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From the time we are children, we are taught to say "thank you" and "I'm sorry." These communications are central to many social interactions, and the failure to say them often leads to conflict in relationships. Research has documented that, alongside the impact they can have on relationships, apologies and thanks can also impact material outcomes as small as restaurant tips and as significant as settlements of medical malpractice lawsuits. But, it is trivial to utter the words; how can such "cheap talk" carry so much value? In this article, we propose a "responsibility exchange theory" that explains why these communications are not costless, and which draws connections between four forms of communication that have not previously been connected: thanking, apologizing, bragging, and blaming. All four of these communications relay information about credit or blame, and thus introduce image-based costs and benefits for both the communicator and the recipient of communication: Each of the four communications involves a tradeoff between appearing competent and appearing warm. By formalizing these social psychological insights with a utility-based approach to modeling communication, and by applying game theoretic analysis, we offer new insights about social communication. We test several of the model's novel predictions about strategic communication in two experiments: The first involves hypothetical choices in a scenario study, and the second involves real choices in a live interaction. We end with a discussion of the theory's place in the literature and consider extended predictions and applications as examples of future directions for research.

Keywords: credit and blame, responsibility attribution, interpersonal communication, warmth and competence, impression management

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Imagine that you just purchased a coffee to-go from your neighborhood coffee shop. As you walk out the door, another customer accidentally elbows your coffee to the floor. Though clearly recognizing what she has done, the culprit simply continues walking toward the cashier to place her order. Why is the absence of an apology in this situation so upsetting? Now, think of the last time you let a driver squeeze in front of you in dense traffic. How did you feel if he failed to signal "thank you" with the obligatory hand-wave? In the absence of material consequences, and often in situations in which we will never see the other party again, why do we care so much about these communications, and about their absence?

Understanding the value people place on these simple communications can help to explain why their occurrence, as well as absence, can not only elicit emotional responses in situations like the examples above, but also have more profound consequences. Thanking is not only helpful in enhancing relationships (Algoe & Zhaoyang, 2016; Lambert, Clark, Durtschi, Fincham, & Graham, 2010; Lambert & Fincham, 2011) but can promote socially and economically valuable behaviors like tipping (Rind & Bordia, 1995), volunteering (Bennett, Ross, & Sunderland, 1996; Grant & Gino, 2010), voting (Panagopoulos, 2011), helping behavior (R. D. Clark, 1975; Deutsch & Lamberti, 1986; Goldman, Seever, & Seever, 1982; Moss & Page, 1972), self-sacrificing protection of strangers (McGovern, Ditzian, & Taylor, 1975), and a variety of other positive actions (e.g., Carey, Clicque, Leighton, & Milton, 1976; H. B. Clark, Northrop, & Barkshire, 1988; Maheux, Legault, & Lambert, 1989).

Apologies, likewise, are central to conflict resolution, resulting in greater forgiveness (Darby & Schlenker, 1982; Fehr, Gelfand, & Nag, 2010; Girard, Mullet, & Callahan, 2002; McCullough et al.,

1998; McCullough, Worthington, & Rachal, 1997), particularly among friends (e.g., Hodgins & Liebeskind, 2003) and family (e.g., Maio, Thomas, Fincham, & Carnelley, 2008), which can lead to downstream benefits for physical health such as reduced blood pressure (Hannon, Finkel, Kumashiro, & Rusbult, 2012). Beyond securing forgiveness, apologies can also reduce the wronged party's desire to punish (Darby & Schlenker, 1982; Ohbuchi, Kameda, & Agarie, 1989; Pinker, 2011) and enhance perceived trustworthiness (Kim, Dirks, Cooper, & Ferrin, 2006; Kim, Ferrin, Cooper, & Dirks, 2004). Apologies have been shown to be more effective than moderate cash payments in convincing customers to reverse negative reviews (Abeler, Calaki, Andree, & Basek, 2010), and, when states introduce regulations that encourage physicians to apologize to patients in malpractice lawsuits, the effect is not only reduced settlement times but also reduced settlement amounts (Ho & Liu, 2011).

How can such "costless" communication have so much power? According to standard game theory and signaling theory, because thanks and apologies are materially costless to convey, and because there is usually a conflict of interest between the speaker and target (e.g., physician and patient in the case of medical malpractice, or waiter and customer in the case of tipping), these communications should be considered "cheap talk" (Crawford & Sobel, 1982; Grafen, 1990; Maynard-Smith & Harper, 2003; Spence, 1973; Zahavi, 1975; Zahavi & Zahavi, 1997): Without a tangible cost to sending these communications, they should be overused— that is, used by people who do not mean them—making them inconsequential and useless. Addressing this puzzle, we propose a responsibility exchange theory (RET), which explains why these communications are, in fact, not costless. The theory has two major components: (a) a definitional framework that draws connections between thanking and apologizing, and, as a natural extension, identifies two other related forms of communication— bragging, and blaming—and (b) a utility model capturing the underlying value (benefits and costs) of these communications. The theory provides an explanation for why these communications, and their absence, can be so emotionally fraught; it can explain why thanking and apologizing are considered "polite" whereas bragging and blaming are considered "rude;" and, both on its own and in combination with other theories, it generates a wide range of implications—for emotional responses to situations, attributions of character, and ongoing relationships.

The definitional framework identifies the situations in which thanking and apologizing primarily apply. Although multiple parties could potentially be involved, we focus on situations in which there are two people (or groups, countries, etc.), one of whom, the "Originator," has taken an action that imposed a cost on, or provided a benefit to, the other, the "Receiver." Thanking and apologizing then serve to give credit and take blame, respectively. As illustrated by Figure 1, these communications are distinguished by whether the outcome is positive or negative (always for the Receiver) and whether the communication comes from the Originator or the Receiver: Thanking is a communication from the Receiver giving the Originator credit for a positive outcome; apologizing a communication from the Originator taking blame for a negative outcome. But, as can be seen in the figure, this classification identifies two additional forms of communication that can occur in these situations: "bragging," in which the Originator takes credit for a positive outcome, and "blaming," in which the Re-

Speaker
(action)

Valence of the outcome (attribution)	*Originator* (taking)	*Receiver* (giving)
Positive (credit)	Bragging	Thanking
Negative (blame)	Apologizing	Blaming

Figure 1. Definitional framework.

ceiver assigns blame to the Originator for a negative outcome. We use the labels *thanking*, *apologizing*, *bragging*, and *blaming* to distill the essence of these four general classes of communication. Although these words may have additional associations and connotations when used in conversation, here we use them to refer to their most basic functions: the conferral or appropriation of credit or blame. As a result, these terms can classify communications as thanking and apologizing even if they do not make use of the phrases "thank you" or "sorry," as long as they involve giving credit or taking blame, respectively—for example, "that was sweet of you to bring me coffee."

The second component of the theory is a utility model we use to make game-theoretic predictions about when and how people choose to use these communications. The model has three basic building blocks. The first two are inspired by the idea from the literature on attributions that observers make inferences, albeit potentially mistaken, about a person's character based on their observed behavior (Gilbert & Malone, 1995; Heider & Simmel, 1944; Jones & Davis, 1965; Ross, 1977). First, because all four communications affect attributions of responsibility, they also affect perceived competence. People are perceived as more competent when they are judged to be responsible for a positive outcome, and as less competent when the outcome is negative. People care about these communications, in part, because they affect attributions of competence, a valued trait.

The second building block concerns warmth. Again, because people care about appearing competent, communications that bolster another person's perceived competence at the expense of one's own perceived competence (i.e., thanking for a positive outcome or apologizing for a negative one) are seen as generous and polite, and hence promote the view that the communicator is warm. The opposite is true of blaming and bragging, which bolster one's own competence at the expense of the other and thus are considered rude. Because people care both about appearing competent and about appearing warm (Fiske, Cuddy, & Glick, 2007), and because each of the four forms of communication has opposite effects on these two critical dimensions of person perception, all four confront potential communicators with a tradeoff between appearing competent and warm.

The third building block is that people feel and behave as if their interactions with others are being observed by an uninformed party, even when there is no observer (i.e., the "virtual spectator"). This concept serves a specific function with respect to our model, but the idea is not new. The virtual spectator idea is consistent with multiple, existing interpretations of why people act as if someone

is watching when no one actually is, such as self-signaling (Bénabou & Tirole, 2002; Bodner & Prelec, 2003), imagined audiences (e.g., Baldwin & Holmes, 1987), and self-deception (Baumeister, 1993; Gur & Sackeim, 1979). However, we use this term for two reasons: First, the formal model is based on caring about the opinion of spectators, and the virtual spectator is a simple way of thinking about how to map the formal model from situations when there are real observers to those in which there are not real observers. Second, the virtual spectator concept also helps make clear a central part of our theory: For responsibility communication (and its absence) to have value, it must inform someone, even if that someone is invisible. Even if the goal of a thank-you is to assuage a favor-doer, when both parties know what has happened, it cannot work without the cost of informing an uninformed party. When, as in the opening example, the driver you allowed to cut in front of you fails to wave thanks, it is as if there is an observer who, as a result of the omission, fails to recognize your generous act. Likewise, when the stranger who knocked over your coffee fails to apologize, it is as if there is a spectator who believes that you were responsible for the spill and who, in the absence of communication, is likely to conclude that you are clumsy. Communication may serve to cure the virtual spectator of their ignorance: In the example of the spilled coffee, when you utter a sarcastic "I'm sorry" to replace the apology that the Originator failed to deliver, it is as if you are telling someone (perhaps, yourself): "What a clumsy jerk! I am blameless."

In sum, the theory describes (and is named after) a "responsibility exchange." The ability to shift the assignment of responsibility from one person to another is, according to the theory, what gives communication about credit and blame an image-based value. All four of these communications involve a tradeoff for the speaker between perceived competence and perceived warmth, constituting an exchange of a valued commodity—social image—between individuals. These communications also affect the recipient of communication, as will be detailed later. Thus, image-based effects accrue to both parties, and the theory helps to explain not only why people care so much about receiving thanks and apologies, but also why people are often reluctant to thank or apologize.

