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States of Affairs and States of Mind: The Effect of Knowledge of Beliefs

BOAZ KEYSAR AND LINDA E. GINZEL

The University of Chicago

AND

MAX H. BAZERMAN

Northwestern University

Research on the "curse of knowledge" demonstrates a tendency to behave as if others have access to one's privileged information about a certain state of affairs. We explore the possibility that information about beliefs may induce this tendency, previously attributed exclusively to factual knowledge. In two experiments, subjects predicted the behavior of a buyer in a negotiation scenario. The seller's agent had a belief about the value of the firm that was independent of its true value. Subjects had information about (1) the true value (i.e., factual knowledge) and (2) the agent's belief. These two types of information were unknown to the buyer. Subjects' predictions of buyer behavior were affected by this privileged information about both the factual knowledge *and* the agent's belief. This suggests that curse of knowledge applies to information not only about states of affairs but also about states of mind.

When perspectives diverge, perspective taking is important for accurately understanding other people and effectively predicting the outcome of interdependent situations. People attempt to evaluate the cognitions and emotions of others when they negotiate, plan actions, and anticipate outcomes; in general, whenever they attempt to understand aspects of the social world. Though individuals sometimes appear to be quite attuned to the perspective of others (Isaacs & Clark, 1987; Fleming & Darley, 1991; Krauss & Fussell, 1991; Schober, 1990), problems do arise when they possess information that is different from the information available to the other (e.g., Fussell & Krauss, 1992; Keysar, 1994).

Though people can be attentive to the information accessible to others, their assessments can be systematically biased. Fussell and Krauss (1992) found that people rely on their own knowledge in assessing the knowledge of others (cf. Dawes, 1989; Hoch, 1987). Similarly, Nickerson, Baddeley, and Freeman (1987) found that individuals who knew the answer to a problem overestimated the percentage of their peers who could accurately solve that problem. In both of these studies, the bias may have resulted from uncertainty regarding the others' access to information. Indeed, related work demonstrates that people make insufficient allowances for uncertain aspects of situations, which leads them to overrely on their own construal of ambiguous events when they make predictions about others (Griffin, Dunning, & Ross, 1990; Ross, 1989). People's anchoring in their own knowledge, then, may be affected by insufficient or uncertain information regarding the accessibility of that knowledge to others (Quattrone, 1982; Tversky & Kahneman, 1974).

Insufficient knowledge about others' access to information induces a tendency to use one's own information as if it were readily accessible. However, even when people are fully informed about others' ability to access a certain piece of information, they do not seem to use this information sufficiently; they still exhibit a tendency to be anchored in their own knowledge. Two general phenomena, mirror images of one another, illustrate this notion. First, when others are more informed than they are themselves, people do not fully take into account others' privileged access to information; they sometimes behave as if the others do not have such extra information. Second, even when people know that others do not have access to their own privileged information, they may behave as if those others

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had access to this information. The first phenomenon was investigated in a negotiation setting by Bazerman and his colleagues (e.g., Bazerman & Carroll, 1987; Samuelson & Bazerman, 1985). They demonstrated that negotiators do not incorporate information about their opponent's access to information into their own assessment of the decision processes of that opponent. Specifically, subjects were asked to make a bid on a company whose value was unknown to them but known to the sellers. Their bids did not take into account the fact that the sellers had access to the true value of the company. They behaved as if their opponents were as uncertain or uninformed as they were—consistently causing them to lose money. This effect was replicated even when subjects were compensated based on their performance (Samuelson & Bazerman, 1985; Ball, Bazerman, & Carroll, 1991), when subjects made multiple bids and therefore had the opportunity to "correct" over time (Ball *et al.,* 1991), and with subjects from highly trained and competent populations such as CEOs, investment bankers, and Big 6 accounting firm partners.

In this paper, we are concerned with people's tendency to behave as if others have access to their own privileged information—even when they are fully aware that they do not. Fischhoff and his colleagues (Fischhoff, 1975, 1982; Fischhoff & Beyth, 1975) documented hindsight effects in people's reports of their own perceptions of the likelihood of events. They showed that after people learned about the outcome of an event, they overestimated their ability to predict that event's occurrence. Moreover, people overestimated the predictive ability of others who did not have access to the outcome information. This effect persists even when subjects are instructed not to use the outcome information (Fischhoff, 1975, 1977; see Hoch & Lowenstein, 1989, for a discussion). Similarly, Baron and Hershey (1988) documented an outcome bias in people's evaluation of the quality of a decision. Camerer, Lowenstein, and Weber (1989) introduced the notion of the "curse of knowledge" to argue that in predicting others' behavior, agents do not disregard knowledge that they have, even when they know that knowledge is privileged to them. In their experiments, subjects played the role of traders who possessed privileged information. Even though this information could have been used to their advantage, they did not maximize their profits but instead behaved as if their trading partners also had access to their privileged information. Though market forces reduced the overall bias, 50% of the effect persisted despite feedback from recurring transactions. In this sense, people seem to be "cursed" by the extra knowledge they possessed (see also Wilson & Berkke, 1994).

