Teams Promise But Do Not Deliver*

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Abstract

Individuals and two-person teams play a hidden-action trust game with pre-play communication. We replicate previous results for individuals that non-binding promises increase cooperation rates, but this does not extend to teams. While teams promise to cooperate at the same rate as individuals, they consistently renege on those promises. Additional treatments begin to explore the basis for team behavior. We rule out explanations hypothesizing that concern for partner's payoffs is the basis for team outcomes, as absent within-team communication, promise fulfillment rates *increase* compared to individuals. Rather, the results are consistent with the idea that communication between teammates provides support for self-serving behavior.

Key words: trust game, hidden-action, non-binding communication, teams versus individuals

JEL classification: C72, C91, C92, D83

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Economic transactions are often characterized by imperfectly observable actions. These unobservable actions, and the lack of trust surrounding them, can prevent potentially profitable partnerships from being formed in one-off interactions (Bolton and Dewatripont, 2004). However, a large literature with individual decision makers has shown that non-binding communication increases cooperation in one-off transactions of this sort (Ben-Ner and Putterman 2009, Ben-Ner et al. 2011, Charness and Dufwenberg 2006, Vanberg 2008, Ellingsen et al. 2010, Ederer and Stremitzer 2016, Ismayilov and Potters 2016, Schwartz et al. 2014, Bhattacharya and Sengupta 2017). Much of the time economic interactions occur between groups of players, or teams, acting on behalf of the organizations they work for, not between individuals. While the effects of communication are robust with individual decision makers, the effects for teams has not been investigated.

This paper aims to close this gap for the hidden action trust game, comparing individuals with two-person teams. This is important since if decision making by individuals and teams differs substantially, false inferences may be drawn based on individual decision makers.[1] Employing two-person teams as decision makers also opens up the opportunity to better understand the motivation for meeting (or failing to meet) non-binding commitments through analysis of within-team conversations.

As the title of the paper indicates, with communication teams make non-binding promises to cooperate at the same rate as individuals (56% and 57%, respectively). However, while individuals fulfill these promises 60% of the time, teams do so 27% of the time ($p < 0.01$), a cooperation rate which is not much higher than when teams have no opportunity to communicate (27% versus 21%, $p = 0.71$). The main factors cited in the literature as motivating individuals to fulfill their promises---guilt/feeling bad or wanting to maintain consistency between actions taken and promises made---play an insignificant role in motivating second movers in teams to live up to their promises. Within-team conversations show that factors influencing first movers' choices rest on their willingness to take risks, believability of promises made, and first movers' beliefs regarding their own willingness to follow through on promises had they been second movers.

A second set of experimental treatments, referred to as the Passive Team treatments, start to better understand why teams are so much less cooperative than individuals. The standard argument from the psychology literature is that communication between teammates provides support for self-serving

[1] For example, the results for individuals have been used to suggest a more limited need for formal contracts in one-shot transactions than previously thought (Charness and Dufwenberg 2006). The results of the present experiment show that this conclusion is premature as applied to group decision making.

behavior, whereas for individuals social norms regarding cooperation following promises guide behavior. The alternative hypothesis explored is that teams are concerned with their teammate's payoff, more so than the opposing team's payoff. Two additional team treatments were implemented to explore this, using the same procedures and payoffs as in the team sessions, but where one teammate was designated as the "decider", with the other a "passive" teammate having no input into the decision making process, but receiving the same payoff as the decider. Somewhat surprisingly, under both Passive treatments, one without and one with a team building exercise, cooperation rates were significantly *higher* than for individuals. Conjectures regarding the basis for this outcome are discussed below.

As noted, all hidden action trust games to date have used individual subjects. We are aware of two experiments comparing teams to individuals in "standard" trust games. In this setup, there is no communication between first and second movers, and there are no hidden actions. Rather, first movers have a fixed sum of money to distribute between themselves and the second mover, with the amount of money sent common knowledge. The amount sent is doubled or tripled, after which the second mover decides how much to send back. Kugler et al. (2007) compare three-person teams with individuals in this game. The main finding is that teams are less trusting than individuals, sending less money, but are as trustworthy, giving back the same fraction of the money sent.[2] Song (2008) compares behavior between individuals and group-representatives for three-player teams. She finds that group-representatives are less trusting and less trustworthy than individuals, sending back a smaller percentage of the money compared to individuals. Beside the differences in second mover behavior in these two papers, neither looks at the effect of non-binding communication, which is the central issue under study here.

Closer to the present game, in terms of tapping into the same underlying strategic considerations, are simultaneous move prisoner dilemma games comparing teams with individuals, with and without communication, reported in the psychology literature (Insko et al., 1993; Schopler et al., 1993). These experiments typically employ open ended, face-to-face communication over both finite and uncertain number of repetitions, with financial incentives. In these games, communication increases cooperation significantly for individuals but not for teams, quite similar to the results reported here. These will be discussed in more detail below.

[2] Note that very little is returned in these standard trust games, so that on average first movers would be better off not sending any money. That is, teams and individuals are equally trustworthy in these standard trust games, but on average both are not very trustworthy.

The structure of the paper is as follows: Section I outlines the experimental design and procedures. Results comparing individuals and teams with and without communication are reported in Section II. Section III reports results from the Passive team treatment. Section IV analyzes the team discussions to better understand the basis for the behavior reported in the team communication treatment. The paper ends with a brief summary of results reported and possible extensions of this line of research.

I. Teams versus Individuals in Hidden Action Trust Game

I.1 *Experimental Design and Procedures*

Choices and payoffs, shown in Figure 1, are the same as in Charness and Dufwenberg (2006). A Players move first, deciding between In or Out. Out is a safe option guaranteeing \$5. The payoff from choosing In depends on B's choice, with expected earnings greater than \$5 if B cooperates (Rolls), and \$0 if not. Participants played 5 periods of the same game with perfect stranger matching and no feedback regarding outcomes until the last period.[3] Roles were held constant throughout a session, with one period chosen randomly to determine earnings (along with a \$5 show-up fee). At the end of a session, participants learned the payoff they would have received in each of the 5 periods, along with the randomly selected period determining their payoff. Subjects were told that they would not know whether the chance move was a "Success" or a "Failure", so that As could not attribute a \$0 payoff to B choosing Don't Roll.

