) participants' mental representations before observing their bargaining behavior. In addition, both studies expanded the domain of this research by using a nonmatrix game to investigate a consequential behavior—the use of deception in negotiation. Deception is typically not available in matrix games in which parties are assumed to have perfect and complete information that is also common knowledge. Studies 5 and 6 investigated how thinking about outcome interdependence in terms of one of the four archetypal games relates to deception in ultimatum bargaining and multi-issue negotiation, respectively.

Study 5: Mental Representations and Deception in Distributive Bargaining

The game of Chicken pushes rational players toward unilateral exploitation: Its payoff structure rewards people who behave competitively when their counterpart cooperates. Thus, Chicken games often lead to greed-driven competitive behavior (Bornstein et al., 1996; Bornstein & Gilula, 2003). This motivational force is absent in the Assurance and Maximizing Difference games and it is less clear in the Prisoner's Dilemma, which encourages competitive action for multiple reasons, regardless of the counterpart's choice (Miller & Holmes, 1975).

Also, although the equilibria in the other three games all provide equal outcomes to both parties, the two equilibria in Chicken games provide different outcomes to the two parties—the unilateral competitor gets his or her best outcome while the unilateral cooperator gets his or her second-worst outcome. These differences can contribute to games of Chicken feeling more contentious than the other three games, as well as providing a rationale for the observation that endorsements of Chicken as a depiction of conflict were associated with more belligerent attitudes, worldviews, and behavior than endorsements of the Prisoner's Dilemma game (Halevy et al., 2006).

Thus, Study 5 investigates the specific behavioral consequences of viewing conflict as a game of Chicken. In particular, because research has repeatedly shown that greed leads people to engage in deceptive behaviors to obtain better outcomes than their counterparts (Boles, Croson, & Murnighan, 2000; Cohen, Gunia, Kim-Jun, & Murnighan, 2009; Gneezy, 2005; Steinel & De Dreu, 2004), we predicted that perceiving a conflict as a game of Chicken would lead to more deception than any other mental representation.

Method

Participants. Forty Stanford University students were recruited from a large subject pool to participate in a study on negotiation (50% female; mean age = 20.3 years, SD = 1.8).

Materials and procedure. Participants arrived in groups of 6–8 and were randomly assigned to dyads. Participants first completed our measure of game endorsement, indicating on 5-point scales (1 = *not at all*, 5 = *very much*) how much they perceived dyadic negotiations as Maximizing Difference, Assurance, Chicken, and Prisoner's Dilemma games. They were then randomly assigned to be either the proposer or the responder in an ultimatum game, followed by detailed instructions about the rules of the game. They were told that only the proposers would know the size of the pie and would send responders a message with two pieces of information—the size of their endowment (i.e., how much money they controlled) and how much of that amount they were offering the responder. The responders would then decide whether to accept or reject the offer: Accepting would distribute payoffs that were consistent with the offer; rejecting would result in zero payoffs to proposers and to responders (Boles et al., 2000; Pillutla & Murnighan, 1995). The 20 proposers (10 women) then learned that their endowment was $11. On their offer forms, they indicated that this was their endowment (if they told the truth) as well as the value of their offer. The experimenter subsequently delivered this form to their responder, who decided whether to accept or reject the offer.

Results and Discussion

Five of the 20 proposers lied about their endowment. On average, the proposers declared that their endowment was $9.90 ($SD$ = 2.5), which is marginally less than the $11 that they actually received, $t(19)$ = –1.90, p = .07. As in previous research (e.g., Pillutla & Murnighan, 1995), the proposers offered about half of what they declared that they had (M = $4.93, SD = 1.29). All of the respondents accepted their offers.