Our focus here is on the question: What aspects of "knowledge" contribute to this effect? Typically, in operationalizations of the curse of knowledge in the literature, the knowledge which is privileged to the subject represents a description of a state of affairs. Knowing the state of the world seems to have an overwhelming effect on people when they attempt to take the perspective of another. They behave as if what they know to be true is also accessible to others who are known to be completely uninformed. This is particularly striking when people attempt to recall their own previous estimates of the likelihood of outcomes (Fischhoff, 1975): Once they know the outcome, the true state of the world, this type of factual knowledge overwhelms them and affects their recollection of their own previously uninformed estimates. Thus, knowledge of the world seems to be difficult to ignore.

One reason for these effects could be that the state of affairs itself appears to be directly accessible to the uninformed other. In this sense, people behave as if the information is not truly privileged, as if others could gain access to this type of knowledge regardless of whether they know about it or not. Another reason could be that informed subjects take the belief itself, not the state of the world, to be the information that is somehow accessible to uninformed others. The curse of knowledge, then, may be induced not only by the existence of a state of affairs but also because the sender of information holds *beliefs* about it. We suggest the possibility that beliefs per se may contribute to the curse of knowledge.

STATES OF AFFAIRS AND STATES OF MIND

The notion that one's beliefs per se may seem relatively accessible to others is related to findings by Keysar (1994) that communicative intentions appear to be transparent. Keysar used ambiguous utterances to show that once people know what speakers intend, they believe that addressees will perceive the same intention—even when addressees lack the crucial piece of information which is necessary to understand the speakers' intention. These studies involved "cooperative" communicative intentions; intentions that speakers desire to be perceived as intended to be communicative (Grice, 1957, 1975). In this paper, we will focus on beliefs in a noncooperative or competitive setting.

We chose a third-party setting because it allowed us to introduce a natural distinction between states of affairs and states of mind. One cannot make this distinction within a particular individual: When a person has a belief, an integral part of that belief is that the belief is true[1] (Gilbert, 1991, 1993). One does not hold beliefs about the world and at the same time know that they are false. In contrast, an observer can have information

[1] This, of course, is qualified by a degree of confidence.

about the world that is independent of someone else's beliefs about the world. For instance, such a dissociation occurs in literature when an omniscient writer provides information to the reader about an event and information about a protagonist's beliefs about that event. The information about the event may or may not correspond to the protagonist's beliefs about it. In other words, the reader may know whether the protagonist is well informed or not.

Now consider the following situation which may give rise to the curse of knowledge. Assume a reader who knows about a protagonist who is completely uninformed about an event. At the same time, the reader is fully informed about the event, or the true state of affairs. Given what we know about hindsight and the curse of knowledge, the reader may tend to attribute access to the information about the event to the uninformed protagonist. In this sense, knowledge about states of affairs may be difficult to disregard when taking the perspective of an uninformed other. Now assume there exists a second protagonist who is misinformed about the event—a protagonist who holds false beliefs about the state of affairs. The question of interest in this paper is—would the beliefs of the *second* (misinformed) protagonist, who conveys information to the first protagonist, have a similar effect on the reader when attempting to take the perspective of the *first* (uninformed) protagonist?

To illustrate how we instantiated this situation, consider the following version of the Acquiring a Company problem which we modified from Samuelson and Bazerman (1985). Subjects are told about two companies, the target company that is offered for sale (Company T) and the potential acquiring company (Company A). Company A must decide whether to buy Company T even though Company A does not have access to information about its real value. The value of the company is said to depend entirely on the result of an upcoming oil exploration. All parties know that after the exploration is completed the company may be worth anywhere between $0 and $100 per share (with equal probability for any value in the range). They also know that the Company would be worth 50% more under Company A's management than under the current management of Company T. Subjects are informed that both parties conducted initial negotiations under this state of uncertainty.

After the negotiations, the target company receives the results of the oil exploration and knows the true value of their company. However, the acquiring company does not have access to this information. After discovering the true value of the company, the seller's agent sends a message to the acquiring company, stating that the value of the company is $80/share. They offer the target company to Company A for $85/share in a take-it-or-leave-it ultimatum. Subjects are told that based on the outcome of the oil exploration, the true value of the company is either $20/share or $80/share. Subjects are asked to predict whether the buyer, who has no knowledge of the actual outcome of the exploration, will accept the ultimatum. Whether subjects are told that the true value is $20/share or $80/share should have no bearing on their prediction, because they know that the buyer does not have access to this information. Yet, to the extent that knowing the state of affairs affects their taking the perspective of uninformed others, subjects should predict that the buyer would be more likely to accept the ultimatum when they themselves know that the true value is $80/share than when they know that it is $20/share. Specifically, they would behave as if the state of affairs were accessible to Company A.[2]