The implications of these insights reach beyond personal relationships. The theory can explain and/or offer an alternative account for a wide range of findings, including why thanking can act as a behavioral reinforcer (e.g., Grant & Gino, 2010; Panagopoulos, 2011; Rind & Bordia, 1995), why bragging is more acceptable in some cultures than others (Kurman, 2001), why women apologize more than men (Schumann & Ross, 2010), why not receiving an apology can lower a victim's self-esteem (Luchies, Finkel, McNulty, & Kumashiro, 2010), why an effective way to gain status is to do favors for others, but not accept favors from others (Flynn, Reagans, Amanatullah, & Ames, 2006), why apologizing can reduce aggression and the desire to punish (e.g., Darby & Schlenker, 1982; Ho & Liu, 2011; Ohbuchi et al., 1989), and why effective leadership can involve giving away credit but only if the leader's competence is not under question (Owens & Hekman, 2012). Furthermore, only a subset of the theory's predictions are tested in this article. In the general discussion, we explain that the theory can be combined with other theories, such as the attributional theory of emotions (Weiner, 1985) and the affect theory of social exchange (Lawler, 2001), to generate novel predictions

about patterns of emotions and behavior that have not been tested, but could be in future research.

RET builds on several streams of previous research, including empirical work on these communications in both psychology and economics (e.g., Abeler et al., 2010; Algoe & Zhaoyang, 2016; Darby & Schlenker, 1982; Deutsch & Lamberti, 1986; Grant & Gino, 2010; Ho, 2012; Ho & Liu, 2011; Hodgins & Liebeskind, 2003; Kim et al., 2004, 2006; McGovern et al., 1975; Schlenker & Darby, 1981; Weiner, Graham, Peter, & Zmuidinas, 1991; Williams & Bartlett, 2015); empirical and theoretical work on person perception, self-presentation, and personal relationships in social psychology (e.g., Baumeister, 1982; P. Brown & Levinson, 1987; Fiske, Cuddy, Glick, & Xu, 2002; Fiske, Xu, Cuddy, & Glick, 1999; Goffman, 1959, 1967; Leary & Allen, 2011; Schlenker & Weigold, 1992); theoretical work on signaling from evolutionary biology (e.g., Grafen, 1990; Maynard-Smith & Harper, 2003; Zahavi, 1975; Zahavi & Zahavi, 1997); and empirical and theoretical work on language and communication in cognitive psychology (e.g., Goodman & Frank, 2016; Goodman & Stuhlmüller, 2013; Grice, 1975; Pinker, 2011; Pinker, Nowak, & Lee, 2008; van Rooij, 2003; Yoon, Tessler, Goodman, & Frank, 2016). We bring these various streams of research together in a novel way to produce new insights. No previous work, to the best of our knowledge, has provided an overarching theory to link or systematically describe the value of these four forms of communication in dyadic interactions.

Evidence Supporting the Tradeoff

Much evidence points to the ability of thanking and apologizing to enhance the perception of warmth-relevant traits. People who thank are more likely to feel grateful, and grateful people are more likely to reciprocate, are more prosocial (or concerned about others), and are better relationship partners (Algoe, Fredrickson, & Gable, 2013; Algoe, Gable, & Maisel, 2010; Algoe, Haidt, & Gable, 2008; Algoe, Kurtz, & Hilaire, 2016; Algoe & Haidt, 2009; Algoe & Zhaoyang, 2016; Bartlett, Condon, Cruz, Baumann, & Desteno, 2012; Bartlett & DeSteno, 2006; DeSteno, Bartlett, Baumann, Williams, & Dickens, 2010; Lambert et al., 2010; Lambert & Fincham, 2011; Williams & Bartlett, 2015). Similarly, people who apologize are often seen as more trustworthy and, like thankers, better relationship partners (Darby & Schlenker, 1982; Hannon, Rusbult, Finkel, & Kamashiro, 2010; Ho, 2012; Hodgins & Liebeskind, 2003; Kim et al., 2004, 2006; Maio et al., 2008; McCullough et al., 1997; Weiner et al., 1991). There is also reason to think that apologizers feel more guilty (Baumeister, Stillwell, & Heatherton, 1995; Behrendt & Ben-Ari, 2012; McGarty et al., 2005), and for that reason, people who admit to wrong-doing may be perceived as more empathetic, more cooperative, more prosocial, more honest, and less unethical (Behrendt & Ben-Ari, 2012; Cohen, 2010; Cohen, Panter, & Turan, 2012; Cohen, Panter, Turan, Morse, & Kim, 2013, 2014; Covert, Tangney, Maddux, & Heleno, 2003; Leith & Baumeister, 1998; Lin, Schaumberg, & Reich, 2016; Martinez, Stuewig, & Tangney, 2014; Stuewig, Tangney, Heigel, Harty, & McCloskey, 2010; Tangney, Wagner, Hill-Barlow, Marschall, & Gramzow, 1996).

RET proposes that the reason that thanking and apologizing are effective in eliciting these attributions of likability, generosity, and prosociality is that they involve giving up something valuable:

being perceived as competent. Evidence of this cost has been documented more directly for apologizing, and more indirectly for thanking. Transgressors who apologize in situations in which competence is relevant suffer a negative impact on their perceived competence (e.g., Kim et al., 2006; Weiner et al., 1991), and speakers are aware of this: How difficult it is for a speaker to give an apology is positively related to how satisfying it is for the hearer to receive (Holtgraves, 1989). Physicians are reluctant to give apologies, even though they are desired by patients (Gallagher, Waterman, Ebers, Fraser, & Levinson, 2003) and could mean lower settlement amounts in malpractice cases (Ho & Liu, 2011). To the extent that thanking and apologizing are considered polite speech, research has found that the use of polite communication reflects negatively on the speaker's perceived dominance, power, and assertiveness (Holtgraves, 1997; Holtgraves & Joong-nam, 1990). There is little research examining the negative impacts of thanking on character evaluations—perhaps because no previous theories have proposed that there are reputational costs to thanking—but if thanking can be considered a response to receiving help, then the literature on helping behavior suggests that it may feel difficult to thank in the same situations in which it feels aversive to receive help: Receiving help can lower the recipient's self-esteem and self-confidence (Fisher & Nadler, 1974) and can cause recipients to dislike the helper in certain situations (Broll, Gross, & Piliavin, 1974). People like the helper more when they can reciprocate (Gross & Latane, 1974). Researchers have attributed these findings, at least in part, to the threat that being helped poses to a person's feelings of adequacy and competence. A natural corollary is that admitting to being helped (thanking) could also negatively impact such self-attributions and lead others to make the same attributions. Consistent with this, some recent work suggests that thanking can backfire in competitive negotiations, leading the other party to perceive an opportunity to take advantage of the thanker (Yip, Lee, Chan, & Brooks, 2017).

In the framework presented in Figure 1, we identify two related communications, bragging and blaming, and suggest that, because they shift credit and blame in the opposite directions as thanking and apologizing, they also impact perceived warmth and competence in the opposite directions. Consistent with this perspective, there is considerable evidence that bragging and blaming do enhance perceived competence. Claiming credit for accomplishments makes credit-claimers appear more successful and intelligent (L. C. Miller, Cooke, Tsang, & Morgan, 1992; Vonk, 1999) and increases perceived task aptitude and "hireability" (Rudman, 1998; Stevens & Kristof, 1995). Because of this, people often engage in the strategy of claiming credit (i.e., self-promotion) over other strategies when they aim to project an image of competence (Muller & Butera, 2004; Stevens & Kristof, 1995), although there is evidence that they may be miscalibrated about others' reactions to such strategies (Scopelliti, Loewenstein, & Vosgerau, 2015). Similarly, avoiding blame by providing excuses, or by blaming external circumstances, can help preserve the appearance of competence (Crant & Bateman, 1993) and integrity (Kim et al., 2004, 2006), and can even make a person seem less deserving of punishment (Wood & Mitchell, 1981).

There is also evidence for the opposite side of the tradeoff: Research has documented a negative impact of bragging and blaming on perceived warmth. Though most research on bragging does not involve a victim from whom the credit is taken away,

observers tend to see braggarts as less likable, less social sensitive, and less socially attractive (L. C. Miller et al., 1992; Scopelliti et al., 2015; Vonk, 1999), and it seems logical that negative character attributions would be even worse in cases in which the benefit to self comes at another's expense. Similarly, blaming makes a person seem less likable, modest, and appealing to work with (Forsyth, Berger, & Mitchell, 1981; Forsyth & Mitchell, 1979; F. Lee & Robinson, 2000; Tetlock, 1980). People are to some extent aware of these costs, and, as a result, are often reluctant to brag (e.g., Baumeister & Jones, 1978; Muller & Butera, 2004) or blame (e.g., F. Lee & Robinson, 2000). It is likely because of these costs that we have observed the evolution of something called the "humblebrag," by which a person tries, but usually fails, to avoid the costs of bragging by combining it with either a complaint or expression of humility (Sezer, Gino, & Norton, 2018).

So far, we have assumed that thanking and apologizing make the communicator seem warm because both communications give up something of value, and that the converse is true of bragging and blaming. Though these straightforward attributions are sufficient for generating the general pattern of costs and benefits we propose and describe above, there is a more sophisticated possible perspective that draws from the literature on signaling in both economics and evolutionary biology (Crawford & Sobel, 1982; Grafen, 1990; Maynard-Smith & Harper, 2003; Spence, 1973; Zahavi, 1975; Zahavi & Zahavi, 1997). This more sophisticated account offered by signaling theory involves the signaling of "types." According to Zahavi (1975), for signals to be valuable and useful to the listener or observer, the signal must be less costly for those who actually possess the trait being signaled. For instance, a boxer can signal his superior fighting skill by agreeing to and winning a match in which he ties one arm behind his back, a signal that would be ill-advised for a less skilled boxer. It is clear to see that such a framework could easily map on to our theory: Thanking and apologizing could be signals that a person is a "generous type" for whom these types of communications are relatively natural and low in cost. By the same token, bragging and blaming might signal that the communicator is a "selfish type" for whom not receiving credit for a positive outcome, or being unfairly blamed for a negative outcome, are especially costly. Though we do not discuss this more complex conception of communication as a tool to differentiate "types" of people nor provide the associated formalization in the model presented in the following section of the article, all of the results we discuss are also consistent with this more nuanced approach.

Responsibility Exchange Theory: A Model

In this section, we propose a formal theory to capture the value of thanking, apologizing, bragging, and blaming. Formalizing the theory in a utility model allows us to, in a later section, apply game-theoretic analysis and, as a result, derive novel predictions about when and how people choose to use these communications, which we test in the empirical section.

The speaker's image tradeoff is the crux of the model, and the specific form of the model also incorporates impacts on the target of communication—that is, the other person in the dyad. The primary image that matters is that formed in the eyes of a spectator, an observer not involved in the interaction; this person can be real or virtual.