Game endorsements and deception. As predicted, the proposers who lied endorsed the game of Chicken significantly more than the proposers who did not lie (M = 3.60, SD = 0.55 vs. M = 2.67, SD = 0.90), $t(18)$ = –2.17, p = .044, d = 1.25. Dishonest and honest proposers did not significantly differ, however, in their endorsements of the Maximizing Difference, Assurance, or Prisoner's Dilemma games (p > .05 for all; see Table 4). These findings support the predicted association between people's en-

Table 4
The Mean (SD) Endorsements of Games by Honest and Dishonest Proposers in the Ultimatum Game, Study 5

Game	Proposers	
	Honest	Dishonest
Prisoner's Dilemma	2.40 (1.06)	2.80 (1.10)
Chicken	2.67 (0.90)[a]	3.60 (0.55)[b]
Assurance	3.73 (0.88)	4.40 (0.89)
Maximizing Difference	4.73 (0.70)	4.00 (1.00)

Note. Means with different subscripts differ (p < .05) as determined by an independent-samples t test.

dorsements of Chicken and their self-interested use of deception and provide additional data that differentiate the behavioral consequences of different mental representations of conflict.

Study 5 is limited, however, by its correlational nature, the distributive nature of the ultimatum game, and the constrained strategic options that it allows. To counteract these issues, Study 6 manipulated rather than measured participants' mental representations and used a negotiation task that gave the parties a range of strategy choices that might reduce their need to use deception to boost their payoffs (because less questionable yet effective tactics were also available).

Study 6: Mental Representations and Deception in Multi-Issue Negotiation

In multi-issue negotiations, the parties usually have private information about their interests, priorities, and preferences. This creates an "information dilemma" (Murnighan, Babcock, Thompson, & Pillutla, 1999): Revealing private information increases the chances that the bargainers will maximize their joint outcomes but the bargainer who reveals less has a better strategic position with a better chance of obtaining a larger share of an increased joint outcome. Private information also provides bargainers with temptations to misrepresent their preferences or act deceptively, in the hopes of maximizing their profits at their counterpart's expense. Thus, like Study 5, Study 6 tested the hypothesis that viewing a multi-issue (and potentially integrative) negotiation as a game of Chicken will increase deception more than viewing it through the lens of other mixed-motive games.

Method

Participants. Ninety-six Northwestern University students (67.7% female; mean age = 19.54 years, $SD = 1.24$) participated for $8; they also had an opportunity to earn additional money based on the outcome of their negotiation.

Design, procedure, and materials. Participants arrived in groups of 6–12 and were each seated in a private cubicle. Everyone received information and a profit schedule for a labor-management negotiation. The six issues were salary increases, enrollment in benefits, paid vacation days, the introduction of a flexible work schedule, changes in managerial feedback, and length of contract. For each issue, the payoff table included five possibilities.

We randomly assigned the participants to one of four conditions that used different verbal descriptions of their dispute to manipulate their perceptions of their outcome interdependence (Halevy et al., 2006). These descriptions—the only part of the materials that varied—were designed to lead the participants to believe that their conflict corresponded either to an Assurance, Chicken, or Prisoner's Dilemma game. Participants in the fourth condition, which served as a control, received their payoff table and background information without reference to any particular interdependence structure.[8]

Each participant received a page with two columns, labeled "correct information" and "misleading information" in large, bold, underlined font. Each column contained five pieces of information of approximately equal length (e.g., "Paid vacation days are less important to me than salary" [correct information]; "Paid vacation

days and salary are equally important to me" [misleading information]). The participants could check the statements for accuracy by comparing them to the entries in their payoff tables.

In the first stage of their negotiation, participants could exchange information by sending their counterparts up to five pieces of either accurate or misleading information about their preferences and priorities. To give participants a rationale for sending misleading information and to reduce any ambiguities concerning the motivations behind sending misleading information, the instructions informed them that sending misleading information would probably increase their own monetary outcomes and decrease their counterparts'. The participants then indicated which pieces of information they wanted to send to their counterparts; up to five selections could come from either the correct or misleading information column. The number of pieces of misleading information that they sent was our measure of deceptive behavior. After making their decisions, participants were debriefed, paid, and thanked, without actually negotiating.