One treatment used individual decision makers as a control against which to evaluate team outcomes. The second used two-person teams with the same teammate for all 5 periods.[4] Teammates did not know each other's identity, sitting at separate computer terminals and communicating with each other through a continuously-available chat box. Teams were required to reach agreement on all decisions, with the message and decision protocols structured to allow input from both members. Each team member received the payoff earned for the one, randomly selected, payoff period. There were no restrictions on the within-team discussions, except to refrain from using profanity and not to identify themselves in any way.[5]

[3] The absence of feedback across rounds eliminates the opportunity for *dynamic* session level effects (Frechette, 2012).
[4] Teams were referred to as "group" A or B in the instructions and on their computer screens to minimize rivalrous tendencies.
[5] Subjects generally followed these instructions, with minor exceptions involving some identifying characteristics; e.g., their major and class schedule.

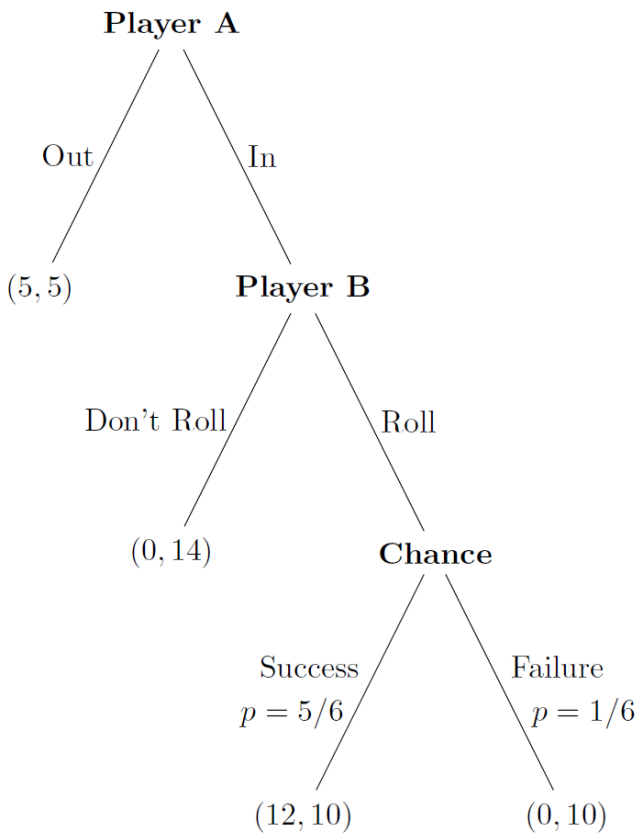

Figure 1: Game Tree: As move first. Bs choose second not knowing As' choices. Chance follows a decision to Roll with the outcome randomly determined. As' payoffs are listed first, Bs' second.

Each treatment had several sessions with no communication and a similar number with communication---a between-subject design with no overlap between subjects. In the no communication treatments, participants played the game exactly as shown in the game tree. All As decided In or Out, followed by Bs deciding Roll or Don't Roll without seeing As' choice, with the chance move computerized. In the communication treatment, Bs had the opportunity to send a single free-form typed message to the A player they were paired with *before* A decided In or Out. After that, decisions proceeded as in the no communication treatment.

Neither teams nor individuals were required to send a message and were explicitly told that they could leave the message blank or write "No Message." In the team communication treatment, Bs had 2 minutes to reach agreement on their message. To give both teammates input into the message content, either member could initially propose a message, with their teammate choosing to accept or reject it. If teammates agreed on the message it was sent after the 2 minutes expired. If they failed to agree within the

2 minute time limit, one member was randomly selected and given 30 seconds to write a message on behalf of the team (with the chat box turned off).[6] While the B teams decided on what message to send, A teams had 2 minutes to freely chat with each other.

After all B teams had decided on their message, they were delivered to their respective A team, with As having 1 minute to decide on In or Out. Teammates were required to agree on their decision, and if no agreement was reached, one teammate was randomly selected to make the team decision (with the chat box turned off).[7] While As decided between In or Out, Bs were able to continue their discussions. After all As made their decisions, Bs had 1 minute to reach agreement whether to Roll or Don't Roll (without knowing A's choice). If Bs could not reach agreement, the same procedures as in the message phase were employed (with the chat box turned off).[8]

In the no communication team treatment, decision times and disagreement options were the same as in the communication treatment. Procedures were essentially the same for the individual sessions with communication, except individuals were given only 1 minute to write messages.

The experiment was programmed and conducted using z-Tree (Fischbacher, 2007). Subjects were primarily from the undergraduate student population at the Ohio State University, recruited through ORSEE (Greiner, 2004). Sessions lasted under 1 hour, with payments averaging $11.50 per subject in the team sessions and $13 per subject in the individual sessions, including a $5 show-up fee. In the team sessions, each member of the team received the team payoff; e.g., if an A team stayed out, both subjects would earn $5. There were 4 individual subject sessions without communication with 38 pairs of A and B players, and 4 sessions with communication for a total of 42 pairs of A and B players. The corresponding numbers for the team treatment were 7 sessions with 37 A and B teams without communication, and 7 sessions with communication for a total of 40 pairs.[9] The statistical analysis is based on decisions at the individual- or team-level and, unless stated otherwise, taking averages of choices over the five periods, or clustering at the subject- or team-level in regressions.

[6] This happened in 13 out of the first 40 periods. However, within-team conversations indicate that, in most of these cases, teammates had already agreed on the message to send.
[7] This happened in 7 of the 375 decisions.
[8] This happened in 3 out of the 385 decisions.
[9] With teams and perfect stranger matching, team sessions required at least 20 subjects. In two of the sessions without communication, 19 subjects showed up and a single experimenter sat in as the second team member, privately telling her partner she was the experimenter and would go along with all of her partner's decisions. In both sessions, the experimenter was assigned to an A team, with these two dropped from the analysis for a total of 35 A teams without communication.

I.2 Experimental Results

Effects of Communication on Cooperation: The left-hand panel of Figure 2 reports the impact of communication on cooperation rates for individuals, with tests for statistical significance reported in the figure notes. In rates increased from 50% to 64% for individuals with communication ($p = 0.06$ based on a two-tailed Wilcoxon rank-sum test statistic).[10] Roll rates increased a bit more, from 26% to 45% ($p < 0.05$). These increases are similar to those reported in CD, although the baseline (no communication) Roll rates are lower here.