Setup

To introduce the formal model, we describe a workplace scenario in which Roger (starting with "R" for Receiver) has an important report due on the following day and Olivia (starting with "O" for Originator) proposes a radical revision, which Roger adopts. The next day, Roger hands the report to Roger's and Olivia's supervisor (the "Spectator" in this scenario), who reads it quickly and, in the presence of both parties, praises or criticizes it. Both Roger and Olivia now have the opportunity to communicate. Though this is a specific example, the theory applies to any situation with the same general structure, as depicted in Figure 2 and elaborated on in the next section. In this example, time $t = -1$ is the moment when Olivia does Roger the favor; time $t = 0$ is when the supervisor reads and publicly evaluates the report, and time $t = 1$ is when the communication, if any, occurs. This example will be used in the discussion of the predictions.

Communicating Information About Responsibility for the Outcome

In this example, the role of communication is to provide information that influences the Spectator's beliefs about what happened. We represent that information with the variable α. Let $\alpha^a \in [0, 1]$ (superscript "a" stands for "actual") represent the extent to which the Originator is actually responsible for the changes to the Receiver's outcome, which was either good or bad. A value of 0 means the Originator was not responsible, and a value of 1 means that the Originator was fully responsible. This implies that the responsibility in this context is zero-sum between the two individuals.

Let $\alpha_0 \in [0, 1]$ represent the Spectator's prior on α^a at $t = 0$, the extent to which, after observing the outcome but before any communication occurs, the Spectator believes that the Originator is responsible. In the specific case we examine, we assume that, without any other information, the Spectator would give the Receiver full credit for the outcome ($\alpha_0 = 0$). At time $t = 1$, however, either the Originator or the Receiver has the opportunity to communicate about the Originator's involvement: The Originator could brag about her own role in creating the outcome (if the outcome is positive) or apologize (if it is negative). The Receiver could publicly thank the Originator for her help (if the outcome is positive) or blame the Originator (if it is negative).

We further assume that communication is veridical and known to be (though we discuss implications of relaxing this assumption in the next section). We make this assumption because, although people can and do lie, they often tell the truth (Arkin, Appelman, & Burger, 1980; Bradley, 1978; Jones & Sigall, 1971; Quigley-Fernandez & Tedeschi, 1978; Ross, Bierbrauer, & Polly, 1974; Schlenker, 1975), and listeners generally accept others' self-enhancing claims at face value (e.g., Crant & Bateman, 1993; Heck & Krueger, 2016; Kim et al., 2004, 2006; L. C. Miller et al., 1992; Rudman, 1998; Stevens & Kristof, 1995; Vonk, 1999; Wood & Mitchell, 1981). Furthermore, that people are honest in their communication is assumed by several key theories in the field of self-presentation (e.g., Baumeister, 1982; Goffman, 1959; Leary & Kowalski, 1990).

Each of the four communications above would lead the Spectator to, at $t = 1$, shift credit for the outcome from the Receiver to the Originator. At time $t = 1$, the Spectator can learn that the Originator was the one responsible ($\alpha_1 = 1$) in one of three ways: If the Originator claims responsibility ($c^O = 1$, bragging or apol-
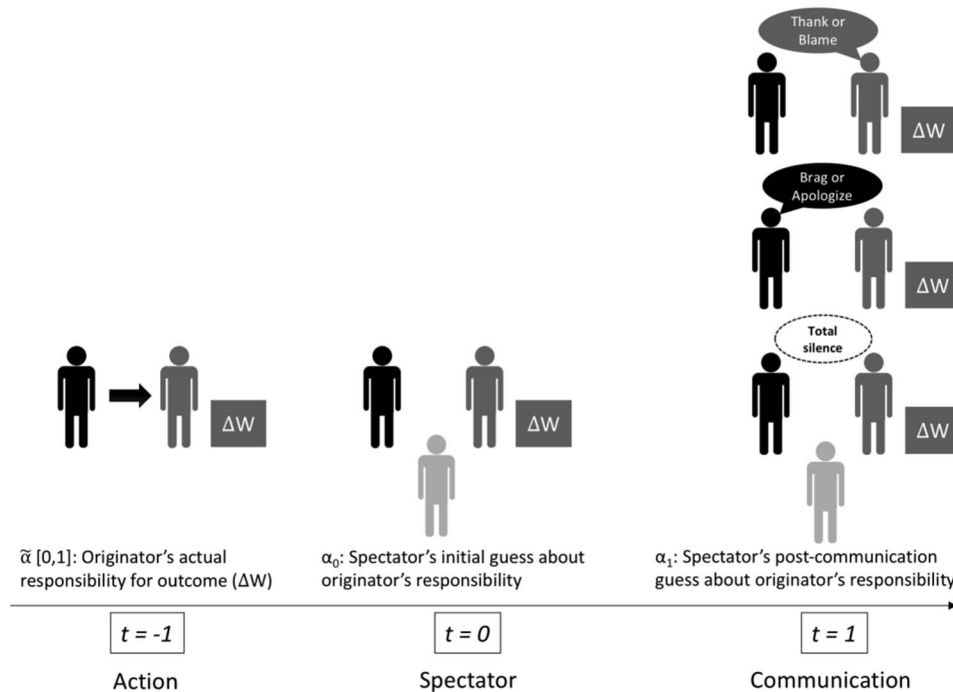

Figure 2. Timeline of the model.

ogizing), if the Receiver gives her credit or blame ($c^R = 1$, thanking or blaming), or if someone/something outside the dyad (like a coworker) credibly reveals that the Originator was responsible ($z = 1$). Otherwise, if no one says anything, the Spectator will continue to believe that the Receiver is entirely responsible for the outcome ($\alpha_1 = 0$). This effect of communication on the Spectator's knowledge is captured by the equation below.

$$\alpha_1(c^O, c^R, z) = \begin{cases} \alpha_0, & for \ c^O = c^R = z = 0 \\ \alpha^a, & if \ \max(c^O, c^R, z) = 1 \end{cases} \quad (1)$$

The Utility Impact of Communication via Changes to Perceived Competence and Warmth

We assume that the Originator and Receiver maximize the utility $U(W, I)$, which is a function of both material outcomes (designated W for "wealth," though it should be assumed to include other types of tangible resources) and what others think of them (designated I for "image"). We designate outcomes to the Originator or the Receiver with superscripts: The terms ΔW^O and ΔW^R represent changes to the Originator's and the Receiver's material outcomes, respectively, between the first two time periods, $t = -1$ and $t = 0$, and the terms ΔI^O and ΔI^R are the changes in the Originator's and the Receiver's image utilities between the latter two time periods, $t = 0$ and $t = 1$, which could be influenced by communication (or a lack thereof) at $t = 1$. The change in image utility, ΔI, is the focus of the model.

Although we do not model it explicitly here, it is natural to assume, and could easily be incorporated into the model, that the weight on I relative to W would increase if the Spectator was an actual person, rather than a virtual spectator, and increase further as a function of how many Spectators there are, and their importance to the parties involved.

As discussed, we assume that the value of communication stems from the impact it has on perceived competence and perceived warmth. Let Ω represent the change in image value a person experiences from being perceived as more or less competent in a particular domain at $t = 1$ compared to $t = 0$, and λ represent the change in image value from being perceived as more or less warm at $t = 1$ compared to $t = 0$:

$$\Delta I = \Omega + \gamma\lambda. \quad (2)$$

Note that, because the model entirely focuses on changes in image value, we have left the Δ symbol off on terms that represent functions—that is, Ω and λ, as well as Λ, which is described later in the article—to streamline the mathematical representation of these throughout the article. We choose an additive functional form here as a simple way of capturing the tradeoff these communications cause for the speaker in terms of perceptions of these two traits. The term γ is the weight on warmth, which can vary across person and situation.

Responsibility information affects perceived competence of both agents. Changes in the perceived competence of each party depends on what happened (ΔW^R) and the change in the Spectator's beliefs about who was responsible ($\Delta\alpha = \alpha_1 - \alpha_0$): $\Omega(\Delta W^R, \Delta\alpha)$. The function Ω maintains the sign of ΔW^R and is monotonically increasing in ΔW^R. If no communication happens, then perceived competence does not change and $\Omega = 0$ because the Spectator's knowledge does not change ($\Delta\alpha = 0$).

Because we treat the amount of responsibility as zero-sum, any change in perceived responsibility from $t = 0$ to $t = 1$ ($\Delta\alpha \neq 0$) for a nonzero outcome ($\Delta W^R \neq 0$) results in a change to perceived competence ($\Omega \neq 0$) for both the Originator and Receiver, regardless of who communicated. In the example, if the supervisor praised the report, thinking initially that it was all Roger's work, and then either Olivia bragged or Roger thanked her, Olivia would look more competent ($\Omega > 0$) after communication compared to before, whereas Roger would look less competent ($\Omega < 0$). The zero-sum nature of responsibility also means that the changes in perceived competence for the Originator and the Receiver are always in opposite directions.

Although we have so far defined competence narrowly, as traits like intelligence, skill, ability, and so forth, in some situations, the credit or blame may signal something about a person's warmth, generosity, and likability. For instance, holding the door open for someone is more likely to make you seem considerate and friendly than it is to make you seem physically strong and capable. When people brag about giving to charity, it can help them appear more generous, rather than skilled (Berman, Levine, Barasch, & Small, 2015). Similarly, avoiding blame in situations in which your perceived warmth or considerateness is at stake can be better than apologizing at preserving perceived trustworthiness, that is, a warmth-relevant trait (Kim et al., 2006). However, in these situations, it is only the specific dimensions of the tradeoff that change, not the presence of the tradeoff. To illustrate, consider a situation in which a brother and sister collaborate on throwing their mother a surprise 60th birthday party. If the sister brags that throwing the party was her idea, she reveals how thoughtful and caring she is on one hand, but at the same time, taking credit away from her brother can make her look petty and selfish. Thus, there is a tradeoff, and which effect is larger depends on elements of the context, like how responsible the mother already believes the sister is for the party idea (e.g., Berman et al., 2015). For the sake of simplicity, we focus our model, predictions, and tests on situations in which the communications pit warmth and competence against each other.