To evaluate the possible effect of beliefs, we added the following manipulation: Assume that the seller is represented by an agent who communicates the ultimatum to the buyer. In addition to the true value of the company, subjects are informed about the agent's belief about the value. In two cases the belief is veridical: The agent believes that the company is worth either $80/share or $20/share and the true value is $80/share (T80/B80) or $20/share (T20/B20). The difference between these two cases should induce an effect of knowledge, but they would not allow an evaluation of a distinct contribution of knowledge of beliefs per se. Now, consider a third case, when subjects know that the company is worth $20/share but that the sellers' agent believes that it is worth $80/share (T20/B80)—with the cause of the agent's misinformation being an accidental error in the communication lines between the board of directors and Company T's agent. Would subjects' predictions be affected by the agent's belief? Would they behave as if the agent for Company A had access to the belief of the agent for Company T?

If the belief per se does not contribute to the effect, then subjects should only be affected by their privileged knowledge regarding the state of affairs, i.e., the true value of Company T. In this setting, when subjects know that the company is worth $80/share they should predict that the offer would be accepted more often than when they know that the company is worth $20/share—regardless of the agent's belief. In that case, their prediction for T80/B80 should be higher than for T20/B80 and for T20/B20 which should not differ. In contrast, if people behave as if others have access to beliefs, then subjects' predictions of the acceptance rate for T20/B80 should be higher, perhaps as high as T80/B80. The following two experiments use this setting to

[2] To control for inferences regarding non verbal communication, the exchange was in a written form.

explore the possible contribution of beliefs to the curse of knowledge.

EXPERIMENT 1

Method

Subjects. One hundred four first-year Master's students enrolled in introductory organizational behavior courses at the Kellogg Graduate School of Management participated in this experiment as part of an in-class exercise.

Procedure. The experiment was described to subjects as an individual decision-making exercise. They were asked to read the scenario which described the negotiations and the message that was sent from Company T to Company A (see Appendix A) and to make their decisions privately without discussion.

Manipulations of true value and seller's belief. Assignment to conditions was random, with each subject receiving one of four versions of the Acquiring a Company problem. Each version differed with regard to the privileged information provided about the true value of the company and the seller's agent's belief about the value of the company. In each of the four conditions, subjects were told the following:

T80/B80: The company was worth \$80/share to Company T, and their agent knew that the firm was worth \$80/share.

T20/B20: The company was worth \$20/share to Company T, and their agent knew that the firm was worth \$20/share.

T20/B80: The true value of the firm was \$20/share, but the agent believed that it was worth \$80/share.

T80/B20: The true value of the firm was \$80/share, but the agent believed that it was worth \$20/share.

Dependent measure. All subjects were asked to predict whether the agent for Company A would accept or reject the offer. Then they were asked to report their confidence in their prediction by providing a probability estimate between 50 and 100% if they believed that the agent for Company A would accept Company T's offer, and a probability estimate between 0 and 50% if they believed that the agent for Company A would reject Company T's offer.[3]

TABLE 1

Mean Confidence (between 0 and 100% Confidence) That the Offer Would Be Accepted in Experiment 1

	Agent's belief	
True value	**\$20**	**\$80**
\$20	33	65
\$80	55	62

In general, we expected to replicate the traditional curse of knowledge effect with the first two conditions: More subjects should predict that the offer would be accepted in the T80/B80 than in the T20/B20 condition. Given this, one could use these two conditions as anchor points to evaluate the effect of knowledge of beliefs. The closer the "accept" rate in the T20/B80 condition is to the accept rate in the T80/B80 condition, the stronger the effect of knowledge of beliefs, while the closer the T20/B80 condition is to the T20/B20 condition, the stronger the effect of knowledge of facts.

Results and Discussion

Table 1 reveals the expected pattern for the traditional curse of knowledge effect. Subjects' confidence that the offer would be accepted was about twice as high for the T80/B80 compared to the T20/B20 condition. Moreover, about four times as many subjects predicted that the offer would be accepted in the T80/B80 than in the T20/B20 (see Table 2). To our knowledge, this is one of the largest curse of knowledge effects to be reported in the literature. More important for our purposes, belief per se clearly induced the same effect: The accept rate in the T20/B80 condition was much larger than that in the T20/B20, and though not significantly so, it was even larger than that in the T80/B80 condition. Similarly, the corresponding confidence measure was a bit higher for the T20/B80 than for the T80/B80 condition and clearly higher than that for the T20/B20 condition. Knowing that the company is worth \$80/share resulted in a similar pattern of results, but the effect was not as pronounced as with knowledge of belief. The accept rate in the T80/B20 was indeed larger than in the T20/B20 (a difference of 33 percentage points) but also somewhat smaller than the rate of T80/B80 (about 23 percentage points difference).

