‘A matter of trust’:
Effects of communication on the efficiency and
distribution of outcomes

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Abstract

In two studies of bilateral bargaining with asymmetric information, we show that the communication medium in which the bargaining takes place, affects the efficiency and distribution of outcomes. The results reflect different degrees of truth-telling and trust across the media. We present a conceptualization of how the effects of communication media can be incorporated into behavioral decision research and game theoretic models of bargaining. Published by Elsevier Science B.V.

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1. Introduction

Employers frequently make an offer immediately after an interview, without fully checking the references. Buyers purchase used goods from sellers without verifying the value of the goods. Firms place orders for new parts or products before complete prototypes have been developed. Agreements such as these are often based on vital information known only to one party, not verified by the other party. Mutually beneficial agreements are not only possible in this type of negotiation, but also common. Yet

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economic analyses and behavioral decision research, though they offer different predictions, are both pessimistic about the likelihood that negotiators will settle on mutually beneficial agreements in negotiations where the vital information is held by only one party. Economic analyses predict impasse (Akerlof, 1970), while behavioral decision research claims the most likely outcome is the 'winner's curse', agreements with a negative expected value for the uninformed party (Samuelson and Bazer, 1985).

We argue that mutually beneficial agreements frequently occur in bilateral bargaining with asymmetric information, a context in which the economic prediction is impasse and behavioral decision research finds the 'winner's curse'. Our findings suggest that economics and behavioral decision research provide inaccurate descriptions of bargaining behavior as a result of ignoring a critical variable – the medium of communication between the parties. Contrary to many economic and cognitive arguments, but in line with the growing literature on the important role of a social context in shaping behavior (Barley, 1991, Bolton, 1991, Rabin, 1990), we assert that face-to-face communication impels negotiators to incorporate elements of honest information exchange, cooperation and trust into their negotiation strategies, thus allowing mutually beneficial agreements even when one party lacks relevant information.

We seek to add to the current understanding of bargaining by exploring the effects of different communication media on a particular game. We present two experiments using a two-party adaptation of Samuelson and Bazerman's 'Acquiring a Company' game to test the influences of different communication media on bilateral negotiations with asymmetric information. Our findings show that the communication medium in which the negotiation takes place affects both the efficiency of the outcomes and the distribution of the available surplus. Any mode of communication during bargaining increases the efficiency of outcomes over economic predictions. In addition, different media affect the outcomes in specific ways: face-to-face negotiations are more efficient and result in a more balanced distributions of surplus than other media; results from written negotiations show a higher incidence of impasse; and telephone negotiations increase the likelihood of losing buyers and highly profitable sellers.

We present our studies below. In Section 2, we review current thinking from economics and behavioral decision research on the adverse selection problem in bilateral bargaining with asymmetric information. We offer proposals regarding the effects of communication while bargaining under this structure. Section 3 presents our first study, an initial examination of communication effects on bargaining with asymmetric information. We find that face-to-face negotiations result in significantly more efficient outcomes than written bargaining, and significantly more than that predicted by the economic analyses or behavioral decision research. Our second study is presented in Section 4. The results regarding face-to-face and written bargaining in the presence of financial incentives replicate those from our first study. We present new findings regarding telephone negotiations and their unique effect on the bargaining efficiency and outcome distribution. Process data collected in this study provide clear answers as to how these different outcomes are achieved.

After presenting our empirical findings, we discuss in Section 5 how different media affect the bargainers' ability to outperform the predictions of a social models. We explore the possibility that the medium used in bargaining partially determines the extent to
which trust can be built, by constraining the moves available to the parties during the negotiation process. Finally, we suggest ways to incorporate the implications from our empirical findings into behavioral decision research and game-theoretic models of bargaining behavior.

2. Background

Bilateral negotiations with asymmetric information are a common form of bargaining. In these negotiations, two parties bargain over the sale of an item when only one party has complete information regarding the value of that item (Kagel, 1995).\(^1\) Bilateral negotiations are often successfully used to settle on a ‘price’, in spite of the asymmetry in knowledge.

The problem of information asymmetry in a bilateral negotiation is analytically quite simple, yet intuitively quite perplexing. To analyze the problem from a market perspective, imagine a market in which sellers know the exact value of the goods they are offering, and buyers assume equal probability of all values within a known distribution.\(^2\) Using Samuelson and Bazerman’s illustration (based on Akerlof’s used car example), assume an acquiring company is considering making an offer on a target company. The value of the company to the seller is

\[ V_s = X, \]

where \( X = \) some value between $0 and $100 per share, all values are equally likely.

Samuelson and Bazerman consider the case where the expected value to the buyer is 1.5 times the value to the seller, or

\[ V_b = 1.5X. \]

For every value \( X \), the surplus available upon purchase is 0.5\( X \). Given a market with this potential for mutual profit, trades are desirable.

Now consider this illustration with the additional complication of asymmetrically held information. Assume that the seller knows the current value of the company, \( X \), but the buyer knows only that \( X \) lies within the uniform distribution of $0 to $100 per share. From an efficiency perspective, the asymmetry in information is not critical; given the 0.5\( X \) surplus available upon purchase, trades are still desirable. Analyzing the illustration from the viewpoint of an individual buyer, however, leads to a very different conclusion. In a negotiation where information about the true value of a good is known only by the seller, ‘lemons’ will be offered at the same price as ‘gems’ (Akerlof). Information provided by the target company cannot be assumed to be credible, since the target has the incentive to present the company as a ‘gem’ regardless of the actual value. Thus, if there

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\(^1\) This winner’s curse game is distinguished from other winner’s curse games in that it is not a common value auction.

\(^2\) The ‘lemon problem’ presented by Akerlof applies more generally to other distributions as well, but predicts impasse only when \( V_n = f(V_S) \) and \( V_S < 2V_S \).
is a uniform distribution of possible target values from $0 to $100 per share, a potential acquirer should use the following reasoning:

Assume I offer $50 per share for the target company. The only way to gather information about the actual value of the target is to see whether my offer is accepted or not. My offer will be accepted only if the target is worth less than $50. Thus, the expected value of the company, if I can acquire it for $50 per share, is (0.5*50), or $25 per share, and my expected value is (1.5*25), or $37.50 per share. Since I bid $50, my expected net return will be (37.50−$50.00), or a loss of $12.50 per share. In fact, since no matter what I bid the seller will only accept only those bids that equal or exceed the actual value of the target, my expected net return on an accepted bid will always be negative. This is the ‘winner’s curse’: If I win the prize, I’ve probably paid too much.

At any accepted price p,

- Expected value of the company for the seller= \( p/2 \);
- Expected value of the company for the buyer= \( (1.5)(p/2) = 3p/4 \);
- Net expected value to the buyer= \( 3/4p−p=−p/4 \).

For an individual buyer, therefore, the only rational strategy is not to make an offer. The perplexing conclusion is that, regardless of the presence of a positive bargaining zone where both the buyer and seller would benefit from the transaction, the economic prediction is no transaction.

Past behavioral decision research shows that the individual negotiators are unlikely to analyze this problem in the manner described above. Samuelson and Bazerman argue that an accurate analysis of the problem makes it necessary that the buyer consider what the seller’s acceptance of a bid means about the expected value of the firm. Instead, subjects tend to calculate the expected value at $50 (or $75 after purchase) and ignore that this calculation omits the critical response of the target company. Subjects fail to consider that the target company’s response is key to calculating the expected value; if the target says ‘no’ there is no sale, but if the target says ‘yes’ the acquirer knows the value of the company is lesser than the bidding price. A large majority of Samuelson and Bazerman’s MBA subjects (114 of 123) fall prey to the winner’s curse, making bids with negative expected value.

Ball et al. (1991) provide evidence that the curse results from the negotiator’s inability to take the perspective of the other party. In one condition, subjects were given the opportunity first to play the role of the buyer, second play the role of the seller and last play the role of the buyer again. The chance to personally experience the perspective of the seller (i.e., to carry out the algorithm, only accepting bids with negative expected value to the buyer) greatly reduced the incidence of the winner’s curse (Ball et al.).