Communication affects perceived warmth of both agents. An important part of impression management is how one's actions affect the "face" of others (P. Brown & Levinson, 1987; Goffman, 1959; Holtgraves, 1997; Juanchich & Sirota, 2013; Juanchich, Sirota, & Butler, 2012; Sirota & Juanchich, 2012, 2015). Because credit for outcomes is valued, communications that give the other party credit for a good outcome, or that take the blame for a bad outcome, are perceived as generous, and the communicator as warm. Thus, in contrast to perceived competence, perceived warmth depends on how the responsibility information is relayed to the Spectator. In the example, if Olivia bragged about her edits to the report, both her and Roger's perceived competence would be affected in the same way as under thanking, but the changes to their perceived warmth would be different: Both Olivia and Roger's perceived warmth would decrease under bragging—Olivia's because she took credit, which is a selfish act, and Roger's because he failed to give Olivia credit—while it would increase under thanking—Olivia's because she could have but did not brag, and Roger's because he gave Olivia credit.

To capture these insights, we assume that the change in the Spectator's perception of each party's warmth depends on how perceived competence has changed, Ω, and on who communicated: $\lambda = (-1)^c \Lambda(\Omega)$. The value of the "warmth function," Λ, is

a monotonically increasing function of Ω, $(\Lambda'(\Omega) > 0)$ that maintains the sign of its argument, that is, $sgn(\Lambda) = sgn(\Omega)$, and passes through the origin, that is, $\Lambda(0) = 0$. This means that if communication increases a person's perceived competence ($\Omega > 0$), then $\Lambda > 0$, and the more competence is impacted by communication, the more warmth is also impacted by communication. (Note that Λ, which is a function of other terms like Ω and λ, represents a change but is not preceded by the Δ symbol to keep simple the mathematical expressions in which it is included.) This term is multiplied by $(-1)^c$ to capture the idea that the speaker ($c = 1$) experiences a tradeoff between perceived competence and perceived warmth, but the target ($c = 0$) does not. In contrast to the effect of communication on perceived competence, the effect on perceived warmth, λ, is in the same direction for the Originator and Receiver. That is, bragging and blaming make both people look less warm ($\lambda < 0$), whereas thanking and apologizing make both people look warmer ($\lambda > 0$). Table 1 below describes the directions in which each communication is expected to affect the utilities of the two individuals.

Audience, context, and individual differences. The term γ in the utility model allows for differences in the weight placed on warmth across people and situations. The impression a person tries to convey depends on the type of audience, the situation, the goals of the actor, and the values or self-identification of the actor. Who the audience is affects the type of image a person tries to project (Baldwin & Holmes, 1987; Baumeister, 1982; Borden, 1975; B. R. Brown, 1968; Leary & Allen, 2011; Reis & Gruzen, 1976). For instance, it might be more beneficial to project competence to a boss than to project it at a social gathering and around your friends, where warmth might be more important. Additional factors that moderate how people present themselves include explicitly or implicitly giving people different goals (to appear likable vs. appear competent; Godfrey, Jones, & Lord, 1986; Stevens & Kristof, 1995), and individual differences like self-consciousness, agreeableness, self-esteem, and even gender (Leary & Allen, 2011; Schlenker & Weigold, 1990; Schumann & Ross, 2010).

All of these elements are likely to affect whether a person cares more about projecting competence or warmth in a given situation. We refer to situations in which competence matters more as "competence favoring" and identify them as those in which the following condition is satisfied: $|\Omega^a| > |\gamma\Lambda(\Omega^a)|$, where $\Omega^a = \Omega(W^R; \Delta\alpha = \alpha^a - \alpha_0)$, representing the impact on perceived competence if the truth (α^a) were to be revealed. Essentially, if the

size of the effect on perceived competence (i.e., $|\Omega^a|$) is larger than that on perceived warmth (i.e., $|\gamma\Lambda(\Omega^a)|$), then communication is competence favoring, and the speaker gets positive image utility from bragging and blaming, but negative image utility from thanking and apologizing. Those situations in which warmth matters more are referred to as "warmth favoring" and satisfy the opposite condition: $|\Omega^a| < |\gamma\Lambda(\Omega^a)|$. In these cases, only thanking and apologizing give the speaker positive utility. Although some behaviors predicted by RET rely on whether a situation is competence- or warmth-favoring, other predictions are insensitive to this situational feature, and thus constitute more general claims.

The virtual spectator. An important puzzle to explain is why communication is performed or desired, even in cases when both people in the dyad seem fully informed about what has transpired and who is responsible. For instance, if the supervisor criticizes Roger's report, it might be understandable that Olivia does not want to apologize in front of the supervisor for fear of hurting her reputation in the supervisor's eyes. However, it would seem a glaring omission for her to not apologize to Roger in private later. This would be even clearer if Olivia had made changes to Roger's report without his permission. What gives apology the power to matter even in private, when both people already know that Olivia was responsible? Even if Olivia simply wants to repair relations with Roger, an effective apology must be costly to her. According to RET, that means the apology has to inform someone who does not already know that Olivia was responsible. This also means that Roger cannot be the Spectator in this scenario, because he is fully informed.

Enter the virtual spectator. This term simply describes the application of our model—in which the idea of a spectator is central—to cases when there are no real spectators. The result is that the model can explain why, in fully informed dyads, communication can still matter: People act as if an uninformed person is watching and can hear their communications. The logic for allowing this application of the model is based on the frequently observed and well-established phenomenon that people often act as if there is someone watching them, even when that is patently not the case.

Perhaps most often this phenomenon is interpreted as an intrapsychic phenomenon, that is, that the invisible observer is the self, as in theories of self-signaling (Bénabou & Tirole, 2002; Bodner & Prelec, 2003), imagined audiences (e.g., Baldwin & Holmes, 1987), and self-deception (Baumeister, 1993; Gur & Sackeim,

Table 1

Expected Effect of Communication on Changes in Perceived Competence and Perceived Warmth From Before to After Communication

Role	Trait (perceived)	Communication			
		Brag (Originator speaks)	Thank (Receiver speaks)	Apologize (Originator speaks)	Blame (Receiver speaks)
Originator	Competence	+	+	−	−
	Warmth	−	+	+	−
Receiver	Competence	−	−	+	+
	Warmth	−	+	+	−

Note. The dash indicates that hypothesized change is expected to be negative, whereas the plus sign indicates that hypothesized change is expected to be positive.

1979). As defined by Gur and Sackeim (1979), this conception requires that people both know and are ignorant of a piece of information at the same time. Indeed, there is some evidence that people can simultaneously know and be (or feign being) ignorant of information at the same time (Grossman & van der Weele, 2017; e.g., when they have taken an action that is likely to have negative consequences for someone else). Furthermore, people tend to selectively recall information that is consistent with how they view themselves, or their self-concept, even after being presented with information that is inconsistent with their self-concept (Swann & Read, 1981). There are also other possible interpretations of the virtual spectator. One is that because in many, if not most, situations, there are, in fact, spectators, people may simply not draw a sharp distinction between situations in which this is true and in which it is not. Another possible interpretation is that these forms of communication create a common knowledge situation in which one can be certain that both parties are on the same page about what happened.

The concept of the virtual spectator does not depend on any of these particular interpretations being correct. Instead, it is a specific, conceptual instantiation of an already well-established phenomenon that serves a technical and rhetorical role. It is an intuitive concept that makes clear how to map the model from situations in which there are real observers to situations in which there are no real observers, and it helps to clarify that it is not always enough for the other person in the dyad to serve as the Spectator.

Predictions of the Theory

In this section, we use the model to generate predictions that serve as the basis for the hypotheses we test in the empirical section. The utility model allows us to specify preferences over communications and to make predictions about how those preferences might vary with various features of the situation (e.g., whether the outcome is positive or negative; whether the situation is competence- or warmth-favoring). Building on that understanding of when and if people will be motivated to communicate, in the section on strategic communication games we apply game theoretic analysis to the dyadic scenario in which both people have the opportunity to speak. This results in predictions about which form of communication (or lack thereof) is expected to occur in a given situation. We test these predictions in a scenario study and a live chat study.

For the predictions, we narrow our focus to the common situation in which there is a nonzero amount of credit/blame to be exchanged ($\Delta W^R \neq 0$), in which being associated with this credit/blame has an impact on perceived competence (i.e., if $\Delta W^R \neq 0$, then $\Omega^a \neq 0$), and in which people care at least a little bit about appearing not only competent but also warm ($\gamma \neq 0$ and if $\Delta W^R \neq 0$, then $\Lambda(\Omega^a) \neq 0$).

Predictable Preferences Over Communications

The dynamics of the model illustrated in Table 1 show that each person should have clear preferences between the two communications that are possible in a specific situation—that is, between thanking and bragging, or between apologizing and blaming. After the supervisor praised Roger's report, if Olivia

and Roger each had to choose that the truth be revealed by either thanking or bragging, both would prefer that Roger thank than that Olivia brag. An analogous set of preferences exists for when the supervisor criticizes the report: Both Olivia and Roger would prefer apologizing to blaming. This is true regardless of whether competence or warmth is favored because this analysis depends only on the signs of the effects, and not their relative magnitudes.

Prediction 1: Preferences over communications. (a) For positive outcomes ($\Delta W^R > 0$), both the Originator and Receiver strictly prefer thanking over bragging ($\Delta I|_{c^R=1} > \Delta I|_{c^O=0}$), and (b) for negative outcomes ($\Delta W^R < 0$), both strictly prefer apologizing over blaming ($\Delta I|_{c^R=1} < \Delta I|_{c^O=0}$).

However, in most cases, total silence—when neither person communicates—is also a possibility, in which case there would be no change in either person's perceived competence or warmth. A person should only prefer total silence when communicating would result in net negative utility for her—this depends on whether competence or warmth is favored in the situation. Communications that boost perceived competence but hurt perceived warmth (bragging and blaming) would be preferred by the speaker to total silence only when competence is favored. Communications that boost perceived warmth but reduce perceived competence (thanking and apologizing) would be preferred by the speaker to total silence only when warmth is favored.

Prediction 2: Originator preferences regarding total silence. (a) For positive outcomes ($\Delta W^R > 0$), (i) the Originator prefers bragging to total silence ($\Delta I|_{c^O=1} > \Delta I|_{c^O=c^R=0}$) when competence is favored ($|\Omega^a| > |\gamma\Lambda(\Omega^a)|$), but (ii) vice versa ($\Delta I|_{c^O=1} < \Delta I|_{c^O=c^R=0}$) when warmth is favored ($|\Omega^a| < |\gamma\Lambda(\Omega^a)|$). (b) For negative outcomes ($\Delta W^R < 0$), (i) the Originator prefers total silence to apologizing ($\Delta I|_{c^O=1} < \Delta I|_{c^O=c^R=0}$) when competence is favored ($|\Omega^a| > |\gamma\Lambda(\Omega^a)|$), but (ii) vice versa ($\Delta I|_{c^O=1} > \Delta I|_{c^O=c^R=0}$) when warmth is favored ($|\Omega^a| < |\gamma\Lambda(\Omega^a)|$).