The statistical analyses for each measure support our predictions. The difference in the accept rate be-

[3] As a secondary measure, subjects were also asked to indicate whether they thought that the agent for Company A would think that the agent for Company T was lying about the true value of the company. This secondary measure turned out to be problematic. The main problem with this measure was that subjects seemed to have interpreted the question differently than intended. After the experiment was completed, subjects explained their answers to the "lie" question. Their explanations reveal that many subjects interpreted the question to mean whether a lie would be detected eventually. Clearly, if the company is worth \$20/share, the buyers would discover that they overpaid for the company once they had complete information about the results of the oil exploration. Yet, this interpretation of the question is irrelevant to the issue that we focus on. The main issue is whether the buyer would decide to complete the transaction before being completely informed of the true value of the company. Therefore, the secondary measure does not allow us to address this question.

TABLE 2
Percentage of Subjects Who Predict That the Offer Would Be Accepted in Experiment 1

	Agent's belief		
True value	**$20**	**$80**	
$20	19 (5)	81 (22)	51
$80	52 (12)	75 (21)	65
	35	78	

Note. Frequencies are in parentheses.

tween the T80/B80 and T20/B20 conditions was significant, χ^2 (1) = 14.63, $p < .001$. More importantly, the accept rate for the T20/B80 was significantly higher than that for the T20/B20, χ^2 (1) = 17.8, $p < .001$.[4] Second, the corresponding confidence data were submitted to a 2(True Value: 80 vs 20) × 2(Agent's Belief: 80 vs 20) between-subjects analysis of variance. Agent's Belief had a significant effect, $F(1,100) = 12.03$, $p < .001$, and it interacted with True Value, $F(1,100) = 5.34$, $p < .03$. True Value had a marginal effect, $F(1,100) = 3.23$, $p = .075$. The crucial comparisons, again, concern "accept" predictions for the T20/B80 condition in comparison to the two anchor conditions T80/B80 and T20/B20. Newman–Keuls tests revealed that the mean confidence rating for T20/B80 was significantly greater than that of the T20/B20 condition, $p < .01$, demonstrating an effect of belief.

The main result of this experiment is that knowledge of an agent's belief induced a curse of knowledge: As many subjects predicted that the offer would be accepted in the T20/B80 as in the T80/B80 condition. More importantly, both conditions induced more "accept" predictions than in the T20/B20 condition. While the results yielded the predicted effect, a few potential methodological problems may qualify the conclusions of this experiment. First, in this experiment subjects were asked to make predictions about the behavior of a hypothetical agent. Although the message from the seller's agent specifically stated that $85/share was Company T's final position (i.e., "Do not come back to us with any other proposal"), it is possible that subjects believed that there would be further contact between the agents. With the possibility of additional negotiations, it is reasonable to assume that the beliefs of the seller's agent about the true value of the company would somehow be revealed to the buyer's agent during future interaction. In addition, it is possible that subjects did not read the instructions carefully and missed the crucial piece of information regarding who had access to what information. If they did not pay attention to the distinction between what they themselves knew and the information that was accessible to the seller's agent, then the results of Experiment 1 have limited implications for our understanding of the curse of knowledge. We designed Experiment 2 to overcome these possible methodological problems. We chose role-playing as an appropriate paradigm to investigate subjects' *beliefs* about the way people behave (Aronson, Ellsworth, Carlsmith, & Gonzales, 1990, p. 100).

In addition, subjects found the T80/B20 condition to be phenomenologically problematic. Recall that in this condition, subjects learn that a firm is worth $80/share, but the seller's agent believes it to be worth $20/share and then offers the company at $80/share to the buyer. Although this condition is logically consistent, it presents an odd situation that violates the script that most people have for a negotiation scenario. Indeed, it was only in this condition that subjects expressed confusion during debriefing. Given that this condition created a strange buyer–seller script, Experiment 2 employs only the T20/B80 condition and the two anchor conditions.

EXPERIMENT 2

The second experiment shares the central question of Experiment 1: Does knowledge of beliefs induce a curse of knowledge? The goal of Experiment 2 is to replicate the effect of beliefs shown in Experiment 1 while overcoming potential criticisms. For subjects in Experiment 2, it was not possible to infer that the agent for the buyers had any contact with the sellers after the initial negotiations. To accomplish this, one person from each group of subjects volunteered to role-play as the agent for Company A, and the rest of the subjects took the role of outside observers of the negotiation scenario. The experimenter emphasized that their task was to predict the actual behavior of the volunteer role-player. In addition, subjects received a monetary incentive to accurately predict the decision of the role-playing agent. Recall that subjects are being asked to predict the behavior of the buyer who has no access to their own privileged information regarding the true value of the company and the beliefs of the seller's agent. To ensure that subjects paid attention to the discrepancy between their privileged information and the information accessible to the agent, the experimenter announced that they would be given information that is not available to the role-playing agent for Company A. This statement was reiterated in writing and appeared at the top of the negotiation scenario, as follows (see Appendix B):

AS AN OUTSIDE OBSERVER, YOU WILL BE PROVIDED WITH INFORMATION THAT IS NOT AVAILABLE TO THE AGENT FOR COMPANY A. THIS PRIVILEGED INFORMATION APPEARS IN BOLD ITALICS BELOW.

