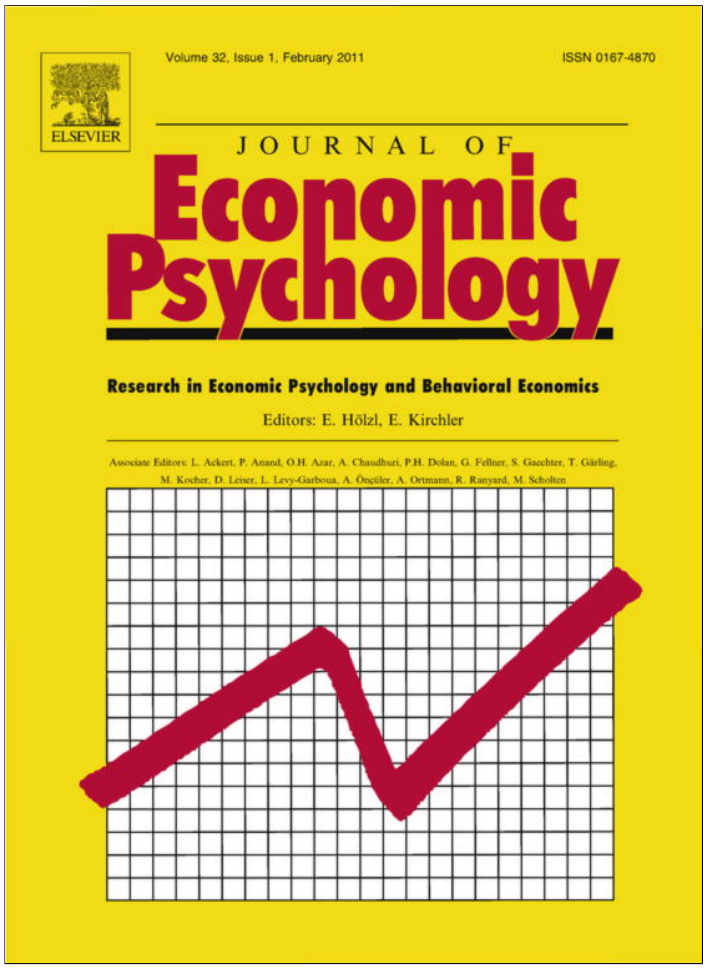

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Journal of Economic Psychology 33 (2012) 278–291

Contents lists available at SciVerse ScienceDirect

Journal of Economic Psychology

journal homepage: www.elsevier.com/locate/joep

Walking the talk in multiparty bargaining: An experimental investigation

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ARTICLE INFO

Article history:
Received 20 December 2010
Received in revised form 13 October 2011
Accepted 14 October 2011
Available online 19 October 2011

JEL classification:
D03
D74
D83

PsycINFO classification:
3020

Keywords:
Communication
Fairness
Bargaining
Negotiations

ABSTRACT

We study the framing effects of communication on payoffs in multiparty bargaining. Communication has been shown to be more truthful and revealing than predicted in equilibrium. Because talk is preference-revealing, it may effectively frame bargaining around a logic of fairness or competition, moving parties on a path toward or away from equal-division agreements. These endogenous framing effects may outweigh any overall social utility effects due to the mere presence of communication. In two studies, we find that non-binding talk about fairness within a three-party, complete-information game leads toward off-equilibrium, equal division payoffs, while non-binding talk focusing on Competitive Reasoning moves parties away from equal divisions. Our two studies allow us to demonstrate that manipulated pre-game talk and spontaneous within-game dialogue lead to the same results.

1. Introduction

Major multi-party transactions are commonly consummated after interactive negotiations involving communication. In corporate acquisitions and mergers, for example, early discussions between the investment bankers for an acquiring company and its target firm are often viewed as critical in shaping subsequent negotiations and the ultimate terms of the final deal. In such meetings, the bankers attempt to agree on a common language that defines the kind of deal they hope to reach. A bargaining frame that results from early and endogenous communication may shape subsequent behaviors and outcomes. Bargaining frames may heighten attention to either fairness or competition in transactions, materially affecting the way in which resources are distributed. An acquisition mutually conceived of and explained as a "merger of equals," for example, is likely to involve a different negotiation process and outcome than a deal conceived of as an "unfriendly takeover." Yet studies of multiparty bargaining have largely ignored the potential for communication to frame bargaining processes and outcomes. Incorporating the framing effects of communication into bargaining theory promises new insights into an important economic activity.

The mere presence of communication among parties has been argued to lead to preferences for more equal payoffs than bargaining without communication (e.g., Sally, 1995). Past experimental studies find that communication facilitates the

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0167-4870/$ - see front matter © 2011 Published by Elsevier B.V.
doi:10.1016/j.joep.2011.10.008

exchange of private information, allowing negotiators to coordinate on a mutually appealing outcome (Valley, Thompson, Gibbons, & Bazerman, 2002), and enhances cooperation even in bargaining games with complete information (Demichelis & Weibull, 2008). Real world outcomes, however, suggest the effects of communication in bargaining may be more complicated. Mergers and acquisitions, for example, rarely occur without communication between the involved parties, yet the equality of payoffs to merging firms varies widely across deals. We present two experimental studies that offer an explanation for this variance in the equality of payoffs across parties in multiparty bargaining with communication.

Standard equilibrium predictions in multiparty bargaining games assume competitive forces will drive bargaining behavior, resulting in payoffs reflecting parties' resources or alternatives outside of negotiations (Nash, 1951; Von Neumann & Morgenstern, 1953). Contrary to these assumptions, experimental results reveal that negotiated agreements often conform to fairness norms more closely than they conform to competitive, game-theoretic predictions (Biel & Thogersen, 2007; Frey & Meier, 2004; Hoffman, McCabe, & Smith, 1996; Prasnikar & Roth, 1992). Communication appears to heighten attention to fairness norms by allowing the transmission of private information to reveal distribution symmetry (Crawford & Sobel, 1982; Roth & Malouf, 1979) and providing parties with an opportunity to raise fairness concerns. Communication may, however, also introduce norms other than fairness in bargaining (Charness & Rabin, 2005; Farrell, 1988).

In two studies, we examine the ways in which the *content* of talk during negotiations allows parties to come to agreement on the "right" way to proceed in the interaction (Charness & Dufwenberg, 2006). Sometimes they may agree to aim for a "fair" outcome and other times a competitive one. Our two studies show (a) that the frame suggested in communication at the onset of bargaining drives outcomes toward equal or competitive payoffs and (b) that fairness and competitive talk occur spontaneously and endogenously, driving outcomes even in the absence of any external manipulation of communication.