There are a number of possible reasons why the trades persist in markets with potential for the winner’s curse. One set of reasons suggests that the winner’s curse is occurring, but the buyers may not be learning from failure, even over repeated trials (Ball et al.). The true value may not be apparent upon, or immediately after, purchase. Thus, buyers may continue to enter the market without understanding the implications of their information
disadvantage, and consequently continue to suffer the winner’s curse. In contrast, these markets may also continue, in part, because of the structurally imposed buyer safeguards, making it less likely that buyers will suffer from the disadvantageous asymmetry in knowledge. In response to the inefficiencies caused by the presence of asymmetric information, some markets have established mechanisms to protect buyers from losses, while promoting sales with positive value to the sellers. Guarantees and warranties, designed to ensure the buyer of some minimal expected quality, serve this purpose. Similarly, many state and local governments have created ‘lemon laws’ and laws of ‘full disclosure’ to protect consumers and promote trade.

Another safeguard for the buyers may result from the shared information within a market. Akerlof suggests that sellers establish reputations for honest dealing. Brand names serve this purpose, promising quality to the buyer and providing a means of retaliation if the promise is not kept. Within person-to-person markets, personal reputation effects may differentiate between trustworthy and untrustworthy brokers.

In the absence of externally prescribed safeguards, open communication within and surrounding the negotiation may promote mutually beneficial agreements in negotiations with asymmetric information. Prior examinations of the winner’s curse do not address the possibility of communication effects. In economic analyses of bilateral bargaining, the interaction between the parties is not seen as pertinent to the buyer’s evaluation of the legitimacy of the seller’s claims – all sellers would like to be thought to have a high X. In behavioral decision research investigating the winner’s curse, the variable measured is the buyer’s bid in an asocial setting, using a pencil and paper format in a one-shot game. The buyer makes a one-shot bid, but there is no interaction with the seller; buyers know that (hypothetical) sellers will accept offers if and only if the bid is greater than the value of the good to the seller. There is no past interaction to guide behavior, no interaction during the decision making process to allow the gathering and evaluation of information, and no expectation of future interaction to encourage trust. This paper introduces communication into bilateral bargaining with asymmetric information and exposes how communication between the parties leads to the promotion of mutual benefit, in contrast to the economic predictions of impasse and behavioral decision research predictions of the winner’s curse.

Adding pre-bid communication between the buyer and the seller creates a signaling game. In a signaling game, one party has private information and can send a signal that may or may not provide accurate information to the other party. Signals have meaning because different signals have different costs to different types of senders, and the receiver extrapolates from these costs while interpreting a signal’s meaning (Spence, 1973). In the two-party adaptation of the ‘Acquiring a Company game’ used in this paper, signals have no cost to the sender, a form called ‘cheap talk’ (Gibbons, 1992). It is in the best interest of any seller to tell a potential buyer that the value of the goods for sale is high. This is a no-cost behavior for both high value sellers and low value sellers. As a consequence, a buyer cannot use this signal, or cheap talk, alone to discriminate between high value goods and low value goods. Thus, simply moving the game into an interactive setting brings in cheap talk, but does not theoretically resolve the problem of information asymmetry.

Previous investigations into the role of communication in bargaining suggest that pre-play communication will affect the extent to which the parties cooperate to overcome the
problem of information asymmetry. Past research on games with full information has shown that face-to-face communication solves the coordination problem in the battle-of-the-sexes game (Cooper et al., 1989). Likewise, face-to-face communication increases the likelihood of cooperation in two- and n-person dilemma games (Bornstein et al., 1989, Dawes et al., 1988, Isaac and Walker, 1988, Loomis, 1959, Orbell et al., 1988, Swensson, 1967, Wallace and Rothaus, 1969) and coalition games (Bolton and Chatterjee, 1994, Murnighan and Roth, 1977). Sally’s (1995) meta-analysis of dilemmas shows that open discussion before each round increases trust and cooperation, even after the control of multiple round reputation effects.

Communication affects cooperation in markets as well. Studying the collusion between sellers in oligopolies, Isaac et al. (1984) find that sellers who are allowed to communicate will cooperate to set supracompetitive prices. Given the opportunity to discuss pricing strategies after each round in a multiple period trading game, sellers will forego the opportunity for the individual gain at the expense of other sellers. Instead, they choose to set prices in unison with one another (Isaac et al.).

Limited research suggests that communication also affects cooperation between buyers and sellers with private, but symmetric, information. Radner and Schotter (1989) and Valley et al. (1996) find that pre-game communication affects the efficiency of outcomes in bargaining between a buyer and a seller with independent valuations for the same good. Both the buyer’s and the seller’s valuations of the good are determined by separate random drawings from a given distribution; thus the buyer and the seller’s outcomes are not yoked as they are in the ‘Acquiring a Company’ problem. The studies find that face-to-face bargaining outperforms the no-communication, sealed bid mechanism in all measures of performance efficiency and is much more efficient than the most efficient equilibrium solution.

There is a critical difference between the bargaining games described above, those with complete or symmetric information, and bilateral bargaining with asymmetric information: here the dependence between the parties is one-sided. In a full or symmetric information setting, communication may affect trust, but it can also increase efficiency without reliance on trust by increasing cooperation, allowing coordination, or highlighting shared utility. For communication to increase efficiency and distribute the surplus with no losses to the less informed party in an asymmetric information game, the interaction between the parties must affect truth-telling and trust.

Frank (1988) presents evidence from multiple disciplines that face-to-face communication affects people’s ability to lie without being detected. He argues that there are physical ‘tell tale clues’ of a person’s trustworthiness. These include facial expressions, blushing, perspiration, and pitch and cadence of the voice (Ekman, 1992). While some of us are better at controlling these signals than others, their presence suggests that people will be much more cautious about lying face-to-face than in writing. “Even if subject to conscious control, there is still another item on the list of things the would-be deceiver has to worry about” (Frank, 1988, p.126). The implication is that humans may develop a heuristic that says don’t lie to someone’s face – it’s too hard to cover up. Both Ekman and Frank also provide evidence that people are fairly good (though not close to perfect) at detecting liars when they can observe them visually and audibly.
Regardless of their ability to cover up a lie or detect a liar in any specific interaction, people may simply use the communication medium as shorthand for making an assessment regarding how likely it is that a lie could go undetected. As discussed above, the findings from games of complete or symmetric information suggest that the face-to-face communication also increases overall cooperation. The combination of a reduced ability to lie, an enhanced ability to detect lies, and increased cooperation when interacting face-to-face is likely to result in large effects for the communication medium, even when one party is asymmetrically dependent on the other for honest disclosure. Thus, we expect the communication medium in which the bargaining takes place to have a significant effect on bilateral bargaining with asymmetric information.

In summary, in a bilateral bargaining game with asymmetric information, of the form of Samuelson and Bazerman’s ‘Acquiring a Company’:

the economic prediction is the impasse for all interactions;
the behavioral decision research findings suggest that a majority of the trades will result in buyer losses; and,
our prediction is lower impasse rates, less frequent winner’s curse, and more frequent mutually beneficial agreements when the bargaining is carried out face-to-face than that predicted by the earlier analyses and than when it is carried out in other communication media.

3. Study 1

3.1. Methodology

The ‘Acquiring a Company’ task (Samuelson and Bazerman), described above, was adapted to a two-party negotiation (see Appendix A). The subjects were 166 MBA students enrolled in eight sections of a negotiation course. The subjects were randomly matched into pairs and conditions within sections, resulting in 83 negotiating pairs – 46 in the written condition and 37 in the face-to-face condition.\(^3\) Seller value sheets, covering all integers from 0 to 100, inclusive, were made up ahead of time and given randomly to the subjects playing the seller role.

Bargaining pairs were randomly assigned to the face-to-face or written condition. All subjects were given private role materials in which they were told, in writing, that they represented either the buyer (acquiring firm) or the seller (target firm). Both the buyer and the seller were told that the value of the firm would be determined by a random draw from a uniform distribution of 0 to $100, all integers equally likely. The seller was given the value of the firm, told that the buyer did not possess this information, and informed that the firm would be worth more under the buyer’s management, but not how much more. The buyer was not given the value of the firm, but was informed that the seller would know the value. The buyer was told that under the buyer’s management the firm

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\(^3\) The original sample was 196 subjects. In 15 pairs, at least one party had been exposed to a similar exercise in another course. All of the observations in which either of the parties was cross-enrolled in the other course were dropped from the analysis.
would be worth fifty percent more than under the present management \((V_b = 1.5V_s)\). Both parties were informed that the seller had decided to open negotiations in an attempt to reach an agreeable settlement on a purchase price.