Prediction 3: Receiver preferences regarding total silence. (a) For positive outcomes ($\Delta W^R > 0$), (i) the Receiver prefers total silence to thanking ($\Delta I|_{c^R=1} < \Delta I|_{c^O=c^R=0}$) when competence is favored ($|\Omega^a| > |\gamma\Lambda(\Omega^a)|$), but (ii) vice versa ($\Delta I|_{c^R=1} > \Delta I|_{c^O=c^R=0}$) when warmth is favored ($|\Omega^a| < |\gamma\Lambda(\Omega^a)|$). (b) For negative outcomes ($\Delta W^R < 0$), (i) the Receiver prefers blaming to total silence ($\Delta I|_{c^R=1} > \Delta I|_{c^O=c^R=0}$) when competence is favored ($|\Omega^a| > |\gamma\Lambda(\Omega^a)|$), but (ii) vice versa ($\Delta I|_{c^R=1} < \Delta I|_{c^O=c^R=0}$) when warmth is favored ($|\Omega^a| < |\gamma\Lambda(\Omega^a)|$).

These predictions affect behavior and the choice to communicate and are key to the game theoretic analysis dealing with when and what people choose to communicate in different contexts.

Postcommunication Communication

The assumption that communications are both accurate and fully revealing of the Originator's responsibility means that, following communication, or lack thereof, the Spectator must be in one of two knowledge states: Either he maintains his initial belief, α_0, or, he learns the truth, α^a. If he already knows the truth, $\alpha_0 = \alpha^a$, then communication does not affect the Spectator's beliefs; it carries no new information ($\Delta\alpha = 0$). Because any one of the two communications in a given situation (e.g., thanking and bragging) can deliver full information, after one communication has occurred, the utility of further communication is zero.

Prediction 4. Postcommunication communication. If communication has already occurred ($c_{t-1} = 1$), then the Spectator is already aware of the truth about who is responsible ($\alpha_{t-1} = \alpha^a$), and neither the Originator nor the Receiver is motivated to communicate further ($I_t - I_{t-1}|_{c_t=1} = 0$).

The implication of this is that, after bragging and blaming, thanking and apologizing (respectively) are less likely to occur because there are no longer any benefits to communicating. Indeed, some evidence shows that when victims blame transgressors, transgressors are less likely to apologize and more likely to deny fault (McLaughun, Cody, & O'Hair, 1983). For the same reason, engaging in thanking and apologizing should be effective ways for preventing bragging and blaming, respectively. However, if the first communication does not deliver all of the relevant information about responsibility, then the other person still may get value out of communicating, as captured in the next section.

Superficial Thanks and Apologies

These communications produce less (or no) impact on utility when they do not relay information about responsibility, that is, the source of their value according to the theory. "I'm sorry you feel that way," or "I'm sorry that you got injured," are very different, according to our model, from "I'm sorry *I made* you feel that way," or "I'm sorry that *I injured* you." Supporting this prediction is research which finds that apologies are more effective at eliciting reconciliation from victims (Tomlinson, Dineen, & Lewicki, 2004) and securing trust from others (Kim et al., 2006) when the apologizer admits responsibility (internal attribution) as opposed to when the apologizer offers excuses or shifts responsibility away from herself. The model makes similar predictions, yet to be tested, for the other three communications. For instance, the model would predict that giving thanks is less meaningful when it does not transfer responsibility ("Thanks for being part of the team") as opposed to when it involves a true attribution of responsibility ("Thanks for doing the heavy-lifting!").

The phenomenon of superficial apologies is significant in part because it has implications for whether follow-up communication is still valuable. To accommodate superficial apologies in the model, we can relax the assumption in Equation 1 that all communication must deliver full information (i.e., that when c = 1, $\alpha_1 = \alpha^a$). Even if communication occurs in one time period ($t - 1$), if it does not deliver all of the information about responsibility ($\alpha_1 < \alpha^a$), then communication in the next period (t) can still confer image benefits (and costs) on the two individuals.

Prediction 5. Superficial communication. If some communication has already occurred ($c_{t-1} = 1$), but the Spectator still does not know the full truth about who is responsible ($\alpha_{t-1} < \alpha^a$), then agents who stand to gain positive utility from communicating about responsibility ($I_t^i - I_{t-1}^i|_{c_t=1} > 0$, where i = {O, R}) will be motivated to communicate in period t.

The implication of this prediction is that bragging is more likely after a fake thank-you and blaming is more likely after a superficial apology. However, whether the benefits of bragging or blaming outweigh the costs ($I_t^i - I_{t-1}^i|_{c_t=1} > 0$) depends on whether competence or warmth is favored. Patterns of communication depend on the preferences laid out in Predictions 2 and 3.

Critically, whether someone is willing to thank, apologize, brag, or blame is not just dependent on whether the communication bestows positive utility upon the speaker; it also depends on what the potential speaker believes the other person in the dyad plans to say (or not to say). In the next section, we address the interaction of these preferences with strategic considerations.

Strategic Communication Games

Given the earlier prediction that once responsibility is revealed further communication has little to no value, who speaks first is an important consideration. Whether or not the agents can coordinate on who speaks first is dependent upon each person's preferences. Communication thus resembles a sequential game in which, during each period, one of two people can reveal the truth about credit or blame. In the credit game (which applies to situations in which there is a positive outcome to be attributed), speaking for the Originator means taking credit themselves (bragging), while speaking for the Receiver means giving credit to the other person (thanking). In the blame game (which applies to situations in which there is a negative outcome to be attributed), the Originator can speak and take responsibility themselves (apologizing), while speaking for the Receiver would involve shifting blame onto the other person (blaming). Players take turns choosing between communicating ($c = 1$) and remaining silent ($c = 0$). The game ends after the first communication or, if no communication occurs, after some finite number of periods (P). As before, the Spectator assumes the Receiver is responsible unless otherwise informed.

The extensive forms of these games using the example of Olivia and Roger are illustrated in Figure 3 for two periods ($p = 2$) and Figure 4 for three periods ($p = 3$). In Figure 3, the credit game is displayed on the top panel, and the blame game on the bottom. Figure 4 only depicts the credit game. We provide some example payoffs by making simplifying assumptions that maintain the preferences described in Predictions 1–5: (a) Olivia and Roger have the same utility function, and, (b) start out at the same level of utility (U); (c) the functions Ω and Λ are simply identity functions such that $\Omega(x) = x$, and $\Lambda(x) = x$ for all real numbers x, and we let $\Delta W^R = 4$ in the credit game and $\Delta W^R = -4$ in the blame game. In this context, we can also indicate whether competence or warmth is favored by only referring to the value of γ: Competence is favored when $\gamma < 1$; warmth is favored when $\gamma > 1$; and neither is favored when $\gamma = 1$.

As a starting point, we consider a world of complete information and rationality, in which there is no uncertainty about the other player's preferences, and players act to maximize their utilities.

Communication equilibria for matched players. The equilibrium of a given game depends on the order of communication, the number of periods in a game (P), a player's trait favoritism, and a player's beliefs about trait favoritism for the other player. Players can be either matched on trait favoritism (e.g., both care more about competence) or mismatched on trait favoritism (e.g., one cares more about competence, the other cares more about warmth). In the simplified example presented in Figures 3 and 4, being matched means both people have the same γ, and being mismatched means each has a different γ. In solving for equilibria, we exclude the "no favoritism" conditions ($\gamma = 1$, in the figures) because they involve many instances of indifference, resulting in a large set of equilibria and little predictive power. The following results regarding equilibria can be intuitively understood by ap-
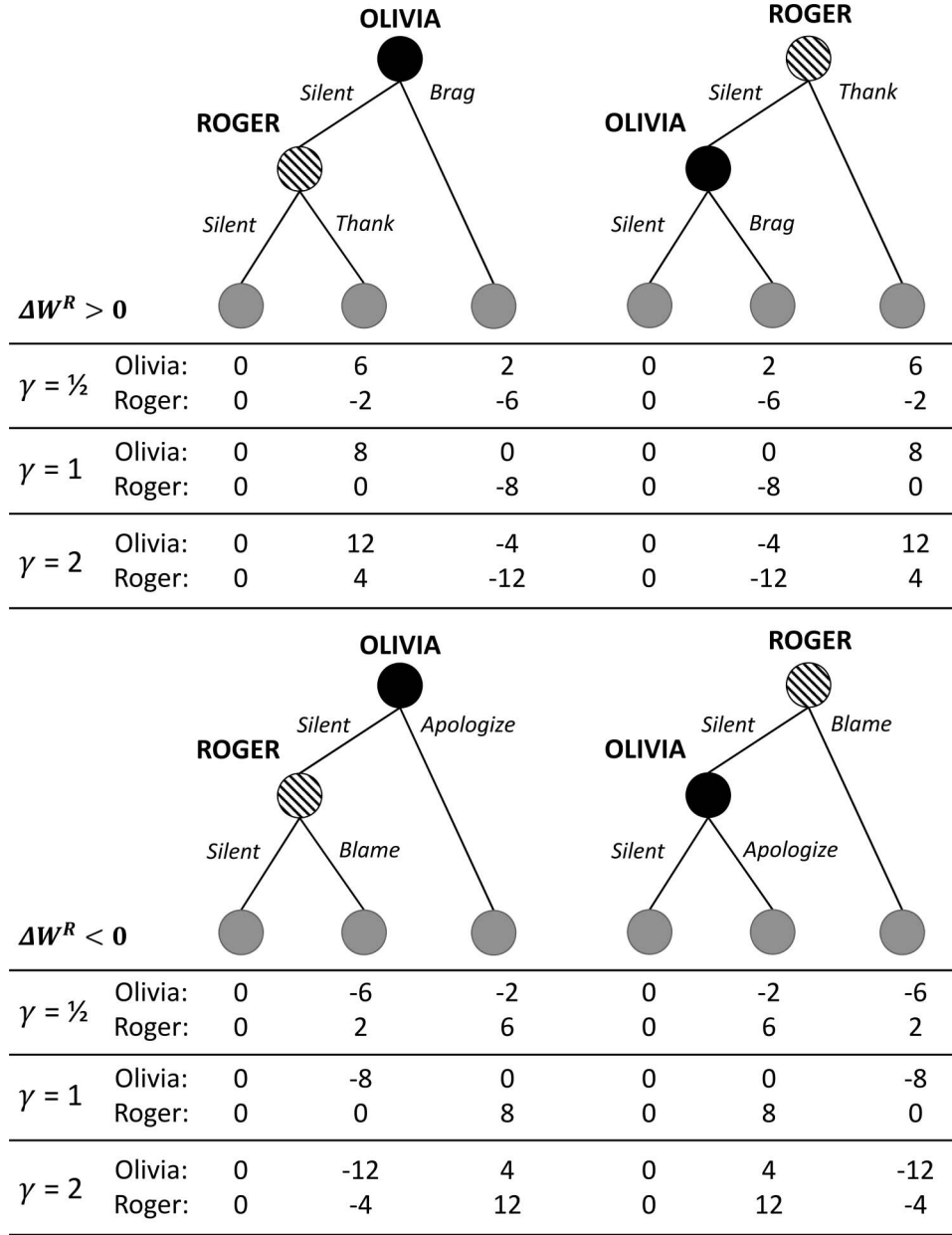
$\Delta W^R > 0$							
$\gamma = \frac{1}{2}$	Olivia:	0	6	2	0	2	6
	Roger:	0	-2	-6	0	-6	-2
$\gamma = 1$	Olivia:	0	8	0	0	0	8
	Roger:	0	0	-8	0	-8	0
$\gamma = 2$	Olivia:	0	12	-4	0	-4	12
	Roger:	0	4	-12	0	-12	4