We explore how talk before and during bargaining affects the likelihood of "fair" payoffs in multiparty bargaining games with complete information. There are various definitions of fairness, but many bargaining studies have operationalized the "fair outcome" as an equal distribution of available surplus (for empirical evidence, see Brams & Taylor, 1996; Güth, Ockenfels, & Tietz, 1990; Young, 1993). This is the definition we adopt in our two studies. We hypothesize that the effects of communication on multiparty bargaining payoffs will depend on whether talk frames bargaining around a logic of fairness or a logic of competition. In our first study, we experimentally manipulated the content of pre-negotiations talk to test whether the initial talk available to negotiators affects the distribution of surplus in a subsequent bargaining game with unrestricted communication. In our second study, we relied on previously uncoded and unanalyzed communication data from a multiparty bargaining experiment conducted by Croson, Gomes, McGinn, and Nöth (2004).[1] We coded unrestricted, naturally-arising talk by type and analyze the effects of communication content on the equality of final payoffs.

Across both studies, we found that the effects of communication are more complex than previous research highlighting the cooperative value of communication has suggested. All talk is not created equal – some talk moves parties closer to equal distributions, while other talk moves parties away from equal division of surplus. Pre-game communication manipulated to prime a fairness frame drives parties to divide surpluses more evenly than pre-game communication manipulated to prime a competitive frame. The content of communication during bargaining shapes outcomes by framing interactions around a logic for exchange – fair or competitive – thereby affecting the likelihood of efficiency-maximizing transfers and the equality of payoffs across parties.

This paper proceeds as follows. In the next section, we review past research on fairness and communication in bargaining games and discuss the mechanisms through which different types of communication may affect the fairness of outcomes in multiparty bargaining with complete information. We then introduce our experimental methods and primary outcome variables. The details and results from our two empirical studies are presented in the next two sections. We conclude with a summary of our findings and a discussion of their implications.

1.1. Fairness and communication in bargaining

Marshall (1969) described economic exchange as "bargaining supplemented by custom and by notions of fairness." Supporting this social view, a plethora of research has documented preferences for fairness in economic transactions (e.g., Kachelmeier, Limberg, & Schadewald, 1991). Kahneman, Knetsch and Thaler's seminal paper (1986) reports on household surveys in which respondents' preferences reflected concerns for fair treatment across multiple market domains. Critical to the question addressed here, the survey responses revealed that fairness was evaluated relative to a stated referent, rather than according to some absolute standard.

The social psychological literature on priming (see Higgins & Bargh, 1987, for review of this literature) reinforces the notion that bargaining outcomes are likely to reflect parties' beliefs about appropriate behavior within an interaction (Messick, 1999). For example, in a study of ultimatum games, McLeish and Oxoby (in press) found that priming participants with a shared identity led to higher offers than priming participants with distinct identities. Focusing on fairness, Liberman, Samuels, and Ross (2004) found that priming different norms in a prisoner's dilemma game by calling it "The Wall Street Game" (a competitive prime) in one treatment and "The Community Game" (a collaborative prime) in another treatment markedly

[1] Croson et al. (2004) use payoff data to test the relative predictive power of three equilibrium models: the Nucleolus (Schmeidler, 1969), the Shapley value (Shapley, 1953), and the Coalitional Bargaining Value (CBV) (Gomes, 2005). Capturing all communication was a byproduct of the study. We requested and obtained the communication and payoff data from the authors with the exception of their Treatment 3 and one observation in their Treatment 6, for which the communication data was lost due to a computer glitch.

changed bargaining behavior. Defection was significantly higher in "The Wall Street Game" than in the (economically identical) "Community Game." Similarly, Robert and Carnevale (1997) primed either a "fairness" or a "rational" frame through written instructions and found the predicted effects on the generosity of individuals' ultimatum offers.

Past research on two-party bargaining suggests that communication may heighten fairness concerns. The possible role for communication in triggering fair outcomes in bargaining varies with the presence or absence of private information. In games with private information, communication allows the revelation of information that makes payoff comparisons possible (Roth & Malouf, 1979; Valley et al., 2002). Games with complete information eliminate the informational advantages of communication, but empirical evidence suggests that communication continues to play a powerful role nonetheless (Blume & Ortmann, 2007; Crawford, 1998; Farrell, 1988; Farrell & Rabin, 1996; Orbell, van de Kragt, & Dawes, 1988; Rabin, 1994; Sally, 1995; Xiao & Houser, 2009). Charness and Rabin (2005) found that even minimal communication signaling a preference for favorable treatment affects distributions in dictator and response games. Heightened attention to what others are expected to do in games where players have a choice between altruism and selfishness leads to increased altruism (Krupka & Weber, 2009), suggesting that communication may alter behavior in complete information games by increasing the extent to which others' expected behavior is considered.

While much of the prior research on communication in bargaining suggests that the mere presence of communication leads toward equal payoffs (Kachelmeier & Towry, 2002), theoretical models of communication in bargaining suggest the effects may be more variable. Economists (Demichelis & Weibull, 2008; Rabin, 1993; Sally, 2005) and social psychologists (Messick, 1999) theorize that when players hold a common understanding of the messages conveyed through communication, behavior and expectations of others' behavior will be consistent with the content of those messages. The generalized notion emerging from these models is that people behave in a way that is consistent with the motives or behavior they ascribe to other parties and that ascription can be driven by communication. Rabin (1990) shows that coordination need not be restricted to equilibrium outcomes if the communication is rationalizable, i.e., if the communication is plausible given the self-interest of the party talking. Illustrating this in a commons dilemma, Dawes and his colleagues (Dawes, McTavish, & Shaklee, 1977) found that irrelevant communication had no effect on contributions, but relevant communication was associated with higher contributions and expectations that others would also contribute at higher levels.

The role communication may play in affecting the equality of distributions in multiparty bargaining is complicated by the potential for coalitions. We are aware of four previous studies that gathered communication data in coalition bargaining games. Bettenhausen and Murnighan (1985) observed the emergence of norms in a repeated, five-party coalition game involving communication. Though they did not examine the content of communication in detail, they attributed their findings of consistency in payoffs within groups and inconsistency across groups to the norm-creating effects of early communication within groups. Bolton, Chatterjee, and McGinn (2003) studied a three-party coalition game in which the grand coalition, but not an equal division of available resources, is predicted in equilibrium. The presence of communication materially affected payoffs. Equal splits occurred frequently between parties engaging in private communication. These authors mention that fairness is offered as a rationale for outcomes in over one-third of the bargaining transcripts but provide no further analysis of communication effects. Croson et al. (2004) permitted communication in their study of three-firm takeover negotiations but did not explore the effect of talk on outcomes. Finally, Bolton and Brosig (2007) found that payoffs in a three-party coalition game were consistently closer to equal when parties communicated prior to coming to agreement. Although both of the Bolton studies link communication with more equal divisions of available surplus, neither of these studies examines *how* communication may move parties toward (or away from) an equal division of surplus.