The negotiations were carried out during a class session. All subjects were given instructions not to show their information sheets to any other party. After reading their private information, subjects were allowed to clarify questions by asking the instructor. When all questions were answered, the face-to-face partners were sent to private negotiation rooms. They were told to stop negotiating and return to the classroom after 30 min. The sellers were given a form to be filled out by both parties after the negotiation was completed. They were instructed to record the agreed upon price if a trade occurred; if there was no trade, parties were to mark the box labeled ‘No trade’. In either case, both parties were asked to sign the form before it was returned to the instructor.

For the written condition, each party was supplied the same information as that given in the face-to-face condition described above. Since the logistics of writing and sending messages takes more time than oral interchange, the time for written negotiations was extended to 45 min. Negotiators knew the identity of their partners but could not see or communicate with them orally during the negotiation. White message sheets, provided to the subjects, were to be used for any communication other than an explicit offer; blue message sheets, also provided, were used for offers. There were no restrictions put on the content of the messages. Senders recorded the time of the message and the direction (i.e., buyer to seller or seller to buyer). Research assistants acting as ‘Runners’ carried messages back and forth between the parties. As in the face-to-face condition, each seller was given a form on to which to record their outcome at the end of the negotiation.

All of the negotiators in both conditions were told before the negotiation that results would be posted, with names attached, in the class following the negotiation, so that all parties would know their own and others’ outcomes. Negotiation outcomes did not affect students’ grades. No financial incentives were provided. Specific outcomes, along with the theory behind the study, were discussed in class, consistent with the format for other class exercises.

### 3.2. Results

Before presenting the detailed findings from the study, we introduce the overall results. Overall results in terms of type of outcome are shown in Table 1. Mean seller values,

<table>
<thead>
<tr>
<th></th>
<th>Face-to-face (n=17)</th>
<th>Written (n=46^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impasse</td>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>(% Rate)</td>
<td>(5.4)</td>
<td>(41.3)</td>
</tr>
<tr>
<td>Winner’s curse</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>(27.0)</td>
<td>(23.9)</td>
</tr>
<tr>
<td>Mutual benefit</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>(67.6)</td>
<td>(32.6)</td>
</tr>
</tbody>
</table>

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*a One written negotiation resulted in an agreement where the buyer captured the entire surplus.*
Table 2
Study 1: Mean seller value, buyer, seller and joint profits (Standard deviations)

<table>
<thead>
<tr>
<th></th>
<th>Face-to-face</th>
<th>Written</th>
<th>S and B</th>
<th>Economic prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=37</td>
<td>n=46</td>
<td>n=120</td>
<td></td>
</tr>
<tr>
<td>Seller value ($)</td>
<td>48.54 (31.96)</td>
<td>44.48 (28.10)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Buyer profit ($)</td>
<td>3.46 (23.60)</td>
<td>–0.51 (18.30)</td>
<td>–8.12</td>
<td>0</td>
</tr>
<tr>
<td>Seller profit ($)</td>
<td>19.54 (15.85)</td>
<td>13.31 (15.91)</td>
<td>16.24</td>
<td>0</td>
</tr>
<tr>
<td>Joint profit ($)</td>
<td>23.00 (16.81)</td>
<td>12.80 (15.34)</td>
<td>8.12</td>
<td>0</td>
</tr>
</tbody>
</table>

average joint gain, average buyer profit, and average seller profit are shown in Table 2. Seller values did not differ significantly across conditions ($F_{(1,81)}=0.38, \text{ ns}$).

The results show that the mode of communication significantly affects outcomes in bilateral negotiations with asymmetric information. The rate of impasse was higher in written negotiations than in face-to-face bargaining ($X^2=13.98, p<0.001$). Conversely, face-to-face negotiations resulted in significantly more mutually beneficial agreements than written bargaining ($X^2=8.82, p<0.005$).

The incidence of the winner’s curse remained relatively constant across conditions ($X^2=0.11, \text{ ns}$). All incidents of winner’s curse in both conditions occurred when the seller’s value was less than $50. Comments made during the in-class discussion following the negotiation suggested that buyers suffering the curse were those who made a bid before gathering any information, a cognitive error that did not appear to differ by communication medium.

Another way to look at the potential benefits of verbal interaction during a negotiation is to examine buyer and seller profits across conditions and relative to game-theoretic and behavioral decision research predictions. One question is whether the seller is better off simply taking bids, i.e., is communication allowing the buyer to do better only at the expense of the seller? To analyze this, we compared the buyer’s outcome, the seller’s outcome, and joint profit in (1) the full communication game, (2) the written condition, (3) previous behavioral decision research findings, and (4) economic predictions (See Table 2). For behavioral decision research findings, simple reanalysis of the Samuelson and Bazerman (1985) data shows that in the asocial version, buyers would have lost an average of $8.12, while the (hypothetical) sellers would have gained an average of $16.24, for joint gain of $8.12.$^4$ As noted earlier, the economic model predicts no trade and, therefore, no profit for either party.

There were no significant differences in the profits made by the buyers across communication conditions ($t_{(81)}=0.86, \text{ ns}$). Buyers’ outcomes in both conditions appear better than those extrapolated from the Samuelson and Bazerman data. In neither of the

$^4$ The seller’s expected profit, conditional on a bid of $B_i$, is $(B_i/100)(B_i/2)+((1-B_i/100))(0)$. Let $B_i$ be the bid for the $i$th buyer in the Bazerman and Samuelson experiment ($i=1, \ldots, 123$). Thus, the formula for the seller’s expected profit is $\sum(B_i/100)(B_i/2)/123$. 
conditions is the buyers’ average profit significantly different from the zero point economic prediction (all <1, ns). The current buyers, however, approximate that zero point with a mix of negative results from being suckered, positive results from mutual gain agreements, and neutral results from impasse – a qualitatively different result than that which the economic theory predicts.

Sellers attained marginally higher profits in the face-to-face condition than they did in the written condition (t₁(81)=1.77, p=0.08). The inferred seller profit from the Samuelson and Bazerman version falls between results from the two communication conditions. Seller profits in both conditions are much greater than the economic prediction of $0 (written t₁(45)=5.67, p<0.0001; face-to-face t₁(36)=7.50, p<0.0001).

Joint gains in the face-to-face negotiations were a significant improvement over written negotiations (t₁(81)=2.88, p<0.005). We cannot test statistically whether these results are different than that expected by the decision theorists, but total gains in both communication conditions are much higher than the economic theory predicts (overall t₁(82)=9.46, p<0.0001; written t₁(45)=5.66, p<0.0001; face-to-face t₁(36)=8.32, p<0.0001). Notably, the total surplus achieved in face-to-face bargaining, $23.00, closely approximates the maximum $25 available surplus.

Given the roughly equal rates of winner’s curse across conditions, and given that all the buyer losses occurred when X ≤ 50, an interesting question is whether the communication medium influences outcomes mainly through effects when X is of high value. Determining this could help us begin to understand the mechanisms through which the medium of communication drives outcomes. We tested this by splitting the sample into two groups – observations where X ≤ 50 and those where X > 50. The split sample results are shown in Table 3. Impasse rates differ significantly across conditions for both

| Table 3 Study 1: Outcome types and profit means, by condition and seller value |
|--------------------------|--------------------------|--------------------------|
| X ≤ 50 | X > 50 | | | | | |
| Face-to-face | Written | Face-to-face | Written | | | |
| n=20 | n=27 | n=17 | n=19 | | | |
| Impasse | 1 | 10 | 1 | 9 |
| (%) Rate | (5.0) | (37.0) | (5.9) | (47.4) |
| Winner’s curse | 10 | 11 | 0 | 0 |
| (50.0) | (40.7) | | | |
| Mutual benefit | 9 | 6 | 16 | 10 |
| (45.0) | (22.2) | (94.1) | (52.6) |
| Seller value ($) | 22.60 | 24.74 | 79.06 | 72.53 |
| (s.d.) | (15.62) | (15.04) | (13.36) | (15.24) |
| Buyer profit ($) | −10.90 | −8.11 | 20.36 | 10.30 |
| (22.08) | (17.38) | (10.63) | (13.83) |
| Seller profit ($) | 21.45 | 16.33 | 17.28 | 9.02 |
| (19.20) | (18.10) | (10.84) | (11.23) |
| Joint profit ($) | 10.55 | 8.22 | 37.65 | 19.32 |
| (8.15) | (9.13) | (11.62) | (19.79) |

* Significantly different at p<0.05.
*b Significantly different at p<0.01.
*c Significantly different at p<0.005.
groups. Individual and joint profits reveal instructive differences across the values of $X$. When $X \leq 50$, there were no differences across conditions on individual or joint profits. For high value trades, however, all the three profit measures differed significantly across communication conditions. Here, both parties profit significantly from the face-to-face bargaining.