Results and Discussion

Participants who were led to view their negotiation as a game of Chicken sent significantly more misleading pieces of information ($M = 2.68$, $SD = 1.07$) than participants who were led to view their negotiation as a Prisoner's Dilemma game ($M = 2.04$, $SD = 0.89$), $t(48) = 2.30$, $p = .026$, or as an Assurance game ($M = 2.17$, $SD = 1.05$), $t(47) = 1.70$, $p = .097$.[9] They also sent significantly more deceptive information than participants in the control condition ($M = 1.95$, $SD = 0.95$), $t(45) = 2.44$, $p = .019$. As Figure 2 shows, the Chicken game condition was also the only condition in which participants sent mostly misleading rather than accurate information, $t(24) = 1.96$, $p = .062$. A contrast that used the proportion of misleading information sent as the dependent variable found that participants in the Chicken condition sent a significantly higher proportion of misleading information than participants in the other three conditions (Chicken: $M = .61$, $SD = .24$; other conditions: $M = .48$, $SD = .20$), $t(93) = –2.55$, $p = .012$. No other differences were significant. These findings add to those of Studies 4 and 5 by illustrating a causal path from perceptions of outcome interdependence to disputants' conflict behavior.

Study 7: Person Perception and Negotiation Expectations

Studies 4–6 demonstrated that perceptions of outcome interdependence affect the process and outcomes of conflict directly, by influencing disputants' behaviors. Study 7 investigated the possibility that the games people think they are playing can also shape the process of conflict indirectly, by influencing counterparts' perceptions and negotiation expectations. Thus, we suggest that

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[8] This experiment did not include a Maximizing Differences condition. Given its cooperative nature and the highly cooperative behaviors that this mental representation elicited in our other studies, it did not seem to fit the context of this study.

[9] In Studies 6 and 7, the nonsignificant trend toward an association between endorsement of assurance and deception may be due to the pivotal role that self-protection (distrust) plays in Assurance games (Bornstein & Gilula, 2003).
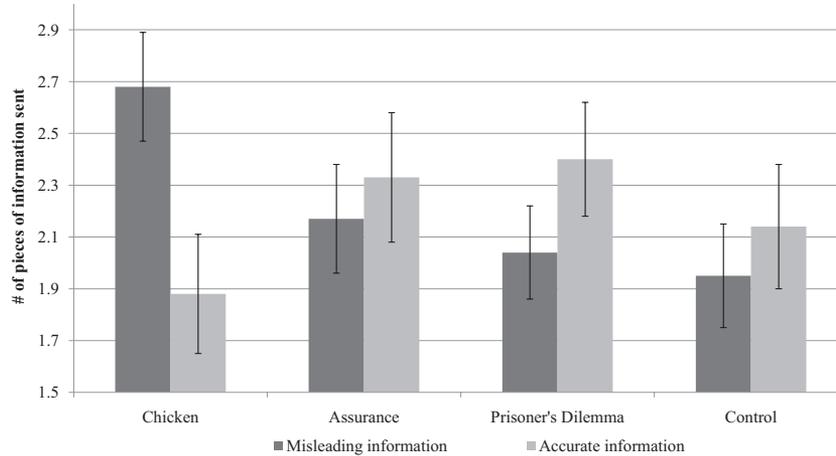
Figure 2. Mean number of misleading and accurate information pieces sent in advance of a multi-issue negotiation as a function of the manipulated mental representations, Study 6. Error bars represent standard error of the mean.

negotiators' tendencies to endorse a particular game will affect how others see and expect to interact with them.

Warmth and competence are considered universal dimensions of social perception (Cuddy, Fiske, & Glick, 2007; S. T. Fiske, Cuddy, & Glick, 2007). Perceived warmth—how much one is seen as helpful, friendly, kind, trustworthy, and so forth—is considered a more primary dimension of social perception than competence, as perceptions of warmth occur sooner and are linked more directly to emotional and behavioral reactions to others, possibly because of the need to quickly classify others as friend or foe (Cuddy et al., 2007; S. T. Fiske et al., 2007). We propose that whether people see their negotiation counterpart as warm depends, at least to some degree, on their counterpart's view of the conflict. Specifically, we propose that, consistent with the work of S. T. Fiske et al. (2007), an expression of contentious conflict perceptions (i.e., seeing a negotiation as a Chicken or a Prisoner's Dilemma game) will decrease negotiators' perceived warmth in their counterpart's eyes. Also consistent with this line of research, we do not expect that expressions of contentious conflict perceptions will influence competence perceptions (although see Van Lange & Kuhlman, 1994). Finally, we predict that the effect of negotiators' expressed representations of their conflict on their counterpart's expectations of their negotiation will be mediated by their perceived warmth (see Figure 3).