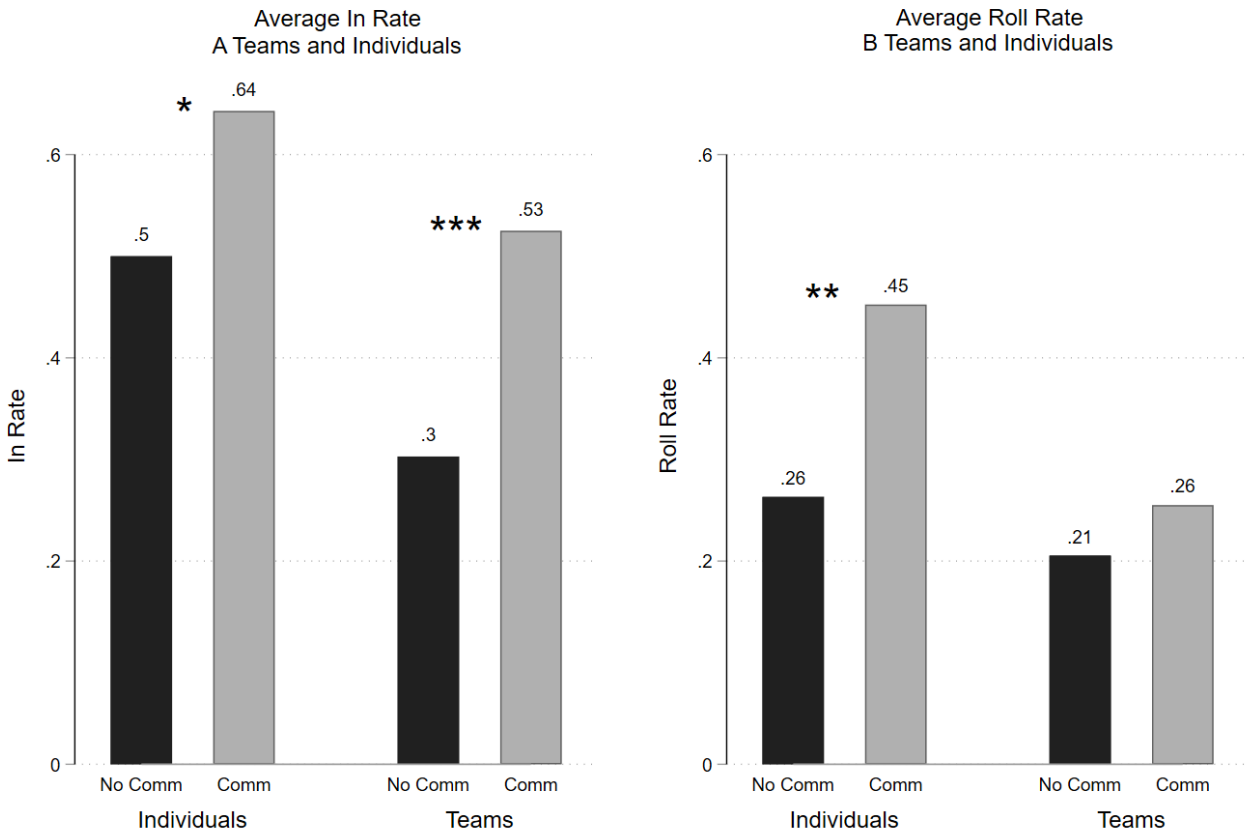

Figure 2: Communication versus No communication: Comparing Teams and Individuals for In and Roll Rates. Communication significantly increased In rates for individuals and teams, but only increased Roll rates for individuals. Comparing individuals and teams without communication, individuals chose In more often (50% vs. 30%, p=0.017), but there were no significant differences in Roll rates (26% vs. 21%, p=0.14). With communication, there were no significant differences between individual and team In rates (64% vs. 53%, p=0.13), but individuals were significantly more likely to Roll (45% vs. 26%, p=0.017).

[10] Two tailed Wilcoxon tests will be used unless indicated otherwise.

The impact of communication on cooperation rates for teams is another matter (right hand panel in Figure 2). While communication significantly increased In rates from 30% to 53% ($p < 0.01$), it had no significant impact on Roll rates, an increase from 21% to 26% ($p = 0.35$). So whereas communication increased In rates more for teams than for individuals, the increase in Roll rates was substantially less.

Conclusion 1: Communication enhances cooperation rates on the part of first movers (A players) for both teams and individuals and, if anything, more so for teams. Communication increases cooperation rates on the part of second movers (B players) for individuals but has only a small, statistically insignificant, increase in Roll rates for teams.

In what follows, the focus is on the effect of communication on As' In rates and how Bs' messages correlate with their decision to Roll or not. Section IV is reserved for analysis of the within team chats.

Messages and Their Impact: Bs' messages were coded into one of four categories: Strong Promise, Weak Promise, Empty Talk, and No Message.[11] Two undergraduate students, neither of whom participated in the experiment, coded the messages after receiving a brief description and examples of each of the categories. A message was classified as a Strong Promise if the sender clearly promised to Roll. A Weak Promise consisted of a less direct statement of intent, or reference to, choosing Roll. Empty Talk were messages unrelated to the game, and No Message was reserved for blank messages or messages where the sender wrote "No Message". Examples of these categories are reported in Table 1, along with the frequency with which both coders classified messages into a given category.

Table 1

Message frequencies across treatments

	Individuals	Teams	Examples
	Percentage	Percentage	
Strong Promise	57% (58%)	56% (59%)	"We will choose ROLL"
Weak Promise	16% (16%)	21% (27%)	"It would be wise to choose In"
Empty Talk	5% (5%)	4% (6%)	"Hi!"
No Message	22% (22%)	19% (18%)	

[11] These categories are based on Houser and Xiao (2011) who reanalyzed the CD data using these four categories.

We report the message frequencies among those messages where both coders agreed on the classification. In parentheses, we report the message frequencies where either coder coded for a given category. Disagreements were usually with respect to Weak Promises versus Empty Talk. For individuals, coders agreed on 99% of Strong Promises, 95% of Weak Promises, 100% of Empty Talk, and 100% of No Message. For teams, the respective agreement rates are 83%, 60%, 67%, and 100%.

Throughout the paper, we focus on Strong Promises. Houser and Xiao (2011) concluded that the cooperation-enhancing effect of communication observed in CD is predominantly due to Strong Promises. Our coders also had the highest agreement rates for Strong Promises: 99% for individuals and 83% for teams. In what follows, when employing Strong Promises in the statistical analysis, we only include cases where the coders were in agreement, as these are the most unambiguous Strong Promises.

Table 2 looks at the effect of Strong Promises on first and second movers' actions. The dependent variable is 1 when first movers (second movers) chose In (Roll) (0, otherwise). No communication sessions serve as the baseline against which to measure the marginal effects of communication. The Strong Promise dummy is equal to 1 following a Strong Promise (0 otherwise). The "other communication" dummy is equal to 1 for communication sessions where the message sent was either a weak promise, empty talk, no message, and cases where the coders could not agree that a Strong Message had been sent. There is a period variable as well – going from 1-5 to measure any possible period effects. Marginal effects are reported.