3.3. Discussion

Previous work on bilateral bargaining with information asymmetry provides predictions of either impasse or the winner’s curse. Results from this study show these predictions are overly pessimistic. When allowed to communicate, many bargaining pairs are able to reach efficient solutions that benefit both parties. Face-to-face negotiations result in greater joint gains than those carried out in writing.

A significant difference between this game and the formal economic model of this game provided by Akerlof is that our experimental form allows for multiple rounds of give and take on bids between the two players, rather than restricting the interaction to a one-shot bid. This suggests that the multiple rounds may be providing the solution. If this were the case, the medium of communication would have no effects on the outcome; all conditions that allowed the multiple rounds would provide the same results. Yet we see significant differences across communication conditions.

The important question is how this difference across communication conditions is achieved. What is it about face-to-face negotiations that increases efficiency? Prior studies have found that in games of complete information, face-to-face communication increases the level of cooperation (Sally, Orbell et al., Bolton and Chaterjee). Roth (1995) asserts that the media effects can be explained by a social utility argument, that face-to-face interaction changes motivation and alters the structure of parties’ functional utilities. This argument, which suggests that face-to-face communication heightens a player’s sensitivity to gains made at another party’s expense, cannot fully explain our findings. If face-to-face bargaining makes the parties care more about one another’s outcomes, we should see face-to-face sellers with low value firms warning buyers that their bids are very high given the value of the company, and a lower rate of the winner’s curse in face-to-face bargaining. Instead, rates of winner’s curse are constant across conditions.\(^6\)

What we do observe are exaggerated differences in impasse and mutually beneficial agreements when the value of the company is high. These comparisons suggest a difference in truth-telling and trust levels across conditions. Face-to-face communication increases the normative pressure toward honest disclosure (Craig, 1986, Donohue et al., 1983). A party in a face-to-face negotiation is aware that these normative constraints are likely to influence the other party’s behavior as well as his or her own behavior. Thus, information which lacks credibility in an asocial context may be assumed to be truthful in a social interaction constrained by norms for honesty in face-to-face communication. While the signal may be costless in an asocial context, sending a signal that ‘you can trust

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\(^5\) Mutual benefit also differs significantly when $X > 50$, but because there were only impasses and mutually beneficial agreements in this set, the test for differences in mutually beneficial agreements duplicates the test for differences in impasse rates.

\(^6\) We are grateful to an anonymous reviewer for bringing this argument to our attention.
me' in a face-to-face setting may hold high personal and social costs for those who do not carry out this promise. Furthermore, as Frank (1988) argues, it may be very difficult for the average negotiator to 'fake' trustworthiness in the face-to-face interactions, given the many available physical 'tell-tale clues'. Our findings suggest that either people are not skilled at lying face-to-face, or perhaps there are strong normative constraints on dishonesty in face-to-face communication. Furthermore, buyers are aware that people are less likely to lie in the face-to-face negotiations and are therefore more trusting in this medium when the seller says the value of the company is high.

Ekman (1992) argues that lying takes two forms: concealment and falsification. In both the written and face-to-face forms of the negotiation presented here, low-value sellers engaged in concealment, not telling buyers that they were bidding too much for a low value firm. Thus, the incidence of the winner's curse remains constant across conditions. But falsification appears to occur less often or less successfully in face-to-face negotiations; face-to-face interactions were more likely to have the buyer and seller both gaining benefit. A mutually beneficial distribution is the likely outcome if the seller is honest about the value of the firm, and the buyer is honest about the premium upon transfer of ownership.

While we assert that the differences in outcomes across communication conditions in this study are due to the differences in trust and truth-telling, there are a number of possible confounds to the findings. One is that all of the subjects knew one another well. While this allows us to eliminate the confound of anonymity in written negotiations versus known partners in face-to-face negotiations, it introduces the possibility that an existing relationship may interact in some systematic way with the communication medium. For example, there may be strong norms for honesty in face-to-face bargaining with friends, norms that may not be present in written negotiations with friends or face-to-face interactions with strangers. The class setting itself could have introduced a systematic bias – since most in-class negotiations are face-to-face, the students may have learned how to maximize efficiency in prior classroom face-to-face negotiations, but lack experience doing so in written negotiations. Finally, the incentive for these was that their outcomes would be posted and discussed in the next class. While it is difficult to see how this could account for the different pattern of results across conditions, it does leave open the possibility that the findings may not generalize to settings with monetary incentives.

We designed and carried out a second study to see if our findings would replicate when these possible confounds were eliminated. In addition, we added a third medium, telephone, to compare it to the face-to-face and the written media already studied. Finally, we collected more process data, to learn more about how the communication media work to affect bargaining outcomes.

4. Study 2

4.1. Methodology

The bargaining scenario used in Study 2 was identical to the 'Acquiring a Company' task used in Study 1. The subjects were 142 undergraduates from five different colleges
and universities in the Boston area. All were recruited via posters and in-class announcements. The posters and announcements stated that participants were needed for a bargaining exercise that could last up to 1 h. They were told they would be paid $10 for participating and up to $20 more depending on their performance in the exercise.

The negotiations were carried out over four days, in 12 separate sessions. Each session included one communication condition. Participants signed up for any one of the sessions, up to 20 participants per session, with no knowledge of the experimental manipulations across sessions. The subjects were randomly matched into pairs within each experimental session, resulting in 71 bargaining pairs – 22 face-to-face, 22 telephone, and 27 written. Care was taken to match subjects with someone whom they did not previously know. This was possible in all but two pairs. These two pairs (one face-to-face and one telephone) were omitted from the analyses. As in Study 1, seller value sheets were randomly distributed to subjects in the seller role.

All sessions began with the subjects in one room. The subjects were thanked for agreeing to participate and told that all of the results from the study would be confidential. They were then asked to count off by \((1/2)n\). This accomplished two things: first, it divided the group into two sets, one set of buyers and one set of sellers; second, it paired each buyer with a seller with the same number. After counting off, the subjects were asked to locate the person with whom they were paired, and make sure that they did not previously know this person. Anyone who knew their partner was re-paired (with the two exceptions noted above). The experimenter provided a general description of the negotiation and then asked the participants to read all of their private instructions.

After the subjects had finished reading their private role information, the experimenter reiterated the critical details. She explicitly stated that the sellers would know the exact value of the company. All the participants were also told that buyers would know how much more the company would be worth under their management than under the seller’s management, but would only know that the seller’s value was between $0 and $100, all values equally likely.

The subjects were told they would be paid a minimum of $10 for their participation. In both their private role information and the verbal explanation provided by the experimenter, participants were informed that they could earn additional money, depending on the outcome of their negotiation. They were told they would be paid 20¢ for every $1.00 earned in the transaction. Additional payments would be calculated on the sale price and the value of the firm such that:

\[
\text{Seller payment} = 0.2 \times (\text{Sale price} - V_s) \\
\text{Buyer payment} = 0.2 \times (1.5 \times V_s - \text{Sale price}).
\]

Both roles were provided with examples showing how to calculate their profits (or losses).

Buyers were told that they could lose money in the exercise. "We will pay you $15 for participating in the exercise. In addition, for every $1 you make in the purchase of Company A, we will pay you 20¢. If you lose money in the purchase of Company A, you will pay us 20¢ for every $1 you lose." Because all participants were guaranteed a minimum of $10 for participation, buyer losses were capped at $5. The seller role information emphasized that the seller should not sell the company for less than its stated
worth to the seller, but made no mention of a penalty if the seller sold at a loss. This did not appear to be a problem – none of the observations in the analysis included a seller selling for a loss. The explicitly stated objective for each participant was to make as much money as possible (see Appendix B for payment details given to subjects).