Isolating the specific way in which communication moves outcomes toward or away from more equal distributions of resources requires an analysis of the connection between communication content and bargaining outcomes. This is the approach we take in the studies described below. Different types of talk during multiparty bargaining with complete information should prime participants to frame the interaction differently and thus lead to different paths to agreement. Our studies test the proposition that communication concerning fairness will move agreements toward an equal distribution of surplus, while communication concerning Competitive Reasoning will move agreements away from an equal distribution of surplus. In Study 1, we exogenously manipulated pre-game communication and then examine the outcomes in a subsequent bargaining game involving unrestricted communication. Study 2 allowed unrestricted communication within a range of bargaining games and examined the effects of endogenous talk on outcomes.

2. Design of experimental studies

We studied bargaining situations involving three parties (hereafter referred to as firms A, B and C), designed to loosely resemble takeover markets. These markets vary in terms of the benefits to those involved in mergers and the externalities faced by parties if they are not included in an agreement. Our bargaining game payoffs are designed to simulate these benefits and externalities. The game is described with the following notation: Stand-alone payoffs for firms A, B and C are denoted as V_A, V_B, and V_C respectively. Mergers can involve two of the three or all three firms in a bargaining game. The values of the merged companies, AB, AC and BC, are denoted as V_{AB}, V_{AC} and V_{BC}, respectively. The value of the three-way firm, ABC, is denoted as V_{ABC}, where ($V_{ABC} > V_{AB}$, V_{AC}, V_{BC}). Study 1 involves a single set of payoff parameters (See Payoff Structure 1 in Table 1), while Study 2 involves five different sets of payoff parameters (see Table 1).

Table 1
Explanation of game payoff structures across studies. All payoff structures are included in Study 2, but only the highlighted payoff structure (Payoff Structure 1) is included in Study 1.

	Outcome									
	A, B, C separate			A, B merge, C separate		A, C merge, B separate		B, C merge, A separate		A, B, C merge
	V_A	V_B	V_C	V_{AB}	V_C	V_{AC}	V_B	V_{BC}	V_A	V_{ABC}
Payoff Structure 1	100	100	100	230	50	220	70	210	160	400
Payoff Structure 2	50	50	50	300	50	300	50	150	50	400
Payoff Structure 3	0	0	0	130	0	5	0	5	0	400
Payoff Structure 4	100	100	100	220	20	220	150	210	140	400
Payoff Structure 5	50	50	50	240	140	210	150	180	180	400

Two different equilibrium concepts make point predictions about the outcomes of three-party games and incorporate the effects of externalities: the Myerson–Shapley (MS) value and the Coalition Bargaining Value (CBV). Of these equilibria, CBV is a better predictor of laboratory behavior (Croson et al., 2004). Neither considers the possibility that communication among the parties might affect outcomes because all fiscally relevant information is public. An alternative prediction from the behavioral literature would argue the presence of communication will increase the likelihood that negotiating parties will split available surpluses equally regardless of their outside options (Roth, Malouf, & Murnighan, 1981; Sally, 2005). Our prediction is that the frame elicited in communication before or during bargaining will drive payoffs toward or away from an equal split outcome, depending on the content of talk.

2.1. Study procedures[2]

The data for both studies were collected in a computer lab for experimental research within a large US university. Members of the standing subject pool were recruited through advertisements in multiple campus newspapers. Each participant was randomly assigned to one role (firm A, B or C) and participated in multiple rounds of negotiations in that role. Competitors rotated across rounds to ensure that no participant encountered the same player in more than one bargaining game. Payoffs in each round were independent, i.e., there were no carryovers across rounds. To avoid wealth effects, participants were paid based on their earnings in a single, randomly selected game (US$0.11 for each point earned), plus a base rate of US$15. Participants were not told how many rounds they would play or about the differences across communication treatments in Study 1, but all other information was public.

The participants in each bargaining session sat at individual computers separated by visual dividers so that they could not see one another's screens. The software connecting the three players for a given round was programmed with a single screen interface.[3] This screen included a box for making formal offers to acquire another player's company, buttons for accepting and rejecting offers, a text box for free-form instant messaging communication, and a display reminding participants of complete payoff rules, including the game parameters and the payoffs for current offers and all previously accepted offers. All information on the screen, including offers and written communication, was public information. A sample screen is provided in Appendix A.

Two forms of communication were available to the participants in each round of the bargaining games: non-binding written instant messages and binding offers. Within the instant messaging text box, participants could write anything they wanted with the exception of identifying information. To make a formal offer in the offer box, a party selected one or both of the other parties to be included in the agreement and specified the payment(s) being offered to each of the included parties. Only the included party(ies) could accept or reject an offer. Offers remained open for 15 seconds and were then automatically withdrawn. Only one offer could be open at a time. Accepted offers were binding. If a three-way offer was accepted, the negotiation ended. If a two-way offer was accepted and one party remained independent, bargaining could continue, allowing for the possibility of a subsequent agreement. The seller in the first accepted deal was no longer involved in bargaining. He or she could see all subsequent interactions between the buyer and the third party but could not input messages or offers. A round ended when all three firms consolidated or when the time limit was reached. Aside from the distinctions across studies described below and the unique payoff parameters across games in Study 2, procedures were identical across sessions.

2.2. Outcomes of interest

We examined two types of dependent variables when analyzing the outcomes of the bargaining games described above: (1) whether bargaining concludes with an equal division of available funds (equal split) and (2) the distance between the actual distribution of resources and an equal split of available funds (geometric distance from equal split). Because $V_{ABC} = 400$ is not a multiple of 3, we count any deal giving 133 to two of the parties and 134 to the third as an equal split.

[2] More information on the laboratory protocol, including the instructions used in each of the studies, is available on request from the first author.
[3] This software was designed and programmed by C. Nicholas McKinney, Rhodes College, Department of Economics and Business Administration.

Table 2
Messages available in communication menus for the two talk treatments in Study 1.