[4] The fourth cell turned out to be not informative, as we will explain below.

The information about the true value of the company and the beliefs of the seller's agent appeared in bold italics to remind subjects that this information was available only to them and was not available to the role-playing agent.

In addition, Experiment 2 stressed that the buyer's agent could not have had access to privileged information via possible cues from the seller's agent (Ekman & Friesen, 1969; Zuckerman, DePaulo, & Rosenthal, 1981). To achieve this, the description of the negotiation scenario differed from that in Experiment 1 in the following way. In the first experiment the scenario ended with a "message" that was sent to Company A's agent; in this experiment the seller's agent sends a letter. To ensure that subjects notice that the message was indeed sent in writing to Company T, the letter was set off from the rest of the page and it was formatted to include a salutation ("Dear Agent for Company A") and closing lines ("Sincerely, Agent for Company T"). (See Appendix B.)

Method

Design. This experiment used three conditions in a between-subjects design (Privileged Information: T80/B80, T20/B20, and T20/B80).

Subjects. One hundred thirty-seven Master's students enrolled in introductory management and negotiation courses at the Kellogg Graduate School of Management participated in this experiment as part of an in-class exercise; groups ranged in size from 12 to 37. Each session had a roughly equal number of subjects per condition.

Procedure. The experimenter began each session by asking for a volunteer to play the role of the agent who would represent the acquiring company in a short negotiation scenario. Once a volunteer was identified as the role-playing agent (e.g., John), he or she took a seat at the front of the room.

All other subjects played the role of outside observers. The instructions offered the subjects a cash incentive for accuracy as follows: "You will read about the negotiation that John is currently involved in. He will read about that negotiation too and based on the information provided, John will make a decision about whether or not to acquire the target company. Your task, as observers of this scenario, is to predict John's decision. As an incentive for attempting to accurately predict the decision of John, our role-playing agent for Company A, we will draw the names of three people in this class who will each win $20.00 based on their predictions." Subjects were informed that only those who accurately predicted the agent's decision would participate in the drawing.

While subjects in each of the three conditions had differential privileged information, they all predicted the behavior of their volunteer classmate. They were fully aware of the information that was accessible to the volunteer—identical across all conditions. In addition, as the experimenter distributed the scenarios (see Appendix B), she reminded them that their privileged information appears in bold italics, and the same reminder appeared in capital letters at the top of the printed scenario. Each subject received one of three versions of the revised Acquiring a Company problem. Information differed among the three conditions (T80/B80, T20/B20, and T20/B80) as in Experiment 1. The negotiation scenario ended with the sellers' agent sending the following letter to the role-playing agent for Company A:

> Dear Agent for Company A:
> We have just learned that the true value of Company T if we maintain management of the firm is $80/share. As a result, we will accept a price of $85/share if you choose to make such an offer. (I have enclosed a contract at the price of $85/share signed by me.) Do not come back to us with any other proposal. This is our final position.
> Sincerely,
> Agent for Company T

All subjects were asked to make their decisions privately, without discussion. Each role-playing volunteer was reminded to take the perspective of the agent for Company A. They were provided with the Acquiring a Company scenario in the exact form that the buyer saw it—without any information about the true value of the company or the beliefs of the agent. After indicating whether, as the agent for Company A, they would accept or reject the offer, each volunteer role-player sealed their decision in an envelope and left it on a desk at the front of the room.

Dependent measures. First, subjects predicted whether they thought that the role-playing agent for Company A would accept or reject the offer. Then subjects rated their confidence in their prediction by providing a probability estimate between 50 and 100% if they believed that the role-playing agent for Company A would accept Company T's offer and a probability estimate between 0 and 50% if they believed that the role-playing agent for Company A would reject Company T's offer. Just before collecting the materials, the experimenter asked subjects to write a couple of sentences explaining their decision at the bottom of the page.

Finally, the envelope containing the role-playing agent's decision was opened and the decision was announced. Subjects who had accurately predicted the role-playing agent's decision were included in a $20.00 lottery, one for each condition. Depending on the number of correct predictions, the actual chances of winning the lottery ranged from .12 to .50. Lottery winners

were paid $20.00 and each role-playing volunteer received $5.00.

Results and Discussion

Did A accept T's offer? The major dependent measure was subjects' predictions of the role-player's decision to accept or reject Company T's offer. The results clearly replicated the main results of Experiment 1 (see Fig. 1). First, the anchor points yielded the traditional "curse of knowledge" effect: About twice as many subjects predicted acceptance of the offer when the company was worth $80/share and the agent knew this (T80/B80) as did so in the T20/B20 condition (58 and 30%, respectively); this difference was significant, $\chi^2(1) = 6.23, p < .02$. More importantly, the crucial condition, T20/B80, induced an acceptance rate significantly higher than the T20/B20 condition (60 and 30%, respectively), $\chi^2(1) = 7.31, p < .01$.