Subjects in each condition received special instructions regarding the communication medium and the bargaining process. Face-to-face negotiators were given 20 min to complete the exercise. They were told that they could talk about anything they wanted, but that they could not physically show their role information sheets to one another. Each pair was given a tape recorder and a blank, labeled tape. They were told to go to one of the private negotiation areas provided and turn on the tape before the negotiation began, leaving it on for the duration of the negotiation. Telephone negotiators were given 20 min to complete the negotiation, and could talk about anything they wanted. They were assigned a telephone in a private location and given the telephone number where their partner would be located. The buyer was instructed to initiate the call. The tape recorder was already hooked up to the buyer’s telephone. The buyers were instructed to turn on the tape before the negotiation began and to leave it on for the entire negotiation. Negotiators in the written condition were given 30 min to complete the negotiation. Buyers and sellers were divided into separate rooms. Each player was given a pile of message sheets (no distinction was made in this study between message sheets and offer sheets). They were told to record the time and direction of the message each time a message was sent. Runners would pick up the messages and transmit them back and forth between the parties. All message sheets were to be saved and handed in after the negotiation was over. The participants were asked not to talk with other players in the room while the negotiation was being carried out.

Subjects in all the three conditions were informed that when they had completed the negotiation, they were to come back into the main room together and turn in their Results Form, their Payment Receipt Form, and all of their private role information. Thus, in all conditions the members of each bargaining pair met prior to the negotiation and met each other once again when the negotiation was complete. This held the level of mutual knowledge constant across conditions, except for any revelation that might go on during the negotiation itself. All payments were made in cash after the subjects completed the negotiation and turned in the required forms.

4.2. Results

Means and standard deviations for Seller Value, Seller Profit, Buyer Profit, and Joint Profit are provided in Table 4. Seller Value did not differ significantly by condition ($F_{(2,66)}=0.19$, ns). Outcomes and process data provided in the written messages and verbal tapes strongly suggest that the subjects understood the exercise and were negotiating to maximize dollar payoffs, as intended.

Results in terms of the types of outcomes achieved across conditions are also shown in Table 4. Overall, the type of outcome varied significantly across the three communication conditions ($X^2_{(4)}=12.95$, $p<0.01$). While mutual gains were modal in face-to-face negotiations, the winner’s curse was modal in telephone negotiations, and impasse was the modal outcome in the written negotiations.
Table 4
Study 2: Outcome types and profit means, by condition

<table>
<thead>
<tr>
<th></th>
<th>Face-to-face n=21</th>
<th>Telephone n=21</th>
<th>Written n=27</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seller value ($)</td>
<td>51.81</td>
<td>46.43</td>
<td>50.96</td>
</tr>
<tr>
<td>(sd)</td>
<td>(30.01)</td>
<td>(31.74)</td>
<td>(33.17)</td>
</tr>
<tr>
<td>Buyer profit ($)</td>
<td>6.79</td>
<td>-7.48</td>
<td>0.12</td>
</tr>
<tr>
<td>(sd)</td>
<td>(23.66)</td>
<td>(28.25)</td>
<td>(22.71)</td>
</tr>
<tr>
<td>Seller profit ($)</td>
<td>13.38</td>
<td>24.71</td>
<td>10.99</td>
</tr>
<tr>
<td>(sd)</td>
<td>(15.06)</td>
<td>(20.66)</td>
<td>(19.15)</td>
</tr>
<tr>
<td>Joint profit ($)</td>
<td>20.17</td>
<td>17.24</td>
<td>11.11</td>
</tr>
<tr>
<td>(sd)</td>
<td>(16.05)</td>
<td>(15.05)</td>
<td>(16.00)</td>
</tr>
<tr>
<td>Impasse</td>
<td>4</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>(% Rate)</td>
<td>(19.0)</td>
<td>(14.3)</td>
<td>(51.9)</td>
</tr>
<tr>
<td>Winner’s curse</td>
<td>5</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>(sd)</td>
<td>(23.8)</td>
<td>(47.6)</td>
<td>(25.9)</td>
</tr>
<tr>
<td>Mutual benefit</td>
<td>12</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>(sd)</td>
<td>(57.1)</td>
<td>(38.1)</td>
<td>(22.2)</td>
</tr>
</tbody>
</table>

The rate of mutually beneficial agreements varied significantly across the three conditions ($X^2_2 = 6.14, p<.05$). In pairwise comparisons, mutually beneficial agreements were significantly more likely in face-to-face negotiations than in written negotiations ($X^2=6.14, p<0.01$). Impasse rates were significantly different across the three conditions ($X^2_2 = 9.72, p<0.01$). Written negotiations resulted in a significantly higher rate of impasses than face-to-face negotiations ($X^2=5.42, p<0.05$) and telephone negotiations ($X^2=7.29, p<0.01$). The incidence of winner’s curse was marginally higher in telephone negotiations than face-to-face ($X^2=2.59, p=0.10$) or in writing ($X^2=2.43, p=0.10$), but there was no overall difference across the three conditions ($X^2_2 = 3.47, p=0.18$).

Having looked at differences in the type of outcomes, we now turn to analyses of the payoffs across conditions. Buyer profits do not vary significantly by the communication condition ($F(2,66)=1.74, p=0.18$). It is meaningful, however, that the average buyer profit in the telephone condition is a $7.48 loss while it is a $6.79 gain in face-to-face negotiations ($t_{40}=1.77, p=0.08$). The extent to which the seller gains from the negotiation varies significantly by condition ($F(2,66)=3.53, p<0.05$). Sellers realize higher profits in telephone negotiations than in face-to-face negotiations ($t_{40}=2.03, p<0.05$) or written negotiations ($t_{40}=2.38, p<0.05$). Joint gains do not differ significantly by condition ($F(2,66)=2.09, p=0.13$).

As in Study 1, these distributions differ qualitatively from the behavioral decision research prediction of the winner’s curse and the economic prediction of impasse. In all conditions seller profit is significantly higher than the zero-point economic prediction (face-to-face $t_{20}=4.07, p<0.001$; telephone $t_{20}=5.48, p<0.0001$; written $t_{20}=2.98, p<0.01$). Similarly, in all conditions joint gain is higher than the economic prediction (face-to-face $t_{20}=5.76, p<0.0001$; telephone $t_{20}=5.25, p<0.0001$; written $t_{20}=3.61, p<0.001$). In none of the conditions is the buyer’s outcome significantly different from zero. But as in Study 1, the near-zero mean of buyer outcomes is not achieved through the universal impasses economists predict, but rather it is the consequence of a combination of losses, gains, and impasses.
The audio tapes\textsuperscript{7} and the written messages allow us to explore differences in the bargaining behavior across the three conditions. Upon an initial qualitative assessment of the transcripts, we found that buyer and seller behavior in the negotiations fell into one of the four categories of truth-telling: full revelation, incomplete revelation, no discussion of values, or lying. All of the buyers’ and sellers’ transactions captured on tape or in writing could be coded into one of these four categories. Negotiators’ behaviors were coded as full revelations when the players were completely truthful – when the buyer specified that the company was worth 1.5X or the seller specified the actual worth of the company under his or her management. Behavior was categorized as incomplete revelation when the actual quantitative worth to the seller or the buyer was discussed but only partial information was given, as long as what was conveyed was not untrue (e.g., “I can’t accept $X because the company’s worth more than that to me”) when this was true. Buyer and seller behavior was counted as ‘no discussion of values’ when there was no quantitative discussion of values (e.g., a seller would state “It’s worth a lot” but never translate that into a number, or a buyer would say “It’s worth more to me than to you,” but never say how much more). Most negotiations where both buyer and seller behavior were coded as “no discussion of values” were basically a series of bids and counterbids. A buyer’s behavior was categorized as a lie when a buyer stated explicitly that the company was worth less than 1.5X. Seller lies could come in two forms—either “It’s worth more than [a given amount]” or “It’s worth [a given amount],” as long as the given amount was more than the seller’s actual value.

The overall pattern of buyer and seller behaviors is presented in Table 5. There is a significant overall difference in seller behavior across conditions ($X^2_{(6)} = 17.10, p<0.01$). Pairwise comparisons showed significant differences (face-to-face vs. phone $X^2_{(3)} = 15.77, p<0.001$; phone vs written $X^2_{(3)} = 11.43, p<0.01$). Specifically, sellers were significantly less likely to lie in face-to-face negotiations than in telephone negotiations ($X^2=8.26, p<0.005$), and marginally less likely to lie face-to-face than in written negotiations ($X^2=3.43, p=0.06$). Buyer behavior varied marginally by condition ($X^2_{(6)} = 12.05, p=0.06$). The most common behavior for all the buyers, regardless of condition, was not to discuss their premium in any quantitative way.