To test these hypotheses, Study 7 asked participants to envision a negotiation in which, prior to bargaining, they overheard their counterpart describe their upcoming interaction as one of our four archetypal games. Participants then rated their counterpart on perceived warmth and competence and indicated their negotiation expectations.

Method

Participants.   One hundred thirty-one Stanford University students (58.9% female; mean age = 20.7 years, SD = 2.1) participated in small groups of 6–12. Each participant was seated in a separate cubicle in the laboratory in front of a computer terminal.

Design, procedure, and materials.   Participants were directed to a web-based survey site. On the first page, they read the following: "Assume that you were preparing for a negotiation and you overheard your counterpart discussing the negotiation with someone else." The web software then randomly assigned participants to one of four conditions. Participants in the Maximizing Difference condition overheard the following:

> The way I see it, if we both act aggressively, our situation would be the worst possible; the best possible scenario for both of us is if we both compromise a little bit rather than take a hard line. However, if one of us acts aggressively while the other person makes concessions, the outcome for the aggressive negotiator would be pretty good, whereas the situation for the person making the concessions would be quite bad.

Participants in the Assurance, Chicken, and Prisoner's Dilemma conditions read comparable paragraphs that described each game's behavior–outcome contingencies using the same terms; for example, the cooperative response was "making concessions"; the competitive response was "acting aggressively"; and the four possible outcomes were labeled *best*, *good*, *bad*, and *worst*.
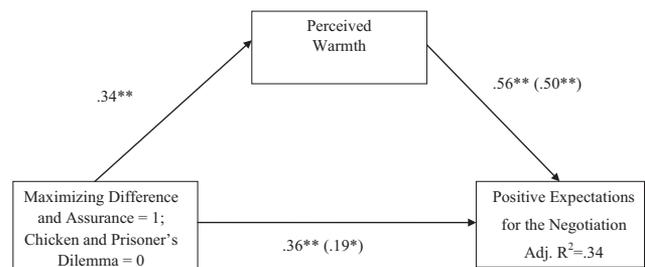

Figure 3. Significant direct and indirect effects of mental representations on positive negotiation expectations via perceived warmth, Study 7.
* $p < .05$. ** $p < .001$.

Participants then rated their counterpart on eight traits (used in previous research; Cuddy et al., 2007) using 5-point scales ranging from *not at all* to *very much*: warm, kind, helpful, friendly (averaged to create an overall warmth index, $\alpha = .88$), competent, intelligent, capable, and smart (averaged to create an overall competence index, $\alpha = .88$). Trait presentation order was randomly determined for each participant. We assessed positive expectations using four items adapted from Curhan, Elfenbein, and Xu's (2006) Subjective Value Inventory: Participants indicated how much they thought that they "will reach an agreement with this person," "be satisfied with the negotiated outcome," "be satisfied with the negotiation process," and "develop a good relationship with this person" (averaged to create an overall index of positive expectations: $\alpha = .85$).

Results and Discussion

As predicted, the game description had a significant effect on participants' evaluations of their counterpart's warmth, $F(3, 126) = 5.48$, $p = .001$, but not on their evaluations of their counterpart's competence, $F(3, 126) = 1.40$, $p = .25$. Viewing the negotiation as a Maximizing Difference ($M = 3.13$, $SD = 0.70$) or an Assurance game ($M = 3.08$, $SD = 0.84$) led to relatively high perceptions of warmth, which did not differ significantly, $t(64) = -0.24$, $p = .81$. Viewing the negotiation as a Chicken ($M = 2.48$, $SD = 0.84$) or a Prisoner's Dilemma game ($M = 2.61$, $SD = 0.81$) led to lower perceptions of warmth, which also did not differ significantly, $t(62) = -0.61$, $p = .55$. The differences in perceived warmth between these two pairs of conditions were significant: Hearing a description of a Maximizing Difference game led to greater warmth perceptions than hearing a description of a Chicken, $t(63) = 3.38$, $p = .001$, or a Prisoner's Dilemma game, $t(63) = 2.76$, $p = .007$, as did hearing a description of an Assurance game, $t(63) = 2.89$, $p = .005$, and $t(63) = 2.32$, $p = .024$, respectively (see Figure 4).