Fairness treatment menu	Competitive Reasoning treatment menu
An even split?	This is a competition
Don't be bold, be fair and collaborative	Since I am in a better position I should benefit more
Equal money!	The way to ultimately maximize is that one person will end up making more than the other two
I would rather be fair	I just would like to make more money
I'll be fair to you	It's in your best interest to get as much $ as you can
Our best bet is to split this three ways and get it over with	A and B are in the stronger position, C
Split or quit!	The stronger players ought to have the larger piece of the pie
That's fair	We are all out for our best interest, I'm not trying to be the philanthropist here
The only "fair" way to do it is to split the bonus	We have unequal bargaining power
We have to be fair, ok?	Says who that you're in the better position?
We should be even	We need to merge in order to reap the benefits
We will all be better off if we merge fairly	It's not about winning, it's about making as much as possible
What's wrong with everyone getting the same?	A three-way deal is the way to make the most money total
Hi	Hi
Howdy	Howdy
Yes	Yes
Good call	Good call

To calculate the geometric distance between the actual distribution in a three-way agreement and an equal split, let the actual payoff of a single party i be denoted by P_i. The general equation for the geometric distance from equal split in a three-way agreement, normalized to lie between zero and one, is calculated as follows[4]:

$$\sqrt{(P_a/400 - 1/3)^2 + (P_b/400 - 1/3)^2 + (P_c/400 - 1/3)^2} \quad (1)$$

3. Study one

We designed Study 1 to test the causal link between talk and equal divisions of available surplus. Written messages sent and received by parties before the start of the bargaining game described above were manipulated so that they contained talk triggering one of two alternative frames that may affect the likelihood of equal payoffs in bargaining: talk about fairness or talk about competition. Several additional pre-game messages containing pure Social Talk were available in both treatments. By randomly assigning participants to a communication treatment – either Fairness Talk or Competitive Talk – we ensured that the type of talk they engage in prior to a negotiation was exogenous. Through the treatment variable, we tested the hypothesis that communication about fairness drives parties toward a more equal division of available surplus than communication about competition.

3.1. Summary of laboratory protocols

We tested our hypothesis using the three-party bargaining game described above. We employed a single payoff structure (Table 1, Payoff Structure 1). One hundred and twenty-six participants completed this study. Communication treatments varied across sessions, so that all parties in a single session received the same communication manipulation. Each participant was randomly assigned to one role within one session and played three rounds within a single treatment, each with a unique set of three players. This resulted in 126 observations of three-party bargaining games. Incentive pay in this study ranged from US$6 to US$26.

The three players in each bargaining game communicated via a single screen interface, as described above. A two-minute pre-game communication period introduced the talk manipulation. During the pre-game treatment, each player was required to select and send a minimum of five unique messages to the other two players from a communication menu listing 17 different messages. All of the messages were quotes from endogenous communication collected in bargaining interactions from a previous study (Croson et al., 2004). Three coders blind to our hypotheses coded all of the communication text collected by Croson et al.[5] The 17 messages in the menu in the Fairness Talk treatment included 13 messages that all three coders classified as containing content about fairness and four messages unanimously coded as containing only Social Talk. The menu in the Competitive Talk treatment included 13 messages all three coders classified as containing Competitive Reasoning and the same four Social Talk messages used in the Fairness Talk treatment. Table 2 presents a list, by treatment, of the messages in the communication menus. In both treatments, the 17 messages were randomly ordered in a player's menu.

[4] For example, if the agreement in a given game allocated 140 points for player A, 130 points for player B, and 130 points for player C, then the geometric distance between that outcome and an equal split outcome would be: $\sqrt{(140/400 - 1/3)^2 + (130/400 - 1/3)^2 + (130/400 - 1/3)^2} = 0.02$

[5] The messages were coded using the procedure and categories described in Study 2 (see Section 4.2).

After sending the required five messages in the pre-game treatment period, players could choose to send additional messages from the menu until the two-minute of pre-game communication were over. The treatment period was followed by a three-minute bargaining game during which free-flow communication, and offers and deals were possible, as described above. Formal offers were allowed only during this three-minute bargaining game.

3.2. Results and discussion

Subjects exchanged an average of 21 messages from the communication menus during the pre-game communication period (avg. frequencies (s.d.): Fairness Talk treatment = 21.4 (4.15); Competitive Talk treatment = 21.3 (5.38); $p = 0.912$). Talk during the subsequent bargaining game was infrequent. In both treatments, participants exchanged at least one free-flow message after the pre-game communication period in exactly 65% of the bargaining games. The average number of free-flow messages exchanged did not differ across treatments (Fairness Talk treatment = 4.1 (3.32); Competitive Talk treatment = 4.9 (3.38); $p = 0.294$). The content of the talk contained in the free-flow messages was directionally consistent with what would be expected from the pre-game treatment, but the frequencies were low overall and none of the content differences were significant (Free-flow messages about fairness: Fairness Talk treatment = 0.89 (1.47), Competitive Talk treatment = 0.78 (1.04), $p = 0.682$; Free-flow messages about Competitive Reasoning: Fairness Talk treatment = 2.51 (2.76), Competitive Talk treatment = 3.58 (3.09), $p = 0.107$). Given the scarcity of free-flow talk in the bargaining game, if talk is driving outcomes, it would be early talk manipulated through the communication menus.

In our first set of analyses, we tested for differences across the communication treatments in our two outcome variables. We found that participants in multiparty bargaining preceded by pre-game Fairness Talk divided final surpluses more equally than those who engaged in pre-game competitive talk. As predicted, the proportion of equal splits (i.e., 133, 133, 134) in the Fairness Talk treatment was significantly higher than in the Competitive Talk treatment (one-sided two sample test of proportions, $fairness_{\%equal\_split} = 30\%$, $competitive_{\%equal\_split} = 9\%$, $N = 126$, $p < 0.001$). The average geometric distance from an equal division of surplus for observations in the Fairness Talk treatment was significantly lower than in the Competitive Talk treatment (one-sided two sample t-test, $fairness_{distance} = 0.09$, $competitive_{distance} = 0.11$, $t = -1.6803$, $N = 126$, $p < 0.05$).

While the effect of pre-game talk on distance is significant, the magnitude of difference is small in absolute terms. To assess whether this difference was economically meaningful, we considered the expected range for the distance variable. The lowest possible value is 0.0 (distance from equal = 0.00 when payoffs are 133⅓, 133⅓, 133⅓), and a reasonable estimate of the high end ranges from 0.10 to 0.22, based on equilibrium predictions.[6] The payoffs in the Competitive Talk treatment were close to those expected in equilibrium, and it appears that the competitive payoff structure was reflected in the final distribution of surplus even in the Fairness Talk treatment. Pre-game talk frames bargaining, but it does not completely eliminate the economic pressures of outside alternatives. In Study 2, we explored the effect of talk across a variety of more and less competitive payoff structures.