It is interesting to ask whether buyers placed different levels of trust in the sellers’ statements across conditions. Trust can be identified by the behavioral investment one party undertakes based on a belief in the other’s current and future actions. To test for the presence of buyer trust, we counted the observations in which the buyer made a bid based on the seller’s representation of the company’s value, regardless of the result of that bid. This measure of buyer trust varied significantly by the condition ($X^2_{(4)} = 7.76, p<0.05$). The buyer trusted the seller’s representation of the company’s value enough to make a bid based on that representation in 79% of the face-to-face negotiations, but this level of trust was evident in only 33% of the written negotiations ($X^2=7.55, p<0.01$). Buyer trust in telephone negotiations (55%) did not differ significantly from that evident in either face-to-face or written bargaining.

\textsuperscript{7} There was a technical problem in the first face-to-face experimental session, so we have no recordings of those negotiations. There were no significant differences in outcomes between the taped and non-taped sessions, so all were included in the outcome analyses.
### Table 5
Study 2: Negotiator behavior, by role and condition

<table>
<thead>
<tr>
<th></th>
<th>Face-to-face</th>
<th>Telephone</th>
<th>Written</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n=14$</td>
<td>$n=20$</td>
<td>$n=27$</td>
</tr>
<tr>
<td><strong>Seller behavior</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revelations</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>(% Rate)</td>
<td>(7.1)</td>
<td>(10.0)</td>
<td>(11.1)</td>
</tr>
<tr>
<td>Incomplete revelation</td>
<td>6</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(42.9)</td>
<td>(35.0)</td>
<td>(14.8)</td>
</tr>
<tr>
<td>Value not discussed</td>
<td>6</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>(42.9)</td>
<td></td>
<td>(40.7)</td>
</tr>
<tr>
<td>Lies</td>
<td>1</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>(7.1)</td>
<td>(55.0)</td>
<td>(33.3)</td>
</tr>
<tr>
<td><strong>Buyer behavior</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revelations</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>(% Rate)</td>
<td>(28.6)</td>
<td>(10.0)</td>
<td>(22.2)</td>
</tr>
<tr>
<td>Incomplete revelation</td>
<td>0</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(30.0)</td>
<td>(3.7)</td>
</tr>
<tr>
<td>Value not discussed</td>
<td>10</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>(71.4)</td>
<td>(55.0)</td>
<td>(66.7)</td>
</tr>
<tr>
<td>Lies</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5.0)</td>
<td>(7.4)</td>
</tr>
</tbody>
</table>

We were also interested in buyers' cognitive errors. Behavioral decision research argues that buyers will make bids without gathering information, ignoring the information advantage of the other party. The results from Study 1 suggest this is happening at a constant rate (23–28%) across conditions, though not at the high rate (93%) found in earlier, asocial analyses. Using the transcripts, we could explicitly test whether the communication condition affected the likelihood that the buyer would ignore the information asymmetry and make an uninformed bid, i.e., whether the buyer would make a bid before gathering any information about the value of the company. This is a more direct test of the prevalence of buyer cognitive errors than is a count of winner’s curse outcomes, which confounds buyer error and seller lies, and masks this type of buyer error in high value observations. Contrary to our expectation that richer media would make buyer errors less likely, we found that buyers made completely uninformed bids in 36% of the face-to-face negotiations, 30% of the telephone negotiations, and only 11% of the written negotiations. It appears that buyers are marginally less likely to make hasty bids in written negotiations than in face-to-face bargaining ($X^2=3.55, p=0.06$). This behavior follows directly from the finding about trust, discussed above – when negotiating in writing the buyer does not trust the seller (or, perhaps, the setting) enough to make any bid at all.

### 4.3. Discussion

The results from this study strongly support those from Study 1. The replication of findings minimizes the possibility that the earlier results were due to the confounds
mentioned in our discussion of Study 1. While bargaining with asymmetric information, results from written and face-to-face negotiations differ significantly. Mutually beneficial agreements are more likely in face-to-face interactions, while impasse is more likely in written bargaining. Once again, the rate of winner's curse does not vary across these media, though there is behavioral evidence that buyers are more trusting in face-to-face bargaining and less likely to make uninformed bids in written negotiations.

Telephone negotiations, rather than being the middle ground we had assumed they would be, present an interesting dilemma for the buyers. In terms of mutually beneficial agreements and impasses, telephone negotiations look much like face-to-face negotiations. The difference we observe is in the rate of winner's curse, with cursed buyers being much more likely in telephone negotiations than in face-to-face bargaining. This difference is even clearer when we turn to the distribution of gains. Sellers in telephone negotiations realize significantly more profits than those bargaining in other media.

The process information gathered from the tapes and messages begins to tell us how these differences across the media are achieved. Seller behavior varies significantly by the communication condition, with sellers lying less frequently face-to-face than in the other conditions. In contrast, buyer truth-telling is relatively constant. The sellers appear to be controlling the negotiation and the buyers are reacting to the sellers' behavior. Buyers show the lowest level of trust in the sellers' motives and statements in written negotiations - thus, we see the highest rate of impasse here. When it comes to oral bargaining, however, the buyers are inaccurate in their assessment of seller truthfulness. Buyers appear to be just as trusting over the phone as in person, while the sellers nearly never lie in person and lie over half the time in telephone negotiations. Thus, sellers in telephone negotiations reap higher gains at the expense of the trusting buyers.

5. General discussion

The mode of communication in a negotiation affects both the efficiency of outcomes and the distribution of available surplus. When allowed to freely communicate in a bilateral bargaining game with asymmetric information, negotiators capture and share nearly all the benefits available from the trade. These results are in direct conflict with the game-theoretic prediction of no trade and previous behavioral decision research findings of the winner's curse. Our findings support (Mowday and Sutton's, 1993) assertion that “a preoccupation with cognitive processes can lead to theory and research that portrays organizational members as cognitive stick figures” (1993: 197). Introducing the influence of communication media into the descriptive model of bargaining behavior results in a more accurate, and much more positive, portrayal of organizational actors.

Ironically, our findings are foreshadowed by an infrequently cited finding from Samuelson and Bazerman. In the second half of their experiments, after making their bids, subjects were asked to take the role of the target company and state the lowest price they would be willing to accept for their company. Sellers, even though they were aware
of the premium the buyer would earn upon purchase, chose to set their demands at levels that left some profit remaining for the buyer. Samuelson and Bazerman conclude that the sellers are more cooperative than would be predicted by a normative model. They go on to state that having the seller set a price is likely to result in more mutually beneficial outcomes than letting buyer bids establish the price. Our results suggest that in interdependent bargaining the actual price is set by an iterative, social process that varies depending on the medium used. In this process, seller cooperation appears to have a bigger effect on the outcomes than does the buyer's cognitive error, the focus of years of subsequent research on the winner's curse.

We have eliminated some possible confounds so that the driving force behind these differences is easier to identify than in previous studies. To keep anonymity versus knowledge constant, in Study 2 the subjects were strangers who were introduced to one another before beginning the negotiation, while in Study 1 they were classmates. Thus, neither anonymity nor prior acquaintance can explain the overall pattern of results. To keep reputation effects constant, everyone in Study 2 knew they would be paid for the actual profit earned in bargaining, so they were aware that the other party would know if they had been cheated. This is a different control than that used in Study 1, where the results were posted in the next class. These different controls make it unlikely that reputation effects are creating the consistent differences across conditions. It is possible that Samuelson and Bazerman's results would have been different if the subjects had known the results would be posted and thus our comparisons to those results are confounded. Similarly, some models of bargaining behavior do make different predictions when reputation effects are present. Years of running the asocial version of the Acquiring a Company problem with executive groups and posting the results suggests publicly posting outcomes has no effects on buyer bids. Still, the fact that both parties were informed of the outcome of the negotiation either through in-class postings or their payoffs in our studies should be noted.

Another possible confound is a deadline effect: this argument asserts that the results would have been different under looser time constraints. The time given in Study 2 bargaining was 2/3 of that given in Study 1 bargaining sessions, yet we see the same pattern of results, leading us to conclude that deadline effects were not determining the results. It is also unlikely that prior experience can explain our pattern of results. The subjects in the second study were undergraduates with a broad array of major areas of study, rather than MBAs enrolled in a negotiation class as in Study 1.