The confidence ratings in subjects' predictions regarding the role-playing agent's acceptance of the offer yielded exactly the same pattern of results. The two anchor conditions differed as expected: The mean confidence level for subjects in the T80/B80 condition was higher than those in the T20/B20 condition (58 vs 40%). As with the categorical decision, the mean confidence rating for the third condition, T20/B80, was very close to that for the T80/B80 condition (59 and 58%, respectively). A one-way analysis of variance on the confidence ratings revealed that the three conditions differed, $F(2,133) = 5.85, p < .01$. More importantly, the difference between each of the two high-confidence conditions (T80/B80 and T20/B80) and the low-confidence condition (T20/B20) was statistically significant, $p < .01$ by Newman–Keuls tests. These measures, then, converge on the conclusion that subjects' privileged information about the agent's beliefs affected their prediction of the role-playing agent's decision.

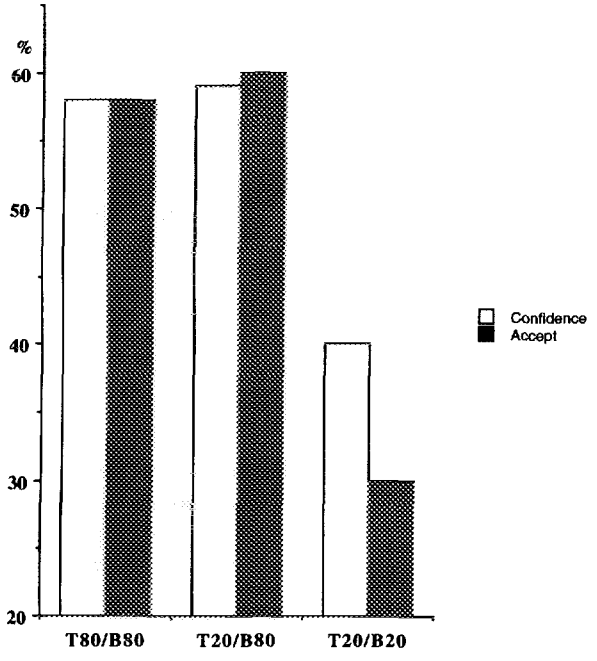

FIG. 1. Percentage of subjects who predicted that the offer would be accepted and their corresponding confidence levels as a function of condition in Experiment 2.

GENERAL DISCUSSION

These two experiments add to our knowledge about the curse of knowledge in two important ways. First, they replicated the traditional effect: When subjects knew that the value of the company was high and that the agent believed it to be high, they predicted more acceptance on the buyer's part than when they knew that the value of the company was low and the agent believed it to be low. More central to our purposes, both experiments clearly demonstrated the effect of knowledge of beliefs. In the first experiment, subjects' predictions were affected by their privileged information about the agent's belief. They were more likely to predict that the buyers would accept the target company's offer when they knew that the seller's agent believed the stated value was true, even when they knew that the real value was actually lower than stated. Experiment 2 underscored this conclusion by replicating the effect even when privileged information was clearly and unambiguously marked as inaccessible to the buyer's agent. Furthermore, the effect replicated when subjects' decisions did not concern a hypothetical agent but the behavior of one of their own peers. Thus, even when subjects predict the behavior of their own classmate, with uncertainty about the actual decision maker removed, they exhibit an effect of knowledge that is induced by their knowledge of beliefs.

In general, outcome information must have some information value (cf. Hoch & Lowenstein, 1989). When an event occurs, it is reasonable to infer that the conditions for its occurrence could have been found at an earlier time. A successful oil exploration implies that the site had oil all along and suggests that the geological profile of the area is more typical of oil fields than not. In this sense, then, subjects make a reasonable inference from their knowledge of the outcome of the oil exploration to the buyers' decision. Once subjects know that the oil exploration was successful, they might infer that the buyers have access to diagnostic information, such as the geological profile of the oil field. In this case, it is reasonable to expect that the buyers would accept the offer when the oil exploration is successful—even though they did not know that it was actually successful. They could have inferred that it was very likely to be a real oil field and thus accept the offer.

This could explain the differential results for the two anchor conditions, T80/B80 and T20/B20. However, this explanation does not apply to our main result: It does not explain why people predicted more acceptance when the oil exploration was *not* successful but the agent believed that it was (T20/B80), compared with the case when the exploration was similarly unsuccessful but the agent knew it (T20/B20). Given that the erroneous belief of the agent resulted from a communication failure, it does not affect the likelihood of the success of the exploration. If there is no "information" in the agent's belief that could have induced the effect, what could explain it?