$\Delta W^R < 0$							
$\gamma = \frac{1}{2}$	Olivia:	0	-6	-2	0	-2	-6
	Roger:	0	2	6	0	6	2
$\gamma = 1$	Olivia:	0	-8	0	0	0	-8
	Roger:	0	0	8	0	8	0
$\gamma = 2$	Olivia:	0	-12	4	0	4	-12
	Roger:	0	-4	12	0	12	-4

Figure 3. Two-stage credit (top) and blame (bottom) games.

plying backward induction to the two and three period games presented in Figures 3 and 4, respectively.

First, we present the subgame perfect Nash equilibria (SPNE) for credit and blame games in which players are matched on trait favoritism. Considering games with a finite number of periods, we get the following result:

Result 1. For the credit (blame) game, when players are matched on dimension favoritism, thanking (apologizing) is a unique pure strategy SPNE outcome for all finite games with more than two periods ($p > 2$).[1]

In the context of the example, this means that, when the report is praised, as long as Olivia and Roger know they will have multiple chances to interact with each other in the workplace, (a)

Olivia will refrain from bragging and (b) Roger will choose to thank. That is, when people have full-information and act to maximize their utility, bragging will never happen. This result holds regardless of whether competence or warmth is favored, but the reason it holds in each case is very different. Consider the three-period example in Figure 4. In the case when both favor warmth ($\gamma > 1$), Olivia would never want to brag as it results in

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[1] Note that thanking and apologizing are unique outcomes, but not necessarily unique equilibria. Thus, we know that thanking and apologizing will result but do not know when they will happen. If there are more than three periods, thanking and apologizing can happen in any period before the other person's last chance to speak.
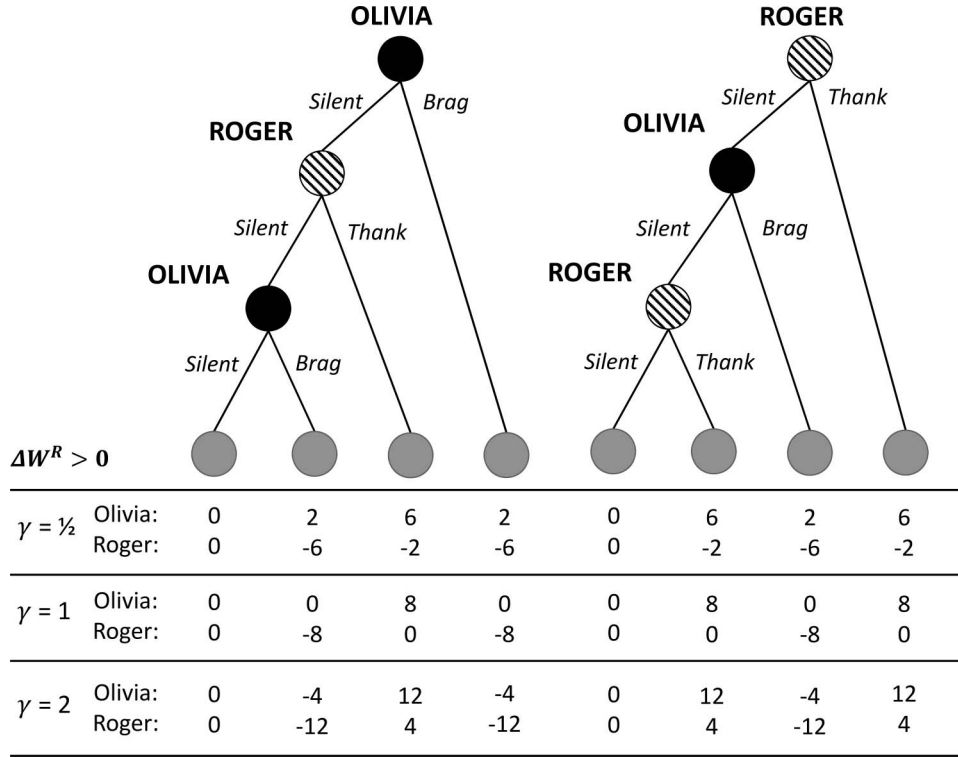
$\Delta W^R > 0$									
$\gamma = \frac{1}{2}$	Olivia:	0	2	6	2	0	6	2	6
	Roger:	0	-6	-2	-6	0	-2	-6	-2
$\gamma = 1$	Olivia:	0	0	8	0	0	8	0	8
	Roger:	0	-8	0	-8	0	0	-8	0
$\gamma = 2$	Olivia:	0	-4	12	-4	0	12	-4	12
	Roger:	0	-12	4	-12	0	4	-12	4

Figure 4. Three-stage credit game.

net negative image utility; she prefers to remain silent. On the other hand, Roger will always thank voluntarily as that option results in net positive utility and, thus, outranks silence. There is no conflict of interest between the two, and they can easily coordinate on thanking.

In the case when competence is favored ($\gamma < 1$), there is a conflict of interest between the two individuals, but they can coordinate on thanking nonetheless because Olivia can credibly threaten to brag. Olivia knows this, and because she also prefers being thanked to bragging, she will choose to give Roger a chance to speak, as long as she has a chance to communicate after him. As a result, Roger will preemptively thank, despite the fact that it will result in net negative utility. (Because people do not have full information in the real world, it is unlikely that bragging and blaming will never happen. However, this prediction would suggest that thanking and apologizing are likely to occur more often than bragging and blaming.)

The critical element that makes thanking and apologizing equilibria for all games with at least three periods in which the individuals are matched on trait favoritism is that one person can credibly threaten to brag or blame in a subsequent period if a thanks or an apology is not forthcoming. However, if this opportunity is not available as, for example, in two-period games, then we obtain some nonthanking/nonapologizing equilibria:

Result 2. For the credit (blame) game, when players are matched on dimension favoritism, thanking (apologizing) is a unique pure strategy SPNE outcome for all two-period games ($p = 2$), except for the situation when competence is favored and the Originator (Receiver) moves first, in which case bragging (blaming) is a unique pure strategy SPNE outcome.

The bragging/blaming outcome in Result 2 can be understood by considering Figure 3, which depicts the payoffs for the two-period credit and blame games. As before, when warmth is favored ($\gamma = 2$), there is no conflict of interest and both parties can easily coordinate on thanking in the credit game. However, if competence is favored ($\gamma = \frac{1}{2}$) and there are only two periods, there is a conflict of interest and who gets a chance to speak first matters. If Roger goes first, there is a real possibility that Olivia will brag in the second period. Therefore, he will preemptively thank, even though it leaves him with net negative utility. In contrast, if Olivia moves first and decides to forgo bragging, Roger will prefer to remain silent, since Olivia cannot threaten to brag if he chooses not to thank. Silence would leave Olivia worse off than if she were to brag, so Olivia will brag if she goes first.

Communication equilibria for mismatched players. We now consider finite-period games played between two individuals who do not share the same trait favoritism—they are mismatched. When players are mismatched, results for the two-period games are the same as those for games longer than two periods.

Result 3. For the credit (blame) game, when competence (warmth) is favored for the Originator but warmth (competence) is favored for the Receiver, thanking (apologizing) is a unique pure strategy SPNE outcome for all finite multiple period games ($p \geq 2$).

As Figures 3 and 4 illustrate, in the credit game, when Olivia cares more about perceived competence ($\gamma^O = \frac{1}{2}$) and Roger cares more about perceived warmth ($\gamma^R = 2$), even though they are mismatched on which trait they care about, there is no conflict of interest: Roger gets positive utility from thanking, and Olivia values being thanked more than bragging. Olivia will give Roger

the chance to thank, and he will gladly accept. However, when the preferences are reversed, thanking is no longer the result:

Result 4. For the credit (blame) game, when warmth (competence) is favored for the Originator but competence (warmth) is favored for the Receiver, silence is a unique pure strategy SPNE outcome for all finite multiple period games ($p \geq 2$).

In the credit game, when Roger cares more about competence ($\gamma^R = \frac{1}{2}$) and Olivia cares more about warmth ($\gamma^O = 2$), Roger will essentially take advantage of Olivia. He knows she will not brag, and because he gets net negative utility from thanking, he will remain silent. In this situation, they coordinate on silence, though Olivia will likely not be happy about it. Notably, Results 3 and 4 make it clear that, even when the players are mismatched, bragging and blaming are never equilibria. (Translating this into the real world may mean that bragging and blaming are much less common than thanking and apologizing, and potentially even less common than silence.)

Tests of the Predictions

We present two studies testing the predictions of the model. The first is a hypothetical scenario study that examines the preferences implied by the theory (Predictions 1–5 and a preference for speaking order implied by Result 1), and the second brings together pairs of individuals engaging in live interactions to test whether the real-life strategic choices by individuals coincide with the dynamics predicted by the model for multiperiod ($p > 2$) interactions (Results 1, 3, and 4). (Testing Result 2 would require restricting interactions to two periods, which we do not do here to focus on the more naturalistic context of conversation.) Additional materials for each of the experiments can be found in the online supplemental material.