Finally, we used fairly significant monetary incentives in the second study, minimizing the likelihood that the findings were due to some interaction between incentives and communication conditions. Whether the participants were paid for their performance or not, they seemed to engage in the same sort of bargaining strategy - face-to-face negotiations result in mutually beneficial agreements most of the time, while written negotiations are much more likely to result in impasse. We are left to conclude that the differences were influenced not by factors idiosyncratic to the experimental setting or the specific incentive structure, but rather by the communication medium in which the bargaining took place.

Earlier arguments regarding the effects of the communication medium on bargaining outcomes (Bolton, 1991, Roth, 1995) maintain that the medium affects the utilities of the
parties: face-to-face communication allows the parties to understand and empathize with one another, which in turn increases the utility each places on the other’s outcome. This explanation may help explain why evenly splitting the surplus occurred marginally more frequently in our face-to-face negotiations than in our written negotiations. It may also explain how higher rates of uninformed buyer bids in the face-to-face condition, relative to the written condition, result in the same rate of winner’s curse outcomes across conditions.

But a utility argument alone cannot explain the bulk of our results. Sellers in face-to-face negotiations are not making deals at their own expense – they are making more money than in written negotiations, and the differences between our telephone and written negotiations are not easily explained by a utility argument. Somehow, sellers bargaining over the phone are getting buyers to believe them as they lie; the outcomes reflect an interaction between self-interested sellers and duped buyers. In order to understand the effects of communication, we must learn how the medium affects the extent to which the more informed parties honestly reveal their private information and how they make this information (honest or dishonest) believable.

A parsimonious explanation is that the medium of communication has a powerful effect on truth-telling and assumptions about truth-telling. This explanation can account not only for the higher rates of seller revelations, but also for the buyers’ behavior, which is not addressed by a utility argument. We suggest that possibilities within the negotiation itself for certain ‘moves’ – moves that build trust, give meaning to information, and provide the perspective of the other party – help determine the efficiency and distribution of outcomes in a bilateral negotiation with asymmetric information. Written communications are likely to restrict the peripheral, interpersonal part of communication, and encourage stricter attention to task behavior, e.g., explicit tit-for-tat demands and concessions. In contrast, both forms of verbal exchange allow for relationship building to provide the foundations of trust (though, ironically, it is mistakenly placed trust that hurts the buyers in telephone bargaining).

Even under conditions of asymmetric information, in face-to-face bargaining the social interaction comes to resemble honest information sharing rather than the deceptive signaling assumed by the game-theoretic analyses. Face-to-face negotiations nearly always involved a significant proportion of the early bargaining time taken up in getting to know more about one another and talking about topics unrelated to the negotiation, setting a positive tone for the entire negotiation. In written negotiations, however, the parties found it difficult to establish a basis for trust. When they failed to find grounds for trusting one another after a few tries at the beginning of the bargaining session, they became even less open to the other’s suggestions for solving the problem. In a number of the written messages, the tone changed from testing things out, to testy with one another, to completely rude. This decline in the emotional tone of the negotiation was never present to the same degree in either of the verbal conditions.

In a number of the face-to-face negotiations, trust was discussed explicitly. For example, a buyer tried to explain to a seller why he was having a hard time accepting at face value her (truthful) claim that the firm was worth more than $90: “How can I trust you? In what way, I mean that’s the thing. We can’t do any side agreements. It’s all a matter of trust. It’s all a matter of trust.” This pair went on to slowly reveal, first generally
and then more specifically, the private information held by each side. This sort of exchange, dealing directly with the establishment of trust, never occurred in written bargaining.

Telephone bargaining poses the middle ground that results in socially (rather than cognitively) influenced winner's curse. The sellers are acting as the prototypical self-interested party, even more so than in written negotiations. But the buyers behave as if they are negotiating face-to-face – they make nearly as many uninformed bids as in face-to-face, and they are more likely to believe the seller rather than not. Telephone buyers do not show the same defensive posture as those in written bargaining. Telephone negotiations are personalized, reflecting much of the small talk also present in face-to-face bargaining. While most of the buyers are softened into thinking they have established some basis for trusting the sellers, most of the sellers are lying. Over the phone, the establishment of a foundation for trust seems to be one-sided, to the noticeable disadvantage of the hoodwinked buyer.

One distinction between the scenario in our studies and that hypothesized by Akerlof is that our buyers did have some information to trade – they knew the premium after purchases while the sellers did not. Although this information does not affect the sellers’ reservation price, it does affect their knowledge of the surplus available from trade. This information is not pertinent for economic analyses, since the impasses are driven by rational buyers unwilling to bid on a trade with negative expected value. Behavioral decision research assumes that the seller knows the buyer’s premium. Neither analysis considers that in many settings the seller may not know this premium, nor do they explicitly consider the value of this information if it were held only by the buyer. This information gives the buyer something that can be perceived as a trade. The process data suggest this information was seldom given out by the buyer and did not significantly affect the bargaining process or outcomes. It is necessary to caution, however, that the results may have been different if the seller had possessed all of the information regarding the surplus available from trade and was not dependent on the buyer for any information.

Similarly, we would also expect the results to be different when private valuation information is held by both sides and neither side is dependent on the information provided by the other to be sure of a profit. Here, the presence of trust is not as vital to trade, so the difference between face-to-face communication and the other media should be less pronounced. Valley et al. examine the effects of communication media on a one-shot bargaining game under two-sided asymmetric information, the problem studied by Myerson and Satterthwaite (1983), Chatterjee and Samuelson (1983). In this bargaining game, the buyer and seller have independent valuations for the good being sold and do not have to rely on one another for information. Valley et al. find that in this game the efficiency of the outcomes is not as affected by the medium of communication; both written and face-to-face negotiations are nearly always efficient when the parties have a prior relationship. In contrast, face-to-face outcomes are significantly more efficient than written outcomes between strangers. These findings provide support for our assertion that the medium affects outcomes in games with one-sided asymmetric information through its role in the development of trust; in games where trust in unnecessary for efficient trade, the medium has less critical influence on the outcomes.
Though the medium of communication has pronounced effects on the efficiency of bargaining, its effect on cognitive errors is more subtle. In Study 2, the transcripts provided an actual count of the number of uninformed bids. A small number of buyers were 'cursed', making uninformed bids for goods of unknown quality. The error rates varied from 11% in written negotiations to 36% in face-to-face bargaining. Interestingly, buyers were less likely to walk in and make uninformed bids in written negotiations than in face-to-face negotiations. This appears to be a defensive reaction to the inability to establish trust in this medium, as discussed above. In no condition, however, did buyers walk in and make uninformed bids at nearly the rate seen in Samuelson and Bazerman's asocial version of the game (92% with incentives or 93% without). It appears that any chance for interaction between the parties leads to heightened awareness of the complexities of the situation, greatly reducing the likelihood that negotiators will resort to simplified definitions of the problem.

Fewer cognitive errors, however, do not translate directly into fewer losing buyers. When interaction is allowed, the winner's curse is no longer simply a cognitive error – instead it is an error with both cognitive and social roots, exacerbated or mitigated by different levels of honesty and trust across the communication conditions. The audio tapes and written messages are enlightening as to the source of buyer error across conditions. All of the incidents of winner's curse in the face-to-face condition occurred when a buyer made an uninformed bid and the seller accepted it. In contrast, less than half of the cursed buyers in the telephone and written conditions occurred as a direct result of fully uninformed buyers – the rest were the result of buyers making a bid after the sellers overstated the value of the firm. This combination of cognitive and social errors is maximized in telephone negotiations, making it most likely that buyers will suffer losses in this medium.

Future behavioral decision research needs to consider whether the decision being studied is more likely to be made independently or interdependently. When Bazerman and Samuelson (1983) first began to examine the winner’s curse, they were studying auctions. Their experiment appropriately included competitive bidding, and the findings were based on the independent decisions of what bids to make in this context. But Samuelson and Bazerman were concerned with the winner’s curse in bilateral bargaining games with asymmetric information, an interdependent decision making context. Yet their buyers and sellers never interacted as they would in actual bilateral bargaining. Our findings suggest that when a study examines decisions that are naturally made in a social context, it needs to allow social effects into the experiment in order to provide accurate descriptions of decision making.

Economic models of bargaining will also be more predictive and descriptive if they consider the communication medium in which bargaining takes place. Our results add support to the findings from previous research on games of complete or symmetric information, that face-to-face communication reduces the likelihood that a player will act in a purely self-interested way. The findings from our studies suggest that this result is not due solely to changes in the utility function, but also to the more personalized interaction which increases the incentive for truth-telling and provides a foundation for building trust. Game theorists can begin to incorporate these results into their models using
functions that increase the likelihood of cooperation and honest revelation when face-to-face interaction is present.