Table 2
Marginal Rates for In and Roll
(standard errors reported in parentheses)

VARIABLES	In Rate for As		Roll Rate for Bs	
	Individuals	Teams	Individuals	Teams
Strong Promise	0.241***	0.275***	0.269***	0.050
	(0.08)	(0.09)	(0.09)	(0.09)
Other Messages	0.012	0.163*	0.081	0.048
	(0.08)	(0.08)	(0.09)	(0.09)
Period	-0.042***	-0.023***	-0.051***	-0.033***
	(0.01)	(0.01)	(0.01)	(0.01)
Observations	400	375	400	385

***, **, * Significant at the 1%, 5% and 10% levels respectively. Standard errors are clustered at the subject/team level. Other messages – weak promises, empty talk, no message and where coders could not agree on strong promises.

The first two columns of Table 2 look at first movers. There are relatively large, positive marginal effects of Strong Promises on In for both teams and individuals. Other messages have no significant effect on In rates for individuals, but is positive and significant at the 10% level for teams. The period coefficient is negative and significant in both cases teams which, at first blush, seems quite odd. However, the team chats suggest this is a false "end game" effect, most likely resulting from subject experience in previous experiments; e.g., "haha maybe we can do in for the first two or three rounds. people tend to be more nice the first several rounds."[12]

In the second two columns of Table 2, the Strong Promise dummy is large, positive and significant at the 1% level for individuals, but effectively zero for teams. For both teams and individuals, other messages have no significant effect on Roll rates. That is, the positive effect of communication on Roll rates reported in Table 1 for individuals largely results from following through on Strong Promises, while the low Roll rates for teams result from reneging on their promises.

Conclusion 2: There are strong positive marginal effects on In following Strong Promises for both teams and individuals relative to sessions with no communication. These marginal effects are about the same size in both cases, and are not significantly different between the two.

Conclusion 3: While individuals are more likely to Roll and cooperate following a Strong Promise, the same is not true for teams. Teams are equally willing to make promises, but follow through on them at much lower rates.

Benefits (or the lack thereof) from Choosing In: Cooperation rates are far from the subgame perfect Nash equilibrium (SPNE), Out - Don't Roll, both with and without communication.[13] A natural question is whether Roll rates were high enough that it paid for As' to deviate from the SPNE. With no communication, the (ex post) expected payoff for In is $2.60 for individuals and $2.10 for teams, so that in both cases they were better off choosing Out. With communication this increases to $6.00 for individuals following a Strong Promise, making In an empirical best response. In contrast, the expected return for In is $2.70 following a Strong Promise for teams, less than for staying Out.

[12] The same regressions have been run restricting the analysis to periods 2-5 or 1-4 to check if the results are driven by early-round confusion or late-round deterioration of cooperation. Similar results to those reported in Table 3 are observed. Quotes from chats are always reported verbatim, hence the poor grammar and spelling at times.

[13] This SPNE prediction assumes players are expected-money maximizers.

II.3 Discussion

The effect of Strong Promises on cooperation rates for individuals replicates those reported in previous hidden trust game experiments, in that communication results in a large increase in Roll rates compared to no communication controls. However, these results do not extend to two-person teams.

One explanation for this is that groups provide their members with support for acting in a self-benefiting manner, whereas individuals have no such support. That is teams, or groups, help to overcome the pressure from social norms of equity, equality and reciprocity in one-to-one interactions (see, for example, Insko et al., 1993 and Wildschut and Insko, 2007 for a survey of this literature). Similar results have been reported from the psychology literature comparing team with individual outcomes in short, finitely repeated, simultaneous move, prisoner dilemma games. In those experiments there are simultaneous choices with mutual benefits from cooperation. Communication increases joint cooperation by a substantial and significant amount for individuals, but not for teams (see, Insko et al., 1993 and Wildschut and Insko, 2007 for a survey of this literature).[14]

In presenting our results, a number of people offered an alternative to this hypothesis. Namely that cooperation (Roll rates) are lower for teams as B team members are more concerned with their teammate's payoff, rather than the opposing team's payoffs, leading to more self-serving behavior. Two new treatments were conducted to explore this hypothesis.

III Passive Team Sessions

III.1 Experimental Procedures

Experimental procedures mirrored those used in the previous communication treatments. The decision structure was similar to the individual sessions while the payoff structure was similar to teams. Two-person teams were randomly established, with teammates remaining the same throughout the 5 periods. However, only a single member of the team (the "decider") made decisions, without any input from or communication with his "passive" partner. Though passive partners had no input into decisions, the instructions made it clear that they received the same payoff as the decider. Further, the passive partner could not observe deciders' messages (if any), nor whether they decided to Roll or not. Thus, the Passive treatments were as similar as possible to the Individual treatment, the only difference being that a player's decision now impacted the payoff of the "passive partner." If the low promise-keeping rates for Bs in

[14] These experiments use financial payoffs and written communication.

teams are a result of other-regarding preferences for their teammate, the prediction is that the passive treatment will look similar to the team treatment.

As a second variation on this design, which we refer to as the Passive-Team Building treatment, the hidden action trust game was preceded by a team building exercise designed to foster team cohesion. In this exercise, teammates created words from a string of letters, following the team building exercise in Charness et al. (2014).[15] Subjects could communicate with their partner through a chat box during this exercise. Once the exercise was completed, the instructions were the same as in the passive treatment, adding in the fact that subjects retained the same partner from the team building exercise.

There were 3 Passive sessions with 72 total subjects and 2 Passive team building sessions with 48 total subjects.

III.2 Experimental Results:

Figure 3 reports In/Roll rates for the passive and passive-team building treatments compared to the Individual and Team treatments. There are relatively minor variations for In rates, ranging from a high of 64% in the Passive-Team Building treatment to 52% for both the Team and Passive treatments ($p<0.18$ for all binary comparisons). Roll rates are another matter. In both the Passive and Passive-Team Building treatments, Roll rates were 61% and 65% respectively. This compares to 45% for individuals and 25% for teams, contrary to the hypothesis under investigation. We find no evidence that lower Roll rates for teams resulted from other-regarding preferences favoring their teammate. In what follows the focus is on second movers' behavior, as this is most relevant to the hypothesis under consideration.

[15] To keep incentives similar to the Individual sessions, no show-up fee was paid, with the team-building exercise calibrated to averaging $5 per person.