Experimenter demand effects could pose an alternative explanation for our findings if the type of messages seen in the communication menus led participants in the Fairness Talk treatment to believe the experimenter wanted them to divide surpluses equally and led participants in the Competitive Talk treatment to believe the experimenter wanted them to work toward an outcome that reflected their outside alternatives. To test the potential for demand effects, we collected additional experimental data in a small supplemental experiment involving an identical bargaining game except that the use of messages was *optional* rather than required. As in the full experiment, participants were exposed to one of two randomly assigned communication menus: one containing the 13 messages classified as Fairness Talk plus the four Social Talk messages ($N = 22$) and another containing the messages 13 classified as competitive talk and the four Social Talk messages ($N = 22$). In this supplemental experiment, however, participants could refrain from sending messages. The participants in the supplemental study used these pre-set messages sparingly, sending an average of 2.6 messages per game, compared to the 21 sent when communication was required. This experimental design should have been just as likely to induce a demand effect as the design in our primary study, but communication was unlikely to be framing the interaction since so few messages were actually sent. When no talk was required, we found no significant difference between the proportion of equal splits in the fairness and competitive treatments (one-sided two sample test of proportions, $fairness_{\%equal\_split} = 23\%$, $competitive_{\%equal\_split} = 18\%$, $N = 44$, $p = 0.34$), and the average geometric distance from an equal division of surplus was indistinguishable across treatments (avg. distance from equal split (s.d.): $fairness_{distance} = 0.05$ (0.012), $competitive_{distance} = 0.05$ (0.011)). The uniformly small distance from equal in both treatments suggests that in the absence of framing through communication, the focal division of surplus in this game may be equal payoffs and that the most powerful talk may be that which frames the interaction as a competition. Future research could investigate this possibility. The results from this supplementary experiment support our hypothesis that communication, rather than an implied experimenter demand, is responsible for driving bargaining outcomes.

Study 1 was designed to directly test for a causal relationship between talk and divisions of surplus by exogenously manipulating the type of talk used to frame bargaining. We found that pre-game talk about fairness results in agreements

[6] Distance from equal was calculated for the two equilibrium concepts that make point predictions for games with the payoff structure used here, the Myerson-Shapley (MS) value and the Coalition Bargaining Value (CBV). $CBV_{distance} = 0.101$; $MS_{distance} = 0.223$. Croson et al. found that laboratory payoffs were closer to CBV predictions.

closer to equal division of surplus than pre-game talk about competition. But talk arises naturally in most negotiations. Study 2 turns to the question of whether endogenous talk frames bargaining in multiparty negotiations.

4. Study two

To extend our study of the impact of talk on negotiations outcomes, we turn to an analysis of the relationship between naturally-arising communication and the equality of surplus divisions. While studying the relationship between endogenous talk and negotiated outcomes precludes us from drawing causal inferences about the relationship between talk and outcomes, such an analysis, combined with Study 1, strengthens our ability to evaluate how talk alters negotiations. If communication affects outcomes by causing the emergence of a dominant frame for an interaction, the distribution of available resources in bargaining games should vary with endogenous talk about fairness and Competitive Reasoning. In contrast, if the mere presence of communication affects outcomes, Social Talk or the aggregation of all talk should predict the equality of resource distribution. We investigate these predictions in Study 2.

Croson et al. (2004) studied the predictive power of alternative equilibria in three-party takeover markets with externalities. Their experimental design employed multiple sets of payoff parameters to reflect economic differences across industries. While they collected the messages parties exchanged during takeover negotiations, their study did not consider communication, nor did the authors code the communication or explore in any way the effects of the communication among parties. Croson and her coauthors provided us access to all communication and outcome data from their study. These are the data used in Study 2.

4.1. Summary of laboratory protocols

One hundred and seventeen participants completed this study. Each participant was randomly assigned to one role within one session and played five rounds within a single, randomly assigned payoff structure. This resulted in 194 observations of three-party bargaining games. See Table 1 for a description of the five payoff structures studied and Table 3 for the number of subjects and negotiations in each payoff structure. Participants were paid a US$15 show-up fee, plus any earned incentive pay, to participate in the study. Incentive pay earned by participants ranged from US$0 to US$27.50.

4.2. Content analysis of communication

Analyzing the impact of freeform communication is the focus of this study. To generate predictor variables for this analysis, the written messages sent and received by the parties were coded for the presence of three mechanisms through which communication may affect the likelihood of equal payoffs in bargaining: talk about fairness; talk about competition; and, as others have suggested before us, pure Social Talk. The coding was carried out by three coders ignorant to the study's hypotheses.

To determine the distinct, substantive categories of communication present in the interactions, two of the authors read through several transcripts. Within a transcript, each message sent by one of the three parties was recorded as a separate "talk unit." The authors defined coding categories and identified examples of talk units fitting into each of the three relevant coding categories. The three raters then coded all of the messages using this coding protocol. Code definitions, along with appropriate examples of talk units drawn from the transcripts, are presented in Table 4. The agreement rate was 92.1% across all coding categories. When raters disagreed on a code, the majority opinion was recorded.

We created frequency counts for each of the three talk variables by summing the total number of talk units coded for a given category within a single three-party bargaining game. For all three measures, the raw frequencies were normalized by dividing each of the frequency counts by the total number of talk units in a given game (average number of talk units = 20, standard deviation = 23, min = 0, max = 122). A z-transformation on these ratios resulted in three predictor variables, which we refer to as Fairness Talk, Competitive Reasoning and Social Talk. Table 5 provides descriptive information about the raw data and correlations between our transformed communication variables.

4.3. Additional outcome variables

Study 1 allowed us to assess the causal impact of talk on negotiated outcomes through the use of exogenously-imposed communication. In Study 2 we were able to examine the impact of endogenous communication in negotiations. Because talk

Table 3
Distribution of subjects and negotiations across payoff structures, Study 2.

	Subjects	Negotiations
Payoff Structure 1	21	35
Payoff Structure 2	24	40
Payoff Structure 3	18	30
Payoff Structure 4	27	45
Payoff Structure 5	27	44

Table 4
Coding protocol and examples.

Communication variable	Coding protocol	Examples from transcripts
Fairness Talk	(1) Use of the word "fair" or a synonym	– *"How about a more equitable division of assets?"*
	(2) Proposing or mentioning an equal division of points between two or more players	– *"do y'all wanna split 3-ways?"* – *"25 for each of us is totally fair"*
Competitive Reasoning	(1) Comments in which a player states his/her underlying rationale for a move or questions the underlying rationale of another player	– *"yeah, but what are you going to get with B?"*
	(2) Explanations of thoughts, plans or actions or questions about the thoughts, plans or actions of another player	– *"but the point is, you're not in much of a position to bargain"*
	(3) Comments fitting 1 and/or 2 were excluded if the talk unit was also coded as Fairness Talk	– *"you guys can't make more than 100 if i'm not a part of the merger."*
Social Talk	(1) Comments containing any non-task-related discussion of one or more players' outside lives	– *"are you all undergrads?"*
	(2) Questions about aspects of other players' lives	– *"anybody got plans for thanksgiving?"*
	(3) Friendly or neutral conversation that is not task-related	– *"I'm from Seattle."*
	(4) Social filler that does not also serve a task function	– *"hello"* – *"everyone enjoying themselves so far?"*

Table 5
Descriptive statistics about raw variables and correlations between transformed talk variables ($N = 194$).