The same pattern emerged for positive expectations, which were high when the negotiation was described as either a Maximizing Difference ($M = 3.77$, $SD = 0.67$) or an Assurance game ($M = 3.67$, $SD = 0.76$); expectations did not differ in these two conditions, $t(64) = -0.51$, $p = .61$. Expectations were relatively low

when the negotiation was described either as a Chicken game ($M = 3.01$, $SD = 0.79$) or a Prisoner's Dilemma game ($M = 3.17$, $SD = 1.06$); expectations did not differ in these two conditions, $t(62) = -0.70$, $p = .49$. As with perceived warmth, positive expectations in the Maximizing Difference and Assurance game conditions were significantly higher than those in the Chicken and Prisoner's Dilemma game conditions, $t(63) > 2$, $p < .05$ for all four comparisons.

Finally, Preacher and Hayes's (2008) bootstrapping procedure provided evidence for a significant indirect effect of game endorsement on the counterpart's positive expectations via perceived warmth (see Figure 3). The 95% bias-corrected bootstrapped confidence interval (CI) for the mediator did not include zero, demonstrating significant partial mediation (perceived warmth CI [.13, .51]).

Study 7 showed that negotiators' endorsements of a particular game affected their counterparts' perceptions of them as well as their negotiation expectations. Specifically, negotiators who endorsed either the Chicken or the Prisoner's Dilemma game were seen as less warm; they also decreased their partners' expectations for the negotiation. Thus, Study 7 suggests that individuals' representations of their conflicts can also affect the process and outcomes of their negotiations through their effects on how their counterparts see them.

General Discussion

Scholars from many disciplines have called for systematic, theory-driven research on individuals' subjective perceptions of their outcome interdependence in conflict (Bazerman et al., 2000; Camerer, 2003; Kreps, 1990; Sebenius, 1992; Tenbrunsel & Northcraft, 2009). The current article responds by identifying four interdependence structures that seem to have psychological prominence in individuals' minds and that influence individuals' conflict behavior as well as how their counterparts see them.

Studies 1 and 2 identified, for the first time, four payoff structures that seem to dominate individuals' thinking about outcome interdependence in dyadic negotiations. Four mixed-motive games—Maximizing Difference, Assurance, Chicken, and Prisoner's Dilemma—surfaced repeatedly as individuals' primary repre-
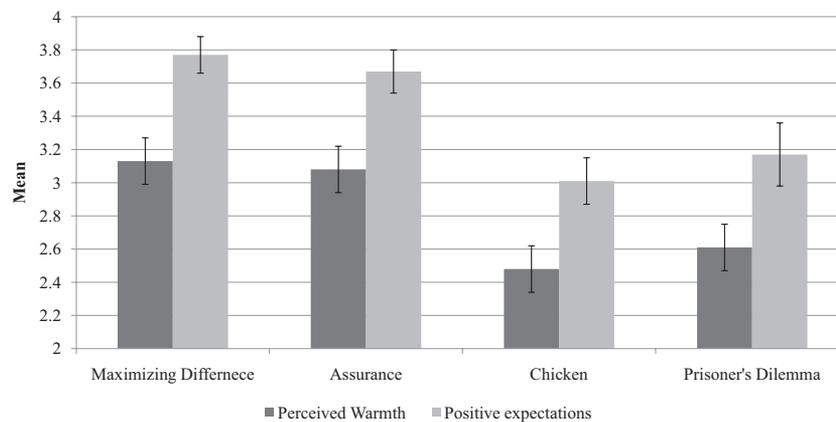

Figure 4. Perceived counterpart warmth and positive negotiation expectations as a function of game, Study 7. Error bars represent standard error of the mean.

sentations of conflict and negotiation. Previous research has shown that participants can use these payoff structures to make sense of their conflicts and that endorsements of particular games to describe a given conflict are related to the temporal accessibility of specific motivations (e.g., fear to Assurance, greed to Chicken) as well as to enduring beliefs and worldviews (e.g., political hawkishness, right-wing authoritarianism; Halevy, Chou, & Murnighan, 2011; Halevy et al., 2006). To the best of our knowledge, the current research is the first investigation to show that individuals create these games at rates above chance as models of their conflicts and negotiations. This observation adds to previous findings on individuals' ability to use these games to meaningfully categorize their conflicts; it also strengthens our confidence in the robustness of the current findings.