Scenario Study: Examining Predicted Preferences

In the following study, we test Predictions 1–5, which underlie the game theoretic analysis and predicted dynamics of real-life interactions. These predictions primarily concern preferences an individual is likely to have, some of which are sensitive to the whether the context favors competence or warmth. We also test if people prefer the speaking order implied by the game theoretic results—that Receivers should go first in the case of positive outcomes, but Originators should do so in the case of negative outcomes.

The method we use is asking people directly about these preferences using hypothetical scenarios. We see this as a critical step before introducing the complexities of live interactions. As such, the proposal here is not that people will behave in real life the same way they state they will in a hypothetical scenario. Rather, the proposal is that if the theory's predictions do not hold under the most controlled circumstances, then there is little hope they will hold once the likes of facial expressions and personal histories are involved.

Furthermore, hypothetical scenarios represent the best method to test all seven of the predictions listed above in one study. Hypothetical scenarios enable us to precisely control the features of the setup that are expected to qualitatively change behavior in ways predicted by RET. Specifically, we are able to vary whether the outcome is perceived to be positive or negative, whether the

context is perceived as competence- or warmth-favoring, and whether the participant is the Originator or Receiver. The patterns of preferences and intuitions outlined in the seven hypotheses (and subhypotheses) that are being tested have never before been proposed, and thus, it is not a given that they should hold, even in hypothetical scenarios.

Method. Participants were recruited from Amazon's Mechanical Turk (MTurk) for a 7–12 min study and compensated with $1.00 for their participation. Participants read a scenario in which they were asked to imagine themselves as one of the two main characters. The scenario, which can be found in Table A1 of Appendix A, involved two individuals (the participant and a co-worker named "John") working at a publishing company, where, similar to the example given to illustrate the model, one person helps the other complete a report. At the end of the scenario, their supervisor reads the report in front of both people and evaluates it. Following this, the participants answered five questions about what they would do in the scenario. (A link to test the sandbox version of the survey can be found in the online supplemental material, along with screenshots of the experiment and its exact instructions.)

This study and its hypotheses were preregistered. (The preregistration can be accessed here: http://aspredicted.org/blind.php?x= yu2d8j). Because all hypotheses involved chi-squared tests of binary outcome measures, we conducted a power analysis based on detecting a 10% relative difference (i.e., a small-to-medium effect size, w = 0.2) with power of 90% and alpha of 0.5. Using the program G*Power (Faul, Erdfelder, Lang, & Buchner, 2007), we found we would need 132 participants per condition. We rounded up and set our sample goal to 140 per condition.

Conditions. Participants were randomly assigned to one of eight conditions in a 2 (outcome valence: positive, negative) × 2 (role: Originator, Receiver) × 2 (trait favored in situation: competence, warmth) between-subjects design. The scenario varied according to condition. Outcome valence in the scenario was positive if the supervisor praised the report, and negative if the supervisor criticized the report (abbreviations: Pos and Neg). Participants in the role of Originators learned that they helped John on his report, while those in the role of Receivers learned that they received help from John on their report (abbreviations: Orig and Rec).

Whether participants were encouraged to care more about (i.e., to favor) competence or warmth was manipulated by several elements: a priming manipulation, whether the participant's character in the scenario considered John a close friend, and the values listed as the company values in the scenario (abbreviations: Comp and Warm). The priming manipulation, which appeared before participants read the scenario, involved asking people to think of a person they admired for being either "competent, intelligent, skilled, and/or hardworking" or "generous, warm, friendly, and/or likable," then to list a few behaviors this person engages in that exhibit these traits. The scenario for the competence-favoring conditions appears in Table A1 in Appendix A. For the warmth scenario, the first bit of underlined text was changed to "You interact with John often and consider him a very close friend. You care a great deal about him." The company values were changed to the following: "Teamwork: We are one team, and together we make the difference. Good Citizenship: Treat others with respect, and follow The Golden Rule. Family: Treat fellow co-workers like

friends and family. Humility: Be humble, and don't take yourself too seriously. Generosity: Put others first. Harmony: Create a culture of warmth and belonging, where everyone is welcome." Also, the last bit of underlined text ("You/He reluctantly agree/agrees.") was removed.

In a pretest of the competence-warmth manipulation, we collected 339 participants across the eight versions of the scenario. After reading the scenario, participants were asked to indicate whether they would find it more important to exhibit competence or warmth in the scenario, using a sliding scale from 0 (care only about competence) to 100 (care only about warmth). Consistent with the intended effect of the manipulation, participants in the warmth conditions provided significantly higher ratings on average ($M = 57.1$, $SD = 23.1$) than those in the competence condition ($M = 27.7$, $SD = 23.0$), $t(330.1) = 9.55$, $p < .001$, Cohen's $d = 1.044$, with a higher rating meaning they cared more about projecting warmth. Furthermore, significantly more people in the competence conditions (82%) than in the warmth conditions (44%) thought appearing competent was more important than appearing warm, $\chi^2(1, N = 339) = 50.4$, $p < .001$—that is, they provided a rating of less than 50.

However, this also means that only slightly more than half (56%) of participants in the warmth conditions reported that appearing warm was *more* important than appearing competent (i.e., gave a rating of higher than 50). This suggests that many people in the warmth conditions would still behave and make choices as if competence was more important to them. As a result, for predictions proposing a sensitivity to trait-favoring context (Hypotheses 2, 3, 5, and 6 corresponding to Predictions 2, 3, and 5), we examined relative differences in responses between the competence- and warmth-favoring conditions rather than absolute preference levels.

Questions. Following the scenario, participants answered a series of five questions, all with only two options to select between. Though the order of appearance was randomized, we will refer to the questions with letters A–E. These questions appear in Table 2 as well as the corresponding hypotheses they were used to test. The wordings and options were tailored to make sense in the given condition. Following this, participants were presented with an attention check, which, if they did not answer correctly, eliminated them from the survey. Following the attention check, participants answered four comprehension check questions, which can be found in Appendix A along with an additional exploratory

Table 2

Questions Asked Following the Scenario Along With the Corresponding Options Presented to Originators and Receivers

Question identifier	Question	Originator options	Receiver options	Predictions tested and preference assessed
A	During the conference call, which of the following two scenarios would you prefer to happen?	(1) YOU take the credit/blame for the report in front of the supervisor (2) JOHN gives you credit/blames you for the report in front of the supervisor.	(1) JOHN takes the credit/ blame for the report in front of the supervisor (2) YOU give John credit/ blame John for the report in front of the supervisor.	H1: Preference for thanking vs. bragging, apologizing vs. blaming (corresponds to P1)
B	During the conference call, which of the following two scenarios would you prefer to happen?	(1) YOU take the credit/blame for the report (2) Neither person says anything about your involvement.	(1) YOU give credit to John/ blame John for the report (2) Neither person says anything about John's involvement.	H2 and H3: Preference between speaking oneself and having both people remain silent (corresponds to P2 and P3)
C	During the conference call, when would you be more motivated to take the credit/take the blame (give credit to John/blame John) for the report?	(1) If John didn't say anything about your involvement in the report. (2) If John gave you credit/blamed you in front of the supervisor.	(1) If John didn't say anything about his involvement in the report. (2) If John took the credit/ blame himself in front of the supervisor.	H4: Preference for communicating before or after John has already spoken (corresponds to P4)
D	During the conference call, if John said that you "glanced at the report and gave a little feedback" (which is much less than you actually did) (John said he "glanced at the report and gave a little feedback" [which is much less than he actually did]), which of the following would YOU be more likely to do?	(1) Say nothing (2) Reveal that you deserve more credit/blame for the report than John indicated.	(1) Say nothing (2) Reveal that John deserves more credit/blame for the report than John indicated.	H5 & H6: Preference for communicating after superficial communication (corresponds to P5)
E	Right after hearing the supervisor's evaluation of the report, which of the following would you be more likely to do?	(1) Immediately take credit/take the blame for the report in front of the supervisor. (2) Wait to let John say something first.	(1) Immediately give credit to John/blame John for the report in front of the supervisor. (2) Wait to let John say something first.	H7: Preference to speak immediately or give John a chance to speak first (corresponds to speaker-order preferences implied by the game theoretic results)

Note. The underlined text appeared in the version of the question presented to Receivers. Phrasing using "credit" was used for the positive outcome scenarios, whereas phrasing using "blame" was used for the negative outcome scenarios.

question that we asked to assess individual differences. We excluded participants from the analyses if they missed any of the four comprehension check questions (as we indicated in our preregistration).

For ease of exposition, in the following paragraphs, we present hypotheses and their corresponding results together. All hypotheses were supported, except for one part of H4. Results are displayed in Figures 5 and 6. There were 1,377 unique participants who started the survey, of whom 12% dropped out before completion or failed the attention check. Another 10% answered at least one comprehension check incorrect, so the final sample analyzed was 1,079 (53% female, 36.7 years). This provided 127–145 participants per condition.

Results for Hypothesis 1: Preferences over communications. Our first hypothesis corresponds to Prediction 1 regarding preferences over communication. The model predicts that both Originators (H1A) and Receivers (H1B) should prefer thanking over bragging and apologizing over blaming, regardless of whether warmth or competence is favored. Supporting this prediction, the majority of both Originators (91%, $\chi^2(1, N = 276) = 183.4, p < .001$), and Receivers (86%, $\chi^2(1, N = 267) = 135.2, p < .001$), indicated that they would rather the Receiver give the Originator credit (thank) than the Originator take credit themselves (brag) for the positive outcome. In the negative outcome scenario, the majority of both Originators (79%, $\chi^2(1, N = 276) = 89.3, p < .001$), and Receivers (93%, $\chi^2(1, N = 263) = 192.3, p < .001$), preferred the Originator to take the blame themselves (apologize) than for

the Receiver to blame the Originator (blame). These findings are presented in Figure 5. Furthermore, these preferences did not depend on whether the scenario was competence- or warmth-favoring.