	Non-standardized mean	Non-standardized standard deviation	Competitive Reasoning	Fairness Talk
Competitive Reasoning	3.56	4.80		
Fairness Talk	0.99	1.78	0.04	
Social Talk	4.02	15.40	−0.21***	−0.04

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

and offers are both endogenous, it is challenging to establish a causal relationship between the two. Talk may frame what is seen as an appropriate offer; if this is the case, early talk would be a good predictor of later offers. But a reasonable alternative is that offers lead to talk that corresponds with the nature of the offers; if this is the case, early offers would reliably predict later talk. Ideally, we would be able to look at the effect of pre-offer talk on first offers, but little talk preceded the first offer in most bargaining sessions. By splitting games into two stages in our analysis, it was possible to assess if early talk shapes later offers or vice versa. We were also able to evaluate the impact of subgame communication on subgame outcomes.

Negotiations in the bargaining games studied could follow one of four possible paths: (1) all parties reach a 3-way agreement in one stage of negotiations (direct 3-way agreement); (2) two parties reach an agreement in a first stage (Stage 1) and the buyer then comes to a subsequent agreement with the third party in a second stage (Stage 2) (3-way agreement following 2-way agreement); (3) two parties reach an exclusive agreement in Stage 1 and the third party remains unaffiliated in Stage 2 (2-way agreement); or (4) no agreement is reached in negotiations (no agreement).

Across the 194 negotiations in this study, we observed 101 direct 3-way agreements (52.1%), 75 3-way agreements following 2-way agreements (38.7%), 14 2-way agreements (7.2%) and 4 impasses (2.1%). Table 6 provides summaries of payoffs. The table reports the percentage of equal 3-way splits and the average geometric distance from an equal division realized across all three parties' payoffs at the end of the bargaining session (see Eq. (1) above), across different paths to agreement.

In addition to creating game-level talk variables, we divided the talk units in each bargaining session into two periods – "Stage 1 talk" and "Stage 2 talk" – to account for the different paths to agreement discussed above. Stage 1 talk included all talk units that occur before the first two-way agreement. Stage 2 talk included all talk units taking place after an initial two-way agreement was reached, i.e., the communication between the two parties remaining after the first two-way deal. This resulted in three z-transformed variables for each type of communication, e.g., Fairness Talk, Fairness Talk in Stage 1, and

Table 6
Average geometric distances between outcomes and equal divisions of available resources across paths of agreement.

	Direct 3-way	3-Way following 2-way	2-Way only	No agreement
Avg. geometric dist. from equal	0.02	0.13	0.28	0.12
% of equal 3-way splits	57%	1%	0%	0%
N	101	75	14	4

Table 7
Parameter estimates (standard errors in parentheses), approximate *p*-values, and associated goodness-of-fit statistics for regression models (robust OLS, Model 1 and logistic, Model 2) that describe the relationship between the type of talk negotiators rely on and the equality of their final division of surplus.

	Dependent variable	
	Geometric distance from equal Model 1 $N = 194$	Equal split Model 2 $N = 154^{\dagger}$
Competitive Reasoning	0.006	0.010
	(0.007)	(0.221)
Fairness Talk	−0.013**	0.623**
	(0.005)	(0.260)
Social Talk	−0.007	0.531**
	(0.004)	(0.249)
Payoff Structure 1	0.051***	−1.45***
	(0.017)	(0.543)
Payoff Structure 2	0.137***	–
	(0.014)	–
Payoff Structure 3	0.072**	−0.804
	(0.028)	(0.521)
Payoff Structure 4	0.039**	−1.23**
	(0.016)	(0.495)
Round	−0.005	0.166
	(0.005)	(0.135)
R^2 or Pseudo R^2	0.271	0.152

Key: *$p < .1$, **$p < .05$, ***$p < .01$.
† All 40 games in payoff structure 2 were dropped by the logistic regression because that treatment condition perfectly predicts an unequal division.

Fairness Talk in Stage 2. We considered the Stage 1 and Stage 2 talk variables only for the 89 negotiations that involved an initial two-way agreement.

In games that involve an initial two-party agreement, in addition to measuring the geometric distance from equal of the final distribution of surplus, we also measured the geometric distance from equal of the Stage 1, two-way division of surplus. An equal split in Stage 1 gives half of the divided surplus to each of the involved parties. Let the Stage 1 payoff of a single party *i* be denoted by $P_{S1,i}$. For example, if players A and B are included in the Stage 1 two-way deal, the normalized geometric distance from an equal split of the Stage 1 outcome is calculated[7]:

$$\sqrt{(P_{S1,a}/(P_{S1,a}+P_{S1,b})-1/2)^2+(P_{S1,b}/(P_{S1,a}+P_{S1,b})-1/2)^2} \tag{2}$$

If a second stage of bargaining takes place after an initial two-way agreement, the distance from equal in Stage 2 depends on the payoffs of the two remaining players only. The Stage 2 outcome measure, similar to the general outcome measure described above, quantifies the geometric distance between the final division of resources and an equal division of the available resources between the parties. An equal division in Stage 2 would give half of the available pie to each of the remaining two players. The available pie in Stage 2 for all games is 400 points minus the payoff to the party acquired in Stage 1. In the case in which player C has already been acquired in Stage 1, the normalized geometric distance from an equal split of the Stage 2 outcome is calculated[8]:

$$\sqrt{(P_a/(400-P_c)-1/2)^2+(P_b/(400-P_c)-1/2)^2} \tag{3}$$

4.4. Results and discussion

We ran a series of analyses to assess the relationship between endogenous communication and payoff divisions in multiparty bargaining. In the first set of regressions, we evaluated the relationship between overall Fairness Talk, Competitive Reasoning and Social Talk and the final division of available resources in all 194 negotiations, ignoring takeover dynamics.

[7] For example, imagine player A acquired player B for 100 points in Stage 1, treatment 1. This means player B's Stage 1 (and final) payoff is 100 points, and because firms A and B are worth 300 together, A's payoff would be 200 if the game ended at this point. The normalized geometric distance between that Stage 1 outcome and an equal split would be: Geometric Distance from Equal of Stage 1 Division $= \sqrt{(200/300-1/2)^2+(100/300-1/2)^2} = 0.24$.

[8] For example, imagine player B acquired player C for 90 points in Stage 1, treatment 1. This leaves available resources of (400 − 90 = 310) for division between firm BC and firm A in Stage 2. If firm BC then acquired firm A for 120 points, the payoff to B is (310 − 120 = 190). The normalized geometric distance between the Stage 2 outcome and an equal split would be: Geometric Distance from Equal Stage 2 Division $= \sqrt{(120/310-1/2)^2+(190/310-1/2)^2} = 0.16$

We then examined the subset of 89 observations in which there was an initial two-way agreement leading to two stages of negotiation. In all analyses presented in this section, we controlled for the game payoff structure with dummy variables (Payoff Structure 5 omitted) and for the experimental round during which the negotiation took place (1–5). We explored the effects of communication by payoff structure in our robustness checks.