Our subsequent studies focused on some of the consequences of these mental representations, showing that perceiving a negotiation as a particular game has consequences for negotiators' behavior as well as for how their counterparts see them. Thus, the data link these mental representations to cooperation, perspective taking, deception, and social perceptions in negotiation and provide a specific depiction of how people think about and act on their interdependence in conflict and negotiation.

Theoretical Implications

Psychologists, economists, and political scientists have long been interested in the role that perception and misperception play in conflict (Jervis, 1976; Robinson, Keltner, Ward, & Ross, 1995). Rubinstein (1991) noted that "a good model in game theory . . . provides a model for the *perception* of real-life social phenomena. It should incorporate a description of the relevant factors involved, as perceived by the decision makers" (p. 910; italics in original). He added, "We are attracted to game theory because it deals with the mind. Incorporating psychological elements which distinguish our minds from machines will make game theory even more exciting and certainly more meaningful" (Rubinstein, 1991, p. 923). The current research satisfies some of these desires by capturing noteworthy regularities in individuals' mental representations of conflict and identifying some of their behavioral and social consequences.

Rapoport (1967) argued that "of the twelve symmetric games, eight are trivial, in the sense that the same outcome is the most preferred by both players, so that there is no conflict of interest" (p. 81). According to this game-theoretic analysis, the four games of theoretical interest are Prisoner's Dilemma, Chicken, Leader, and Battle of the Sexes (Colman, 1995; Wolf, Insko, Kirchner, & Wildschut, 2008). Our data suggest that, although the Prisoner's Dilemma and Chicken games have psychological prominence as models of conflict, Leader and Battle of the Sexes games do not, possibly because unilateral cooperation in these two games provides better results than mutual cooperation, thereby violating the assumption that people prefer counterpart cooperation over counterpart defection (Fehr & Gachter, 2000, 2002).

Instead, the current data suggest that Assurance and Maximizing Difference games, although game-theoretically "trivial," seem to be psychologically compelling. This finding adds to previous research that shows that people sometimes see conflict as potentially cooperative (Halevy, Bornstein, & Sagiv, 2008; Halevy, Weisel, & Bornstein, 2011). Thus, this research highlights the need

to complement game-theoretic analysis with empirical research to identify the characteristics of the games that people think they are playing when they engage in conflict and negotiations.

Future Directions and Unanswered Questions

This research suggests a number of potentially interesting directions for future investigations.

Social reality or mental construal? The current research cannot determine whether the characteristics of the social environment or the characteristics of individuals' cognitions contribute more to the perceptual convergence observed in our studies. Put differently, it remains an open question whether people tend to create the Maximizing Difference, Assurance, Chicken, and Prisoner's Dilemma games primarily because their interactions fit the underlying structure of these games or because of their psychological needs and/or cognitive constraints (Devetag & Warglien, 2008; Halevy, Chou, & Murnighan, 2011; Halevy et al., 2006).[10] Future investigations might address this issue.

Metacognitive processes. Study 7 raises interesting questions concerning individuals' abilities to know what games their counterparts think they are playing, how they might acquire this information, and how accurate their judgments are. Thus, another fruitful avenue for future research involves metacognitive questions, such as how negotiators think about how they and others perceive their outcome interdependence (Thompson & Cohen, in press; Tindale, Kameda, & Hinsz, 2003).

The ambiguous nature of many conflicts allows for considerable variability in their cognitive representations. Thus, two critical issues of interest are the correspondence of perceptions among negotiation counterparts and the accuracy of individuals' beliefs about each other's cognitive representations (Hinsz, 2004; Thompson & Cohen, in press; Van Boven & Thompson, 2003). A recent study with 80 Stanford undergraduate students (Halevy & Chou, 2011) addressed both issues. Consistent with the observation that interaction partners' beliefs tend to become more homogenous over time (Hinsz, Tindale, & Vollrath, 1997), this study found that 5 minutes of face-to-face communication effectively increased both the correspondence of mental representations (i.e., within-dyad similarity) and the accuracy of people's metacognitive judgments of each other's views of their mutual conflict.