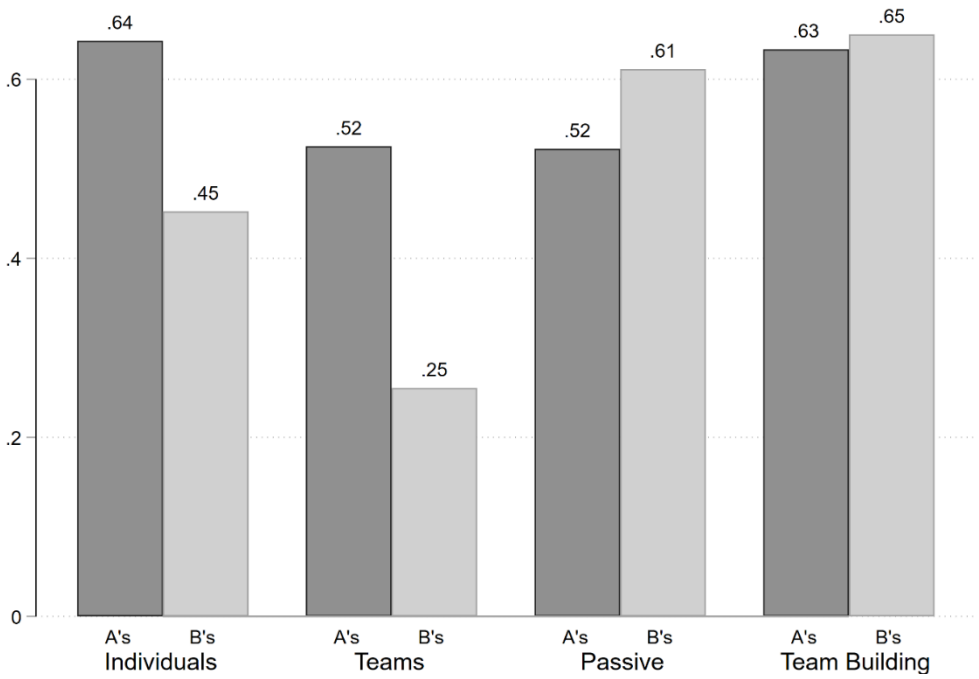

Figure 3: In and Roll rates across treatments.

Pooling the two Passive treatments, Strong Promises occurred at slightly lower rates – 48% compared to 57% and 56% for individuals and teams, respectively.[16] However, as shown below, deciders are significantly more likely to Roll after sending a Strong Promise in the passive treatment compared to *both* the individual and team treatments, resulting in an overall increase in Roll rates.

Table 3 reports a probit comparing the treatment effects of the Passive and Team treatments to Individuals. The dependent variable is equal to 1 when the B player chooses Roll (0 otherwise), with dummy variables (=1, 0 otherwise) for the Team and Passive treatments, with the Individual treatment as the baseline. There are two specifications. Column (1) reports outcomes for all B players. Column (2) includes only those rounds where players sent a Strong Promise, and Column (3) reports B players who did not send a Strong Promise. The first regression shows that overall Roll rates in Passive are significantly higher than for Individuals ($p < 0.10$). As the second probit shows, when a Strong Promise is sent in Passive, Roll rates are significantly higher compared to individuals sending a Strong Promise.

[16] Agreement rates of 93% for Strong Promises in the passive treatment. The distribution of other messages is essentially the same as well (see Table A.1 in the Appendix).

Further, as column 3 shows, this difference is the primary contributor to the overall higher Roll rates in passive compared to individuals, as we see no such effect from non-promisors.

Table 3
Marginal Roll Rates
(standard errors in parentheses)

VARIABLES	(1) All Bs	(2) Promisors[a]	(3) Non-Promisors
Teams	-0.197**	-0.276**	-0.093
	(0.08)	(0.11)	(0.10)
Passive	0.174*	0.341***	0.101
	(0.10)	(0.12)	(0.13)
Period	-0.054***	-0.045***	-0.059***
	(0.01)	(0.02)	(0.01)
Observations	560	287	273

[a] B players who make Strong Promises. ***, **, * significant at the 1%, 5% and 10% levels. Error errors are clustered at the subject level.

Passive sessions were conducted over two years after the Team and Individual sessions, so there is a possibility that a strong shift in the subject population is responsible for the increased Roll rates for in Passive. To check for this, two additional individual sessions with communication were run.[17] These show minimal differences from the original sessions: First-movers chose In 66% of the time compared to 64% in the original sessions (p=0.91) and second-movers chose Roll 51% of the time compared to 45% in the original sessions (p=0.63).

Conclusion 4: Passive team sessions were conducted to determine if the lower Roll rates for teams resulted from teammates being more concerned with each other's payoffs, than the opposing team's payoffs. Contrary to this hypothesis, passive teams had significantly higher Roll rates than either teams or individuals. A second probit shows that the higher overall Roll rates for passive teams are driven by substantially higher Roll rates for those sending Strong Promises.

[17] There were 14 subjects, 7 of each A and B players, in each of these two sessions.

II. 3 *Discussion*

Finding higher Roll rates for passive teams compared to individual's raises the question of why *higher* than for individuals. One potential explanation is audience effects. While we designed the passive treatment to be as similar as possible to the individual treatment, and therefore did not allow the passive player to view the decider's actions and messages, the passive partner could infer the decider's action with high probability when receiving his payoff. The conjecture here is that the deciders did not want to appear selfish with someone able to infer their actions with high probability. That is, in the absence of the ability for their teammate to reinforce self-serving behavior, deciders reverted to honoring their promises, only to a stronger effect since others could infer their behavior.

While concerns of this sort are at odds with pure economic man pursuing his self-interest, similar results have been reported in other experiments. For example, private contributions to charities are systematically lower than when contributions are observed (Andreoni and Petrie, 2004). Closer in structure to the present experiment is Dana et al. (2006), comparing two dictator game treatments. One treatment was the standard dictator game, with the dictator dividing $10 between herself and an anonymous other. The second allowed the dictator to opt out of the game, receiving $9, with second players never learning anything about the game. Twenty-eight of the dictators (11/40) opted out, including two who had intended to keep the $10 in a standard dictator game. These results support the idea that people are concerned with appearing to be fair, a type of audience effect, similar to B players rolling at higher rates when their anonymous teammate could infer their choices.[18] One major difference from these results compared to the present experiment is that the "audience's" incentives are aligned with those of the decider.

IV Analysis of Team Chats

Within-team discussions were coded and analyzed to better understand the motivation underlying teams' decisions. Procedures were similar to those used for coding messages, with two undergraduates independently coding the team chats after first being instructed on the categories of interest. Coding focuses on the motivation for As' and Bs' choices. Where possible, the same categories were coded for the no communication team sessions as well. The analysis below focuses on the original Team sessions rather than the Passive sessions.