4.4.1. Effects of talk on final agreements

An increase in the relative frequency of Fairness Talk was associated with a significant reduction in the geometric distance between the realized outcome and an equal division of available resources (Table 7, Model 1). Neither overall Social Talk nor overall Competitive Reasoning was significantly related to this distance outcome variable. The frequencies of Fairness Talk and Social Talk were both associated with an increase in the odds of an equal split of available resources (Table 7, Model 2).

4.4.2. Effects of talk across subgame stages

To explore the effects of talk in the subset of interactions that involved two stages of bargaining, we analyzed the 89 interactions in which two firms merged initially. Stage 1 talk predicts the geometric distance from equal of the two-way, Stage 1 agreements: more Competitive Reasoning early in bargaining is associated with less equal payoffs in the initial two-party agreements, while more Fairness Talk is associated with more equal payoffs (Table 8, Model 3). In Stage 2, Fairness Talk is associated with more equal payoffs, but Stage 2 Competitive Reasoning and Social Talk have no significant relationship with the equality of surplus divisions (Table 8, Model 4).

Looking at the effects of early talk on later offers and vice versa, we find that talk in Stage 1 predicts the average geometric distance from equal of Stage 2 offers (see Table 9, Model 5). Specifically, talk about Competitive Reasoning increases the average geometric distance from equal of Stage 2 offers, while Fairness Talk decreases it. In contrast, the average geometric distance from equal of offers made during Stage 1 has no significant effect on the amount of Competitive Reasoning, Fairness Talk or Social Talk in Stage 2. This evidence is consistent with data from Study 1 indicating that talk has a framing effect that alters the course of offers, rather than the reverse.

4.4.3. Robustness checks

Before concluding that the content of talk is framing bargaining around certain types of distributions, it is important to address alternative explanations for our results in this study. First, we tested whether our findings were driven by games in

Table 8
Parameter estimates (standard errors in parentheses), approximate *p*-values, and associated goodness-of-fit statistics for a series of robust OLS regression models that describe the relationship between the type of talk negotiators rely on in subgames of their negotiations and the outcomes of those subgames.

	Dependent variable	
	Geometric distance from equal of stage 1 division Model 3 $N = 89$	Geometric distance from equal of stage 2 division Model 4 $N = 89$
Competitive Reasoning in Stage 1	0.043***	
	(0.014)	
Fairness Talk in Stage 1	−0.037**	
	(0.016)	
Social Talk in Stage 1	−0.001	
	(0.019)	
Competitive Reasoning in Stage 2		0.018
		(0.019)
Fairness Talk in Stage 2		−0.039***
		(0.012)
Social Talk in Stage 2		−0.004
		(0.008)
Payoff Structure 1	0.044	0.027
	(0.068)	(0.066)
Payoff Structure 2	0.000	0.114*
	(0.061)	(0.056)
Payoff Structure 3	0.161*	0.158
	(0.086)	(0.104)
Payoff Structure 4	0.062	0.043
	(0.073)	(0.073)
Round	0.006	−0.005
	(0.011)	(0.013)
R^2	0.177	0.157

Key: *$p < .1$, **$p < .05$, ***$p < .01$.

Table 9
Parameter estimates (standard errors in parentheses), approximate *p*-values, and associated goodness-of-fit statistics for a robust OLS regression model that describes the relationship between the type of talk negotiators rely on in Stage 1 and the average geometric distance from equal of Stage 2 offers.

	Model 5 *N* = 89
Competitive Reasoning in Stage 1	0.051***
	(0.012)
Fairness Talk in Stage 1	−0.044***
	(0.015)
Social Talk in Stage 1	0.017
	(0.016)
Payoff Structure 1	0.039
	(0.076)
Payoff Structure 2	0.153**
	(0.069)
Payoff Structure 3	0.080
	(0.074)
Payoff Structure 4	0.072
	(0.070)
Round	0.000
	(0.010)
R^2	0.265

Key: $^{*}p < .1$, $^{**}p < .05$, $^{***}p < .01$.

which an equal split of available resources is predicted in equilibrium. We then looked at the possibility that our results reflected individual player "types".[9] Finally, we conducted a number of robustness tests to evaluate the possibility that the overall presence or frequency of talk, rather than the type of talk, was driving our results. In each case, the set of robustness tests replicated Models 1–5 with the addition or omission of the critical variable(s) for the test in question. None of the additional tests yielded significant results supporting the alternative hypotheses. Details of the robustness tests are provided in Appendix B.

4.4.4. Summary

Study 2 shows that when communication arises naturally in multiparty bargaining, Fairness Talk is associated with payoffs that are closer to an equal division of the available surplus, while competitive talk is associated with payoffs that are further from an equal split. In contrast, the mere presence or frequency of talk is not consistently related to the distribution of payoffs. In this study, both talk and offers were endogenous. Our tests of early talk's effects on later offers and early offers' effects on later talk suggest that talk is driving offers rather than the reverse.

5. Conclusion

Talk can unite, but it can also divide. In multiparty bargaining, communication can focus parties on a fair distribution of resources, but it can also focus parties on a competitive distribution of resources. The dominant frame in the discussions at the onset of interaction – be it fairness or competition – strongly influences the equality of payoffs even in complex, full-information multiparty bargaining. The results from our two studies support our hypothesis that communication concerning fairness moves agreements toward an equal distribution of surplus, while communication concerning Competitive Reasoning moves agreements away from an equal distribution of surplus. This effect holds whether talk is manipulated or occurs naturally.

In Study 1, we exogenously manipulated the type of pre-play communication available to participants in bargaining games. We find that pre-game Fairness Talk leads to more equal payoffs than Competitive Talk. Across five different game parameters in Study 2, we found that increases in the relative frequency of naturally-occurring talk about fairness were associated with more equal payoffs. Talk about Competitive Reasoning had the opposite effect, driving payoffs away from an equal division, though these effects were less consistent than Fairness Talk effects. There were no restrictions on communication in the second study, so any framing evolved endogenously. Across these two studies, the frame assumed in communication, whether assigned or emergent, significantly affects payoffs. These findings are reminiscent of research in social psychology and organizational behavior on "negotiated belief structures" (Walsh & Fahey, 1986), "conflict frames" (Pinkley, 1990), and "logics of exchange" (McGinn & Keros, 2002; Uzzi, 1999).