This study found that most people tended to project their own endorsements onto their interaction partners, as indicated by strong positive correlations between own and other's assumed endorsements of the four games (the correlations for the four archetypal games ranged from .58 to .71 without communication and from .51 to .76 with communication). However, because communication increased the correspondence between interaction partners' perceptions, self-anchoring processes led to significantly greater accuracy following communication. Specifically, communication significantly increased accuracy (correct guesses of the counterpart's most preferred game) from 37.3% to 56.4%. Future research might investigate the social cues (e.g., perceived counterpart warmth) that shape these metacognitive processes.

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[10] We do not suggest that this set of four games exhausts the ways that people think about outcome interdependence. Instead, our findings show that many people use these four games to represent their outcome interdependence in dyadic exchange situations.

Situational cues and subjective construal. The current research did not address the malleability of people's mental representations and whether situational cues might shape individuals' tendencies to view their interactions as a particular mixed-motive game. Previous research has shown that labeling has powerful effects on individuals' conflict behavior. Calling a Prisoner's Dilemma game "the community game," for example, leads to significantly more cooperation than labeling it "the Wall Street game" (Liberman et al., 2004). Different labels can elicit profoundly different norms and expectations, which can then trigger different conflict behaviors (Larrick & Blount, 1997; Liberman et al., 2004; Zhong, Lowenstein, & Murnighan, 2007). Future research might investigate whether and how other situational cues, such as objects related to business negotiations (Kay et al., 2004; Smeesters et al., 2010), influence people's perceptions of their outcome interdependence.

Construal level and mental representations. Mixed-motive games are abstract representations of social situations; thus, people should be more likely to represent their interactions in terms of our four archetypal games when they think about their social interactions in abstract and superordinate terms rather than in concrete and subordinate terms (Trope & Liberman, 2010). In addition, because social motivations are more likely to affect conflict behavior when motives and behavior are matched in terms of their construal level (Eyal, Sagristano, Trope, Liberman, & Chaiken, 2009; Giacomantonio, De Dreu, Shalvi, Sligte, & Leder, 2010; Sanna, Lundberg, Parks, & Chang, 2010), game endorsements should be more likely to mediate the effects of social motivations on conflict behavior under high rather than low levels of construal. Future research might test these predictions directly.

Conclusion

There is remarkable consensus among psychologists that interdependence plays a pivotal role in conflict and that conflict is in the eye of the beholder. Thomas Schelling (1980) famously argued that most conflicts and social interactions tend to be mixed motive in nature. His list of variable-sum games included "wars and threats of war, strikes, negotiations, criminal deterrence, class war, race war, price war, and blackmail; maneuvering in a bureaucracy or in a traffic jam; and the coercion of one's own children" (p. 83). We provide a parsimonious framework that explains how people think about their interdependence by identifying the mixed-motive games that seem to be particularly prominent in individuals' minds. We also show how their views shape their behavior. This framework highlights the importance of people's mental representations of their conflicts and negotiations. Accurate detection and classification of individuals' mental representations can be a constructive, critical step in the process of alleviating and resolving unnecessary and costly conflicts.

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(*Appendix follows*)

Appendix

A Measure of Perceived Outcome Interdependence

Assume that in this negotiation, each party can achieve four different levels of outcomes, which are ordered as follows:

4 – Best outcome / 3 – Good outcome / 2 – Poor outcome / 1 – Worst outcome

Assume further that the parties can behave either cooperatively (e.g., exchange accurate information; make concessions on low priority issues) or competitively (e.g., provide misleading information; refuse to make concessions even on low priority issues). Below there are four different scenarios that may come about during the negotiation.

Please use the aforementioned 4-point scale to indicate what will, in your opinion, be the most likely outcomes of each scenario for yourself and for the other party.

Important Note: You can only use each number (1, 2, 3, or 4) ONCE FOR EACH PARTY.

The scenario:	The outcome for ME	The outcome for the OTHER PARTY
Both I and the other party will behave *cooperatively* during the negotiation		
I will behave *cooperatively* and the other party will behave *competitively* during the negotiation		
I will behave *competitively* and the other party will behave *cooperatively* during the negotiation		
Both I and the other party will behave *competitively* during the negotiation		