[18] Also see Andreoni and Bernheim (2009) for a model of same, and additional results for audience effects of this sort.

Coding frequencies for As are reported in Table 4 along with agreement rates in parentheses. The percentage of teams coded in a given category at least once are reported in the first two columns, with the percentage of periods coded in the last two columns.[19] Coders were instructed to base their coding strictly on within-team discussions for the period in question.[20] Frequencies are based on either coder coding that category. Disagreements were rarely about opposite interpretations of what teams were discussing; e.g., one coding A2, the other coding A3 for the same period. Rather, differences typically resulted from one coder's failure to code a given category in a given period, while the other one did.[21]

The category "Discuss Message" covers instances where the team discussed the type of message they expected to get, as well as discussion of the actual message sent in that period. For example, this includes the following discussion prior to A receiving a message "So, should we just go out every time unless they send us a message saying they swear or something?" "yeah, lets just see based on context." It also includes, as another example, As discussion after receiving the message "we roll"; "these are terrible messages to incentivize us to actually choose in and roll." "yeah, you'd think they'd try to be a bit more convincing."

First mover discussions typically included a rationale for why the message sent indicates the B team is likely to Roll or not (codes A2 and A3, respectively). Reasons for believing an intent to roll commonly emphasized that strongly worded statements were more likely to be upheld. For example, after receiving this Strong Promise, "Choose IN and we will choose ROLL - combined payment is highest!" the A team remarks "I like this" "these guys… haha …communists" … "but they could also be the biggest thieves here!... im still in".

[19] For example, for category A1 93% of teams discussed the message in one or more periods, while the average number of periods with these discussions was 51%, as teams did not always discuss the message in a given period given that there was a common understanding from previous periods.

[20] This was done for two reasons: First, while discussions are correlated across periods within a team, As' choice is heavily dependent on the type of message received, which changes between periods. Second, history-dependent coding would require making inferences based on past discussions, which would have resulted in even more subjective coding.

[21] Coders had opposite interpretations <1% of the time for A2 versus A3 and 3% for A4 versus A5.

Table 4
Coding Frequencies for First Movers (As)
(Agreement rates in parentheses)

	Coding Category Description	**Percentage of Teams**		**Percentage of Periods**	
		Comm	No Comm	Comm	No Comm
A1	Discuss Message	93% (0.86)	NA	51% (0.75)	NA
A2	Reason to Believe Message	40% (0.38)	NA	14% (0.25)	NA
A3	Reason not to Believe Message	55% (0.64)	NA	20% (0.38)	NA
A4	Recognize that In is risky, but willing to take a chance	65% (0.50)	40%** (0.57)	19% (0.29)	12%* (0.43)
A5	Recognize that In is risky, but not willing to take a chance	53% (0.43)	74%* (0.69)	15% (0.33)	20% (0.63)
A6	Mentioned what they would do if B team	33% (0.62)	51%* (0.72)	8% (0.56)	11% (0.55)

Stars are for significant differences between communication and no communication sessions. ***, **, and * for significant differences at the 1%, 5% and 10% levels respectively.

Reasons not to believe the B team most often involved wariness regarding *any* message B might send: "I feel like B has the power because of the message because they could say that they will choose roll so we choose in and then totally screw us and choose don't roll …lets go out for the rest of the time." Along with skepticism for unconvincing messages, like the one noted earlier.

We also coded for teams discussing their willingness to take a chance on In or play it safe (A4 and A5 respectively). Teams playing it safe typically focused on the guaranteed Out payoff: "lets go out for the rest of the time … cause i feel like i would rather have some payout than chancing it for an extra $7." Teams willing to take a chance focused on the much larger potential reward for In: "should we choose in then? … I guess this is just a trust thing but I'd rather have the chance to make $12 than $5 I think." A final category coded for is thinking from the B player's point of view. Coding frequencies for these last three categories (A4-A6) could also be done in the no communication sessions, and those frequencies are reported as well.

Table 5 reports a probit to identify which categories correlate with As' decisions to choose In. The dependent variable is 1 for choosing In (0 otherwise). Two specifications are reported, both with dummies

for receiving a Strong Promise and each of categories A1-A3 from Table 4. The second specification includes dummies for the remaining categories as well.

With respect to the first specification, Strong Promises are positive but not statically significant. Rather what mattered is whether the team believed the promise sent or not ($p < 0.05$ with the expected sign in both cases). In the second specification the Strong Promise dummy is positive and statistically significant ($p < 0.05$). However, beliefs regarding the message sent are driven to zero once one accounts for willingness to take a chance or not, with willingness or not both having the expected sign ($p < 0.01$ for both). Regarding what they would do as B players, A teams who would Roll if *they* were B players are significantly more willing to choose In ($p < 0.05$). This is referred to in the psychology literature as "consensus bias"---assuming that others will act in the same way you would (Ross et al., 1977; Krueger and Clement, 1994). However, for teams who would not Roll, this has no additional impact.

Table 5
Marginal Rates for In
(standard errors in parentheses)

VARIABLES	Communication	Communication
Strong Promise	0.097	0.126**
	(0.06)	(0.06)
Discuss Message	0.024	-0.003
	(0.08)	(0.08)
Believe Promise	0.328***	0.197
	(0.11)	(0.14)
Not Believe Promise	-0.251**	-0.153
	(0.10)	(0.13)
Period	-0.022	-0.026
	(0.02)	(0.02)
Willing to take a Chance		0.380***
		(0.09)
Unwilling to take a Chance		-0.338***
		(0.11)
Would Roll		0.283***
		(0.07)
Would Not Roll		-0.061
		(0.21)
Observations	200	200

***, **, *significant at the 1%, 5% and 10% levels respectively. Standard errors clustered at the team level.

Conclusion 5: In addition to whether or not they received a Strong Promise, a number of other factors impacted As' decisions to choose In. Key among these were their willingness to take a chance or not, and whether they believed the message sent indicated the B player was likely to Roll. All of these effects are intuitive, though not typically discussed. In addition, there was a significant, positive marginal effect for those teams who would have Rolled as a B player, but not for those who would not have rolled.

B Team Chats: Coding focused on Bs' decisions to Roll or not. While the literature on why individuals keep their promises focuses on expectation-based guilt aversion (CD), or a desire for consistency between their actions and the message sent (Vanberg, 2008), team discussions never explicitly mentioned either of these two issues. Given this, the closest we could come to these considerations was to code for "feeling bad" and using terms such as "guilt" or being a "bad person" in discussing decisions not to Roll.