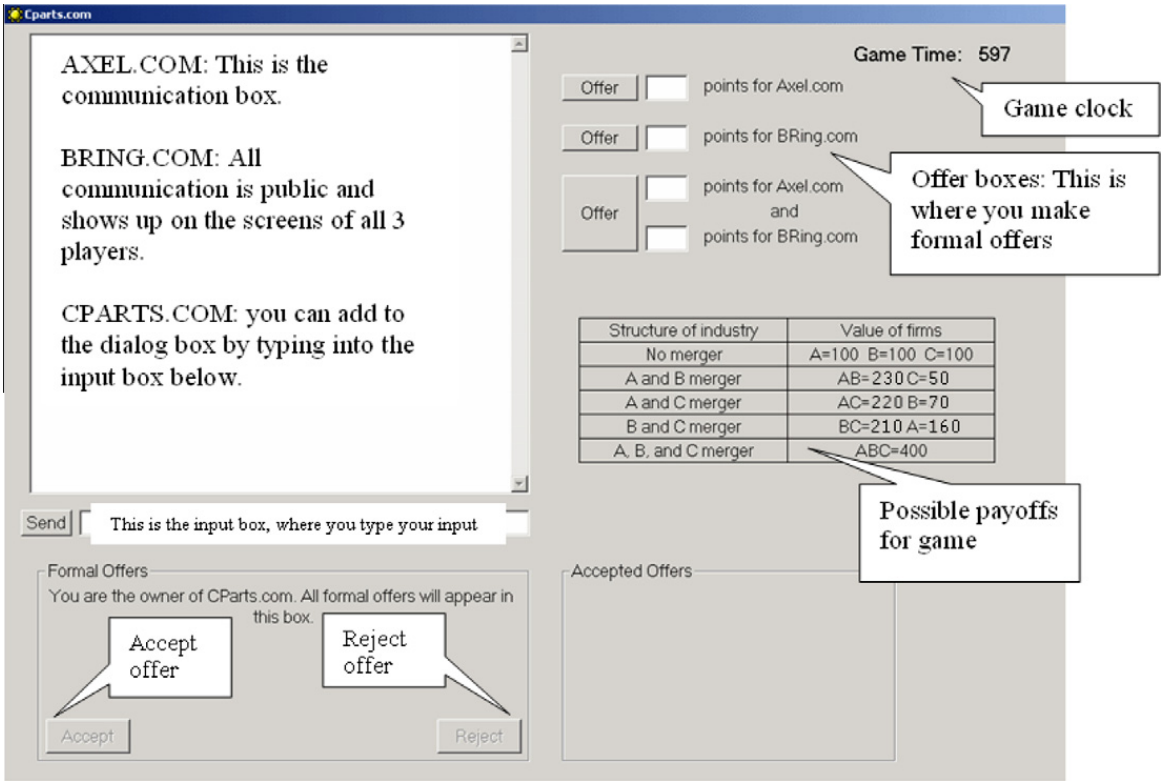
[9] Specific findings and statistics from all of the sensitivity analyses are available upon request. We report primarily overall effects here.

Our results add critical insights to our understanding of communication's role in multiparty bargaining. A view of communication as increasing social awareness (Hoffman et al., 1996; McGinn & Croson, 2004; Sally, 1995) may be too simplistic to explain bargaining outcomes in multiparty settings. The mere presence or frequency of communication did not materially affect payoff distributions in Study 2, nor did the relative frequency of pure Social Talk. In multiparty bargaining, as in two-party bargaining, communication may work in part through social awareness and in part by framing negotiators' views on appropriate outcomes.

The communication in our experiments was carried out through an electronic chat room. Past research arguing for the social closeness effects of communication on bargaining outcomes has shown that face-to-face communication heightens interpersonal awareness more than communication across other media (McGinn & Keros, 2002; Valley, Moag, & Bazerrman, 1998). It may be that Social Talk would have had more impact on payoffs if our bargaining studies had been carried out face-to-face. The same may be true for the framing effects of Fairness Talk or Competitive Reasoning. Future research could explore whether face-to-face communication simply heightens the social closeness effects of talk overall, or whether the medium interacts with the content of the communication to influence framing and outcomes.

The path to equality is paved with talk of fairness, while the path away from equality is paved with talk of competition. Equilibrium models of bargaining have begun to incorporate fairness considerations. To improve their predictive power, they should incorporate the ways in which the content of communication frames the logic underlying bargaining and thereby affects behavior and outcomes.

Appendix A. Sample screen from bargaining game



In the sample screen shown above, the white box in the upper left corner displays the communication between the three parties. The input field below this box can be used to enter a new message, which will be displayed in the public communication box. In the upper right corner players can make offers either to one of the other parties or to both of them simultaneously. The possible payoffs for this specific game are shown on the right side of the screen. In the lower left corner, buttons to accept or reject an offer are displayed.

Appendix B. Details of robustness checks in Study 2

To test whether our findings were driven by games in which an equal split of available resources is the predicted outcome, we reran all of our regressions excluding the two payoff structures (3 and 5) in which the best fitting equilibrium pre-

diction is equivalent to an equal division of available resources (Croson et al., 2004). Our findings are qualitatively the same when payoff structures 3 and 5 are dropped from the analyses (i.e., all results remain significant at the respective levels noted in Tables 7–9).

If certain players are types prone to certain modes of talk and the associated modes of play (Fehr & Schmidt, 1999), any effects of talk on payoffs could be spurious. The fact that each participant played the same role (A, B or C) multiple times allows us to address this alternative explanation. For each of our five treatments and each of our three roles, we ran a one-way analysis of variance to test whether outcomes involving the same player are more similar to one another than outcomes involving different players in the same role and Kruskal–Wallis non-parametric tests of the equality of populations on each player type and treatment. Only one of the fifteen F-tests for the equality of within-player means reached significance at the 10% level. Similarly, one non-parametric test was significant at the 5% level and another at the 10% level. These results suggest negligible individual effects on payoff distribution in our study.

We also ran a number of additional robustness checks to distinguish between the mere presence or frequency of talk and the content of that talk. Thirty of the 194 games involved no informal communication, i.e., no text messages were exchanged through the chat box. Adding a dummy variable, Any Talk, for whether or not a bargaining game included any talk to each of our regressions does not change the significance levels of any of our results. The coefficient for Any Talk does not approach significance in any of the five regressions. We also reran all of our regressions excluding games in which no talk took place. Again, none of the significance levels of our predictor variables change when the games without talk are eliminated from our analyses. As an additional check, we added a variable, Total Talk, measuring the total number of messages exchanged during bargaining and repeated all of our analyses. When we added Total Talk to Model 1, predicting distance from equal in all 192 games, fairness and competitive talk remained significant at previous levels, but Social Talk reached significance ($p < .05$) and total talk was also significant ($p < .05$). The significance levels for our predictor variables remained the same in Models 2–4, and the Total Talk variable was not significant. When Total Talk was added to Model 5, predicting the distance from equal in stage 2, Fairness Talk remained significant only at the 10% level. These robustness checks strengthened our conclusion that the content of talk is more important than the presence or amount of talk during bargaining.

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