Telephone findings suggest that the building of trust is not always symmetric. In this medium, buyers are lulled into trusting sellers who continue to act in a traditionally self-interested way. This condition may imitate markets in which more informed sellers and less informed buyers interact, where the sellers feel no pressure toward honesty while the buyers think they are establishing a foundation for trust. The used car salesman comes to mind, with all the social psychological tricks of reciprocity, foot in the door, etc., seducing the would-be buyer into believing in the credibility of the seller’s claims (Cialdini, 1993). An interesting and important area of study would be to identify those features of a market which make it more likely that buyers will assume a different norm for truth-telling than that perceived and practiced by the sellers. Our findings from the telephone negotiations suggest this will be more likely to occur when the informed party has the ability to disguise or hide telltale signs of deception, while in a setting that fosters the illusion of honest interactions.

One question is how important our findings are relative to the external, market controls placed on buyer losses, such as the warranties and brand name effects discussed in our theory section. While these safeguards are in place for many regular transactions, there are still many situations in which the medium affects bargaining outcomes. Most employers will not make a hire until after a face-to-face interview, a bargaining medium under which the employer assumes the candidate will have a hard time misrepresenting his or her virtues. An old advertisement for the yellow pages urges you to “let your fingers do the walking,” yet many a disappointed would-be buyer has received a telephone quote on price and conditions, only to find upon actually going to make the purchase that the terms were misrepresented during the phone conversation. Similarly, anyone who has been reticent to close on a deal before meeting the other party in person has been in the position of our untrusting, written condition buyers. The effects of the medium in which bargaining takes place are critical to our understanding of bargaining behavior in general.

In summary, game theoretic models of bargaining will become more accurately descriptive and appropriately prescriptive by including functions that give weight to communication effects. Deception, the default assumption for most game-theoretic models where one party’s interest is served by deception, should not be assumed in face-to-face interactions. Distrust, also the default assumption for most game-theoretic models where one party’s self-interest is served by deception, should not be assumed in oral interactions. Finally, any social interaction reduces the likelihood of opportunistic behavior relative to standard models.

Rabin begins to incorporate communication into formal game theory. His model, however, predicts that A will believe B’s communication only in coordination games where it is in the best interests of B to tell the truth. In contrast, our findings suggest that honesty may be endogenous to the negotiation process, dependent on the medium of interaction rather than the potential payoff from truth-telling. Rabin discounts the differences between communication modes, which our studies show to be critical to the accurate exchange and interpretation of information. While his work does not fully capture the extent to which negotiators in our studies honestly exchange valuable
information, our findings show that Rabin's basic premise is correct: "If agents share a common language, they do not babble; they communicate" (Rabin, p. 147).

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Appendix A

A.1. Acquiring a company – seller

You represent Company T (the target). Company A (the acquirer) is considering acquiring your company if a mutually acceptable price can be negotiated. You are going to meet a representative from Company A to determine if you can reach an agreement that would be acceptable for you and Company A.

Company A has some information about your company. They know that Company T has been engaged in a highly risky oil exploration project. They realize that the value of the company depends directly on the outcome of your recent exploration project. No one outside the Company T (including Company A) has any information on the results of this exploration effort. Going into the project, experts inside and outside the company knew that if the project was a total failure, the company under Company T's management could be worth as a little as $0/share. But if the project was a total success, the value of the company under Company T's management could be as high as $100/share. In fact, all values between 0 and $100 (per share) were viewed as equally likely. Thus, 0, 1, 2..., 98, 99 and 100 $ (per share) were viewed to be equally likely. However, the results of the exploration project are now known. You know that the company is worth $_____ under Company T's management. Company A does not have this information.

By all estimates, the company will be worth considerably more in the hands of Company A than under Company T's management. However, you do not know how much more the company will be worth if owned by Company A.

The board of directors of Company T has asked you to try to negotiate the profitable sale of Company T with the representative of Company A. As the representative of Company T, you want to negotiate to maximize the interests of Company T. Your success in this negotiation can be assessed by how much more than $_____ (per share) you can get Company A to pay for the company. Obviously, you would not accept any offer below $___.

You may only agree on a fixed dollar price per share. No other conditions or terms may be added to the agreement. You may reveal any or all of the information provided. But, you may not show the representative of Company A this sheet of paper.

A.2. Acquiring a company – buyer

You represent Company A (the acquirer), which is considering acquiring Company T (the target). A mutually acceptable price must be negotiated for the acquisition to take place. You are going to meet a representative from Company T to determine if you can reach an agreement that would be acceptable for you and Company T.

You are unsure about how high a price you are willing to pay, and the main complication is the following: The value of Company T depends directly on the outcome of a major oil exploration project, and no one outside the firm has any information on the results of this exploration effort. If the project was a total failure, the company under Company T’s management could be worth as little as $0/share. But if the project was a total success, the value of the company under Company T’s management could be as high as $100/share. In fact, the value of the firm is equally likely to be any amount between $0 and $100 (per share). Thus, 0, 1, 2, …, 98, 99 and $100 (per share) are all equally likely. However, Company T may know the actual, true value of the firm.

By all estimates, the company will be worth considerably more in the hands of Company A than under Company T management. In fact, whatever the ultimate value under Company T management, the company will be worth 50% more under the management of Company A than under Company T. If the company was worth $20/share under Company T’s management, the value under Company A would be $30/share. If the company was worth $50/share under Company T’s management, the value under Company A would be $75/share. Similarly, if the company was worth $80/share under Company T’s management, the value under Company A would be $120/share.

The board of directors of Company A has asked you to try to negotiate the profitable purchase of Company T from a representative of Company T. From all indications, Company T would be happy to be acquired by Company A, provided it is at a profitable price.

Thus, you (Company A) will not know the results of the exploration project before negotiating with Company T. However, Company T is likely to have more information about their true value. In addition, Company T is expected to prefer any agreement that provides them with a price higher than their true value.

As the representative of Company A, you want to negotiate to maximize the interests of Company A. If you acquire Company T, your success in this negotiation will be evaluated on the amount by which the value of the firm under Company A’s management is greater than the amount you pay for the company.

You may only agree on a fixed dollar price per share. No other conditions or terms may be added to the agreement. You may reveal any or all of the information provided. But, you may not show the representative of Company T this sheet of paper.
Appendix B

Payment details

B.1. Company T

You are carrying out this exercise for real money. We will pay you $10 for participating in the exercise. In addition, for every $1 you make in the sale of Company T, we will pay you 20¢.

Company T’s profit is the sale price minus the value of the company under T’s management:

\[
\text{Company T’s Profit} = (\text{Sale Price} - \text{Value prior to purchase})
\]

- Example: You are Company T and the value of your company to you, before a sale, is $50. If you sell it for $100, you will receive \((100 - 50) \times 20\)¢ = $10.00.
- Example: You are Company T and the value of your company to you, before a sale, is $50. If you sell it for $75, you will receive \((75 - 50) \times 20\)¢ = $5.00.
- Do not sell the company for less than it is worth to you!

We will pay you in cash at the end of the exercise, after you turn in the completed forms.

B.2. Company A

You are carrying out this exercise for real money. We will pay you $15 for participating in the exercise. In addition, for every $1 you make in the purchase of Company A, we will pay you 20¢. If you lose money in the purchase of Company A, you will pay us 20¢ for every $1 you lose. Any losses incurred will be limited to $5, i.e., you are guaranteed a minimum of $10 for participating in the exercise.

Company A’s profit is the value of the company under Company A’s management, minus the purchase price:

\[
\text{Company A’s Profit} = (\text{Value under Company A’s management} - \text{Purchase price})
\]

- Example: You are Company A and the value of the company to you, after purchase, is $51. If you buy it for $1, you will receive \((51 - 1) \times 20\)¢ = $10.00.
- Example: You are Company A and the value of the company to you, after purchase, is $51. If you buy it for $26, you will receive \((51 - 26) \times 20\)¢ = $5.00.
- Example: You are Company A and the value of the company to you, after purchase, is $51. If you buy it for $76, you will lose \((51 - 76) \times 20\)¢ = $-5.00.
- Do not pay more for the company than it is worth to you!

We will pay you in cash at the end of the exercise, after you turn in the completed forms.
References