One possibility is that subjects inferred that the agent projected cues about his belief. A certain version of such an explanation can be immediately dismissed: One may argue that the buyers detected hints of the agent's belief at some point in the negotiations, prior to extending the ultimatum. This cannot explain the effect because the oil exploration was completed only *after* the negotiations were over. Even if subjects had overlooked this detail, and they may have overlooked it in Experiment 1, Experiment 2 clearly rules out this explanation because subjects attempted to predict the behavior of one of their own classmates. They unambiguously knew that their classmate had no contact with the sellers and made his or her decision based on the scenario and the written message alone. Another explanation for the effect could be based on a construal-type account (Griffin, *et al.*, 1990; Ross, 1989). When subjects knew that the seller's agent wrongly believed that the company was worth its price (T20/B80), they may have perceived the message to the buyers as being more persuasive. In other words, even though subjects in each of the conditions received the same message, they may have "read into" the message and perceived differential cues in the T20/80 and the T20/B20 conditions. Although there was no uncertainty regarding the written message and its elements were not overly ambiguous, this possibility is consistent with our results.

One might explain the result in terms of people's beliefs regarding lies. When the agent knew that the company was offered for much more than its true value (T20/B20), he was consciously lying to the other party. In contrast, when he did not know that the value was lower than the price (T20/B80), he was unintentionally misinforming the other party, but he was not lying. One possible explanation for the effect is in terms of people's belief in a "just world" (Lerner, 1970): "It seems that many people care deeply about justice for themselves and others—not justice in the legal sense but in a more general psychological sense. They want to believe in a world where people get what they deserve, or . . . deserve what they get" (p. 207). It is possible, then, that this kind of thinking led our subjects to predict that the lying agent's proposal would be rejected because they wanted to believe that the agent would be punished for lying. Even though this is possible, the typical case where people exhibit a belief in a just world concerns post hoc explanations for an individual's predicament, e.g., by derogating victims (see review by Lerner & Miller, 1978). That is, people tend to infer that an individual who suffers from a negative outcome must have deserved it. In contrast, our subjects may have predicted the negative outcome for the agent because they believed he deserved it. This kind of explanation for our results, then, would hold only if in general and a priori people tend to predict that immoral behavior would bring about a negative outcome.

A related explanation in terms of lying behavior might be that people believe that lies are relatively transparent and are likely to be detected (Kraut, 1980; Ekman & O'Sullivan, 1991). It is possible that when subjects inferred that the agent was lying, they may have been more likely to believe that the buyer would detect the lie and reject the offer in the T20/B20 condition.

Implications and Conclusions

We have demonstrated that in predicting another's decisions, subjects have difficulty discounting their own privileged information about states of affairs *and* states of mind. While it is frequently argued in economic models that more information cannot hurt, these results along with those from research on the curse of knowledge suggest that it can. For example, Camerer (1992) argues that the curse of knowledge explains the difficulty in teaching because it is difficult to imagine how little students know, in giving directions to your home because you assume the other party has the knowledge to understand your abbreviated instructions, and in product designers overestimating how easy it is for regular people to master high-tech devices. Similarly, Hoch (1988) found that marketing experts (who are also consumers) are worse at predicting the beliefs, values, and tastes of other consumers than are nonexpert consumers.

The importance of perspective taking is widely acknowledged across disciplines as a central ability relevant for success in interpersonal tasks, such as negotiation (Myerson, 1991; Raiffa, 1982; Rubin & Brown, 1975). Bazerman and Neale (1982; Neale & Bazerman, 1983) found that negotiators who had a greater tendency to think about the perspective of others were more successful in negotiations. This focus on the perspective of the other party allowed them to better predict the opponent's goals, expectations and reservation points. While their research looked specifically at individual differences in perspective taking, we believe

that it is useful to identify the social and cognitive constraints on effective perspective taking in general.

Our findings add an important distinction to the notion of the curse of knowledge. They suggest that privileged knowledge of beliefs can cause the same effect as privileged knowledge of facts or state of affairs, with both causing people to behave as if others have access to that information. This distinction will typically be manifest with the presence of a mediating agent because this situation naturally gives rise to a dissociation of facts and beliefs about them. To the extent that future research involves the diverging perspectives of multiple parties, then, it will be necessary to account for the effect of beliefs.

The effect of beliefs about beliefs is important for the study of perspective taking. In general, it suggests a tendency to assume that beliefs are relatively accessible to others. This tendency may result from an overgeneralization of experiences with accessibility to the beliefs of others. This may be beneficial to the extent that beliefs do indeed become public. However, subjects' behavior in our study demonstrates that people have difficulty avoiding it even when they clearly know that a belief is inaccessible to others.