The team chats show no consistent relationship between Promises and feeling "bad/ guilty" when choosing to Roll or not. Figure 4 reports the data. As the graph shows: (i) expressions of feeling bad or guilty when sending a promise are quite low, with no material difference when deciding to Roll (15%) or not Roll (8%) ($p=0.26$) and (ii) these expressions occur at slightly *higher* rates when not sending a promise and not rolling compared to when sending a promise ($p=0.15$). This suggests that while there might be moral costs when choosing not to Roll after promising to do so, these costs were not high enough to consistently induce Bs' to Roll. For example, take this B team deciding not to Roll: "does that make me a bad person?" "yeah but me too so whatever… worth the guilt." Coders did not identify any discussions where teams discussed Rolling to maintain consistency with the message they had sent.

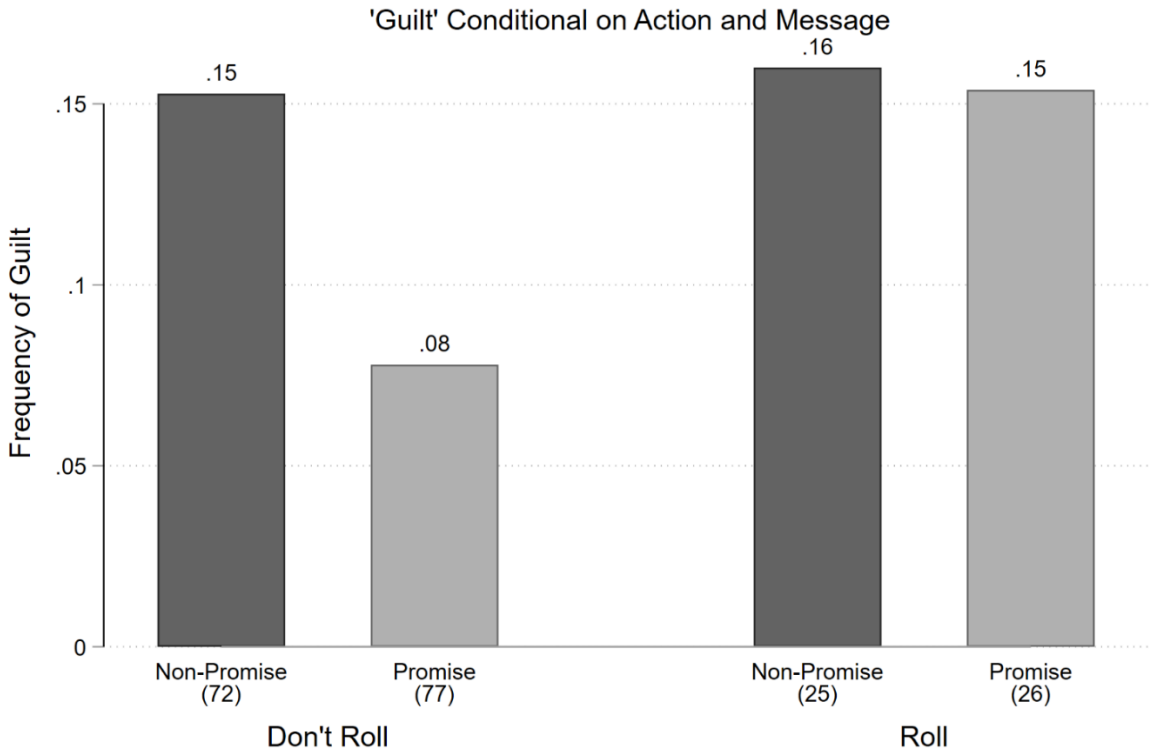

Figure 4: Teams Discussing Guilt or Feeling Bad in relationship to messages sent and actions taken. Number of observations in each cell in parentheses. Exact frequencies at top of bars.

Table 6 provides samples of team chats underlying decisions to Roll or not. The primary justification for choosing Don't Roll is that it makes more money, with their partner providing support for the decision. When choosing to Roll there are a mixture of motives ranging from other regarding preferences (example 1), to self-regard (example 3 - not wanting to "feeling slimy"), feeling "bad" (example 2), or not wanting to "disappoint" the A group (example 4). All four of these cases were coded as feeling bad/guilty in Figure 4 for the Promise-Roll column.[22]

Team discussions also show that close to half of all teams (48%) decided whether to Roll or not prior to sending a message in the first period. Among those choosing to Roll, 36% of teams decided on their action before deciding on their message. In contrast, among teams choosing not to Roll, 54% of teams did so. In the latter case, 36% of these teams sent a Strong Promise to Roll. For example, a team that decided not to Roll: "we should definitely not roll" "Hello! I agree" "should we write them a

[22] Not included here are the many times Bs recognize that As have the short-end of the stick, simply recognizing the situation without passing any judgement on it or impacting their choice: "Sucks that people in group A might only leave with $5 … What would you think about lying" "suxs to be a". And another time "We got super lucky and rolled (got to be the) B group" ... "yeah group A definitely was unlucky"

message?" "however, we should tell the other group that (we will Roll) since we have an 80% shot at getting the 12/10 thats what we want (parentheses added)." Teams that decided to Roll did much the same. For example: "What are your thoughts?" "I think we'd better choose to cooperate" "What should our message say?" Teams typically did not discuss, or change this behavior, after the first period.[23]

Table 6: Justifications for Choosing to Roll or Not[a]

When Rolled:

1. "I think we should actually go with dont roll that way we will make the 14, since we wont be partnered with them anymore and they wont know what we pick. But if we want to be nice to them we could choose roll and just take the 10"

2. "As a B group, we should choose dont roll every time" "Right???"
"true unless we feel bad for the a group then we might as well roll"

3. "I say we go ROLL each time" "hi i think we should choose DONT ROLL actually, as we will have a higher payoff …" "I think it's also super slimy to screw them over after they gave us a chance to earn money. They could just hit "OUT" but instead decided to trust that we would be nicer. "i see. we can try that."

4. What do you think?" "I bet they won't in actually...but I prefer to roll …" "we either get 5 or 14 no matter what if we say don't roll instead of 5 or 10." "yes, but I just don't like to disappoint As if they choose to trust us."

When not Rolled

1. "Since we are in the B group, it is in our best interest to select don't roll for every round, but we want our a group to select in" " Yea i agree"

2. "either way if we choose don't roll everytime we either get $5 or $14"

3. "Go for the same thing (Don't Roll)?" "yea … if you're fine with it still" "Yea I mean it's more money haha" (parentheses added).

4. "roll?" "I say don't roll, we can make more money. That way were gauranteed 5, but can get 14" "cool"

5. "I feel bad being deceptive tho lol (after Promising to Roll and choosing not to)" "Yeah same." (parentheses added)

[23] Team dynamics are such that once having established a strategy, there is typically no further discussion of same in subsequent periods.

Conclusion 6: Analysis of team chats show that expressions of "guilt" or "feeling bad" occur at essentially the same rate regardless of whether teams Roll or Don't Roll. The primary justification for choosing Don't Roll is to make more money. Justifications for choosing to Roll involve a range of motivations. Teams often decided whether to Roll or not before deciding on what message to send.

V Summary and Conclusions

This experiment explores the differences between two-person teams and individuals in a one-shot, hidden action trust game with and without communication. The main takeaway is that the large literature on the positive effects of non-binding communication for individuals fails to hold for two-person teams. This is important since much of the time economic interactions are a result of group decisions, so it is important to determine if the same results hold for groups. For example, the high cooperation rates for teams in these games has been used to suggest a more limited need for formal contracts than discussed in the economics literature (Charness and Dufwenberg, 2006). While this is consistent with the data for individuals, this experiment shows that it is not likely to be true for organizations.

One unanswered question is *why* these high cooperation rates hold for individuals but not for groups. One hypothesis explored is other regarding preferences for one's teammate compared to the opposing team. However, the data contradicts this hypothesis as dropping communication between teammates resulted in *increased* cooperation, not a decrease. No doubt one can think of other possible explanations for the breakdown with teams reported, but exploring these go well beyond the scope of the present paper.

As such, the explanation offered here draws from the social psychology literature. Namely that there are strong social norms for individuals to live up to their promises (at least in Western economic culture). In contrast, groups provide their members with support for acting in a self-benefiting manner, whereas individuals have no such support (Insko et al., 1993; Wildschut and Insko, 2007). Results from our passive treatments are consistent with this hypothesis. The within-team chats provide further support for this hypothesis as there is typically support for self-serving arguments on the part of one's teammate, with infrequent arguments against deciding to Roll or not.

There is strong outside support for the role of social norms in promoting cooperation for individuals. Ismayilov and Potters (2016) employed a hidden action trust game using the same payoff structure as here. As part of their experimental design they have one treatment where Bs can send unrestricted messages to As, and a control treatment where communication was allowed, but restricted so

that Bs could not mention or discussing "anything related to the current experiment." Roll rates were 54% with unrestricted communication versus 52% under restricted communication.[24] Kagel (2018) studied a finitely repeated prisoner's dilemma game with the opportunity for unrestricted communication prior to each round of play. Absent communication, with experience, there was essentially no cooperation in the last stage games for individuals. However, with communication cooperation rates in the last stage games averaged 43% (while still zero percent for teams). These results are indicative of the strong tendency for communication alone to generate cooperation between individuals.

There are a number of interesting questions left unanswered from the present experiment. Why, if teams commonly fail to live up to their promises, do first movers not anticipate this? One explanation from the team chats is that first movers are willing to "take a chance" given the low return for choosing Out compared to In. Would this survive with a larger payoff for Out with comparable risk for choosing In? What happens when comparing teams with individuals in repeated play games where there are multiple equilibria ranging from always defect to high levels of cooperation over time? Will similar differences between teams and individuals be expressed in games with multiple equilibria of this sort? Exploring these issues are topics for additional research.

[24] This is conditional on the messages being delivered.

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APPENDIX

Passive Team Sessions

Table A1

Message frequencies across treatments

	Individuals	Teams	Passive	Examples
	Percentage	Percentage	Percentage	
Strong Promise	57% (58%)	56% (59%)	46% (57%)	"We will choose ROLL"
Weak Promise	16% (16%)	21% (27%)	34% (18%)	"It would be wise to choose In"
Empty Talk	5% (5%)	4% (6%)	11% (5%)	"Hi!"
No Message	22% (22%)	19% (18%)	20% (21%)	

We report the message frequencies among those messages where both coders agreed on the classification. In parentheses, we report the message frequencies where either coder coded for a given category. Passive includes both the Passive Treatment and the Passive Team Building Treatment. Coders agreed on 93% of Strong Promises, 69% of Weak Promises, 31% of Empty Talk messages, and 100% of No Messages in the Passive Treatment.

Table A2

Marginal In Rates

(standard errors in parentheses)

VARIABLES	(1) All As	(2) Promisors[a]	(3) Non-Promisors
Teams	-0.117	-0.162*	-0.047
	(0.07)	(0.09)	(0.08)
Passive	-0.076	-0.072	-0.022
	(0.08)	(0.11)	(0.10)
Period	-0.034***	-0.037**	-0.030
	(0.01)	(0.02)	(0.02)
Observations	560	290	270

[a] B players who make Strong Promises. ***, **, * significant at the 1%, 5% and 10% levels. Error errors are clustered at the subject level.

Beliefs

Beliefs for rounds 4 and 5 were incentivized and elicited at the end of the experiment.[25] Participants were shown the message sent or received in each round and asked to state their beliefs. Team members had 2 minutes to discuss and report a single number representing the team's belief. Table A2 reports these results.[26] Replicating CD's results, for individuals communication increases As' belief that B's will choose Roll, as well as Bs' second-order beliefs that in making a Promise As would be more likely to believe that Bs will Roll. Communication also increases first- and second-order beliefs in teams: As expect Bs to choose Roll with a higher probability (43% vs 22%, $p = 0.056$) with communication than without. Bs' correctly anticipate this effect, reporting higher second-order beliefs with communication than without (58% vs 19%, $p < 0.01$). In addition, there are no significant differences in Bs' second-order beliefs for teams versus individuals with communication (58% versus 63%, $p = 0.5$). In short, B teams not only expect their messages to be meaningful to the A teams, but their expectations are just as high as for B individuals.

Table A3

Tests for Effects of Communication on First and Second Order Beliefs

	A's First Order Beliefs			B's Second Order Beliefs		
	Comm	No Comm	Diff C-NC	Comm	No Comm	Diff C-Nc
Individuals	64%	38%	(<0.01)	63%	29%	(< 0.01)
Teams	43%	22%	(0.06)	58%	19%	(<0.01)
Diff Ind - Tm	(0.05)	(0.03)	---	(0.50)	(0.08)	

*** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level

[25] As received $2 for their belief report using a BDM procedure (complete elicitation instructions can be found in the Appendix). Bs' received a $2 bonus if their guess exactly matched As' report.

[26] Data were collected for 2 team sessions and 1 individual session with communication and for all sessions in the no communication sessions. These were not collected for all sessions as we had hoped that the within team discussions would provide explicit statements to this effect, but this did not materialize.