APPENDIX A

Company A (the acquirer) is considering acquiring Company T (the target). Company T would be happy to be acquired by Company A, *provided it is at a profitable price.* The main complication is that the value of Company T depends directly on the outcome of a major oil exploration project. If the project failed completely, the company under Company T management would be worth nothing—$0/share. But if the project succeeded completely, the value of the company under current management would be worth $100/share. Prior to the exploration, all share values between $0 and $100 were considered by all parties to be equally likely. By all estimates, the company is worth considerably more in the hands of Company A than under current management. In fact, whatever the ultimate value under current management, *the company is worth fifty percent (50%) more under the management of Company A than under Company T.* If the project failed completely, the company is worth $0/share under either management. If the exploration project generates a $50/share value under current management, the value under Company A is $75/share. Similarly, a $100/share value under Company T implies a $150/share value under Company A and so on.

A negotiation began between the two parties. Both parties sent agents to represent them in the negotiation, giving the agents full power to complete an agreement. A variety of issues were discussed. The meeting broke up with the agent from Company T saying that Company T would get back to Company A regarding their interest in being acquired.

In the meantime, the oil exploration was completed. The results of the project were *only available* to the board of directors of Company T. The board of directors of Company T learned from the exploration that the true value of the firm was $20/share ($80/share) and they sent this information to their agent. [However, an error was made in the message to the agent, and the agent actually believed that the firm was worth $80/share ($20/share).]

Company A's board of directors did not know the true value of the firm, but knew that Company T's board of directors did know the true value of the firm.

There was no further contact between the two firms since the meeting described above. Two days later, the agent from Company T sent the following message to Company A's agent:

> We have just learned that the true value of the firm if we maintain management of the firm is $80/share. As a result, we will accept a price of $85/share if you choose to make such an offer. Do not come back to us with any other proposal. This is our final position.

In summary, the message from the seller's agent to the buyer's agent said that the company was worth $80/share to Company T, the company was indeed worth $80/share ($20/share) to Company T, and the seller's agent knew that as well. [the company was actually worth $20/share ($80/share) to Company T, but the seller's agent believed that the company was worth $80/share ($20/share) to Company T.] The message came complete with a legally binding contract at the price of $85/share, signed by the agent for Company T. Company A believed that this was a real "take-it-or-leave-it" proposal, and they had no other means to reach agreement other than to accept this offer.

APPENDIX B

AS AN OUTSIDE OBSERVER, YOU WILL BE PROVIDED WITH INFORMATION THAT IS NOT AVAILABLE TO THE AGENT FOR COMPANY A. THIS PRIVILEGED INFORMATION APPEARS IN BOLD ITALICS BELOW.

Company A (the acquirer) is considering acquiring Company T (the target). Company T would be happy to be acquired by Company A, *provided it is at a profitable price.* The main complication is that the value of Company T depends directly on the outcome of a major oil exploration project. If the project failed completely, the company under Company T management would be worth nothing—$0/share. But if the project succeeded completely, the value of the company under current management would be worth $100/share. Prior to the exploration, all share values between $0 and $100 were

considered by all parties to be equally likely. By all estimates, the company is worth considerably more in the hands of Company A than under current management. In fact, whatever the ultimate value under current management, *the company is worth fifty percent (50%) more under the management of Company A than under Company T.* If the project failed completely, the company is worth \$0/share under either management. If the exploration project generates a \$50/share value under current management, the value under Company A is \$75/share. Similarly, a \$100/share value under Company T implies a \$150/share value under Company A and so on.

A negotiation began between the two parties. Both parties sent agents to represent them in the negotiation, giving the agents full power to complete an agreement. A variety of issues were discussed. The meeting broke up with the agent from Company T saying that Company T would get back to Company A regarding their interest in being acquired.

The next day, the oil exploration was completed. The results of the project were *only available* to the board of directors of Company T. Company A's board of directors did not know the true value of the firm, but knew that Company T's board of directors did know the true value of the firm.

The board of directors of Company T learned from the exploration that the true value of the firm was \$20/share (\$80/share) and they sent this information to their agent. [However, an error was made in the message to the agent, and the agent actually believed that the firm was worth \$80/share (\$20/share).]

There was no further contact between the two firms since the meeting described above. Two days later, the agent from Company T sent the following letter to Company A's agent:

> Dear Agent for Company A:
> We have just learned that the true value of Company T if we maintain management of the firm is \$80/share. As a result, we will accept a price of \$85/share if you choose to make such an offer. (I have enclosed a contract at the price of \$85/share signed by me.) Do not come back to us with any other proposal. This is our final position.
> Sincerely,
> Agent for Company T

In summary, the message from the seller's agent to the buyer's agent said that the company was worth \$80/share (\$20/share) to Company T, the company was indeed worth \$80/share (\$20/share) to Company T, and the seller's agent knew that as well [the company was actually worth \$20/share (\$80/share) to Company T, but the seller's agent believed that the company was worth \$80/share (\$20/share) to Company T]. The letter (shown above) came complete with a legally binding contract at the price of \$85/share, signed by the agent for Company T. Company A believed that this was truly a "take-it-or-leave-it" proposal, and they had no other means to reach agreement other than to accept this offer.

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