Results for Hypotheses 2 and 3: Originator and Receiver preferences regarding total silence. Second, we examined the Originator's preference between bragging/apologizing and "total silence," that is, the situation in which neither person reveals the truth of responsibility. Based on Prediction 2, we expected the Originator's preferences to depend on whether the situation favored competence or warmth, and based on the pretest of the warmth-competence manipulation, we focused on examining relative differences between the competence- and warmth-favoring scenarios: For positive outcomes, more Originators should prefer bragging—which boosts perceived competence at a cost to perceived warmth—over total silence when competence is favored compared to when warmth is favored (H2A). For negative outcomes, fewer Originators should prefer apologizing—which boosts perceived warmth at a cost to perceived competence—over total silence when competence is favored compared to when warmth is favored (H2B). Consistent with this, we found that, for positive outcome scenarios, more Originators preferred to brag when competence was favored (76%) than when warmth was favored (30%), $\chi^2(1, N = 276) = 56.1, p < .001$, as depicted in Figure 6. The pattern was reversed for negative outcome scenarios: Fewer Originators preferred to apologize when competence was
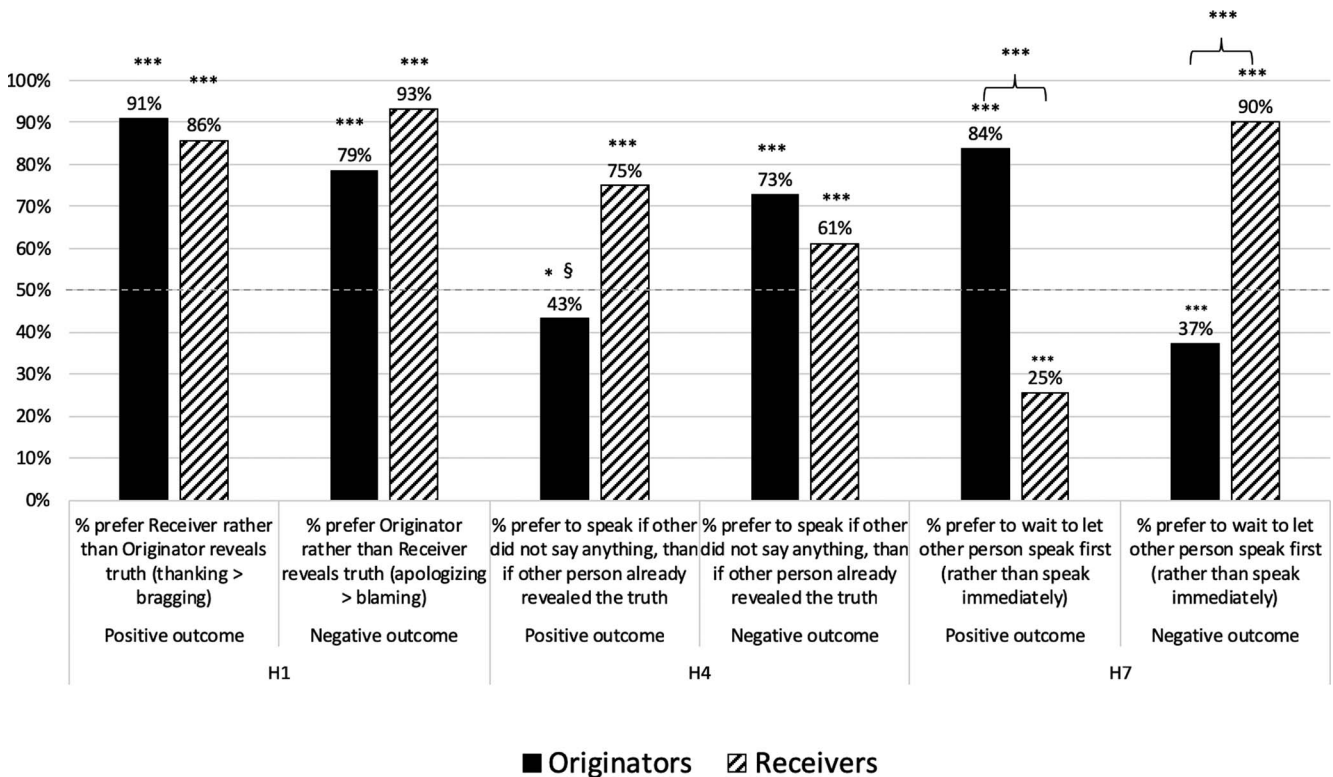

Figure 5. Results for H1, H4, and H7, hypotheses that do not depend on whether the context favors competence or warmth. * $p < .05$. *** $p < .001$. Stars above single bars indicate a significant difference from 50%. The symbol § indicates that the result goes against the hypothesis.
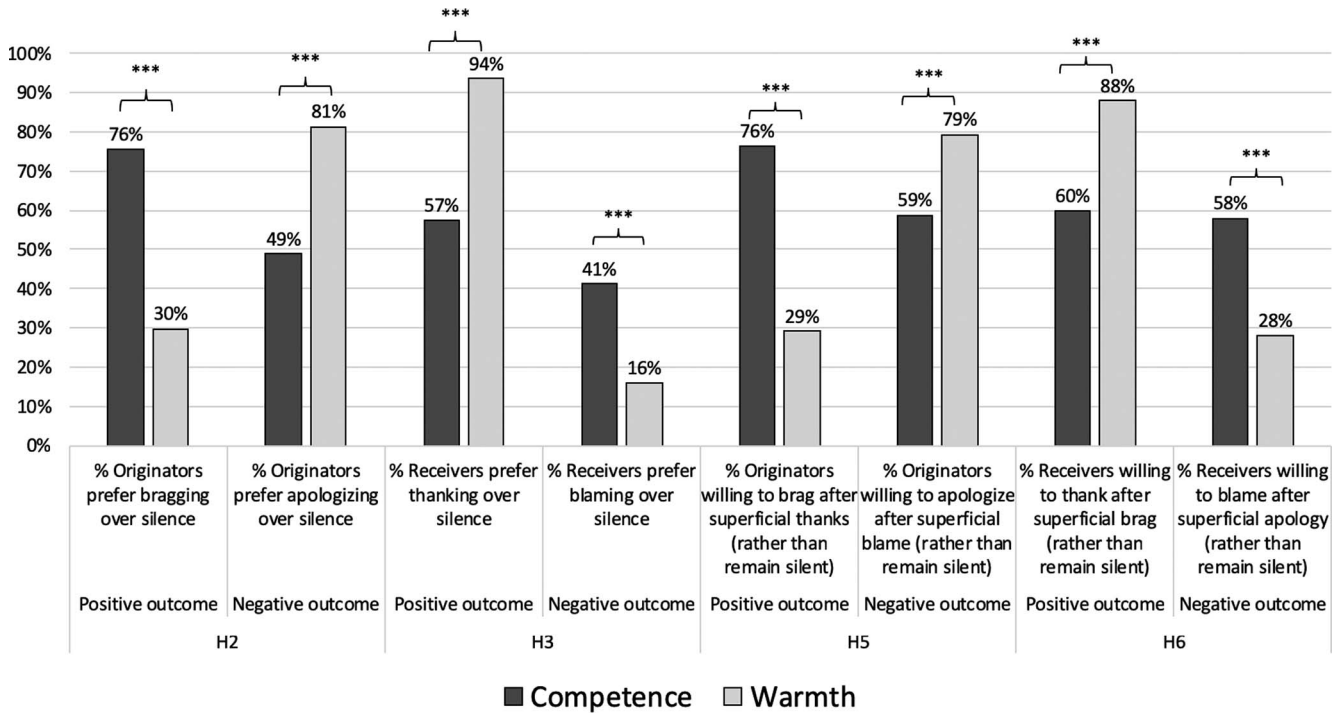
Figure 6. Results for H2, H3, H5, and H6, hypotheses predicting differences that depend on whether the context favors competence or warmth. *** $p < .001$.

favored (49%) than when warmth was favored (81%), $\chi^2(1, N = 267) = 31.0$, $p < .001$.

For Receivers, we examined the preference between thanking/blaming and total silence. Based on Prediction 3, we expected that, for positive outcomes, fewer Receivers would chose thanking—which boosts perceived warmth at a cost to perceived competence—over total silence when competence was favored than when warmth was favored (H3A), but for negative outcomes, more Receivers would choose blaming—which boosts perceived competence at a cost to perceived warmth—over total silence when competence was favored compared to when warmth was favored (H3B). Indeed, we found that fewer Receivers preferred thanking over silence when competence was favored (57%) than when warmth was favored (94%), $\chi^2(1, N = 276) = 46.1$, $p < .001$, as seen in Figure 6. The opposite was true for negative outcomes: More Receivers preferred blaming over silence when competence was favored (41%) than when warmth was favored (16%), $\chi^2(1, N = 263) = 19.4$, $p < .001$.

Results for Hypothesis 4: Preferences for postcommunication communication. Participants were also asked about whether they would be more motivated to communicate about responsibility if John had not yet spoken about it or after John had already revealed the truth. Because the theory proposes that the primary value of communication is in relaying information, as articulated in Prediction 4, we expected that people would be more motivated (if they were motivated at all) to communicate if John had not spoken at all yet. We found this to be true for apologizing (75%), $\chi^2(1, N = 267) = 65.3$, $p < .001$; thanking (73%), $\chi^2(1, N = 276) = 56.6$, $p < .001$; and blaming (61%), $\chi^2(1, N = 263) = 12.8$, $p < .001$; but not for bragging (43%), $\chi^2(1, N = 276) = 4.96$, $p = .026$.

See Figure 5. This latter result is the only result in this study found to be inconsistent with the theoretical predictions. Originators seemed to have a slight preference for bragging only after John had already given them credit. A possible, albeit speculative, explanation is that people recognize that bragging is extremely costly and doing so after credit has already been given is less so.

Results for Hypotheses 5 and 6: Preferences for communicating after superficial communication. After superficial communication, participants should only be willing to communicate if it gives them positive value (Prediction 5). Thus, we would expect preference to communicate after superficial communication to mirror preference to communicate over silence (H2 and H3). Indeed, we find a similar pattern that was consistent with these expectations. More Originators were willing to brag after being superficially thanked when competence was favored (76%) compared to when warmth was favored (29%), $\chi^2(1, N = 276) = 59.7$, $p < .001$. The opposite was true for negative outcomes: Fewer Originators were willing to apologize following a superficial blame when competence was favored (59%) compared to when warmth was favored (79%), $\chi^2(1, N = 267) = 12.8$, $p < .001$. Fewer Receivers were willing to thank after a superficial brag when competence was favored (60%) than when warmth was favored (88%), $\chi^2(1, N = 276) = 26.1$, $p < .001$. More Receivers were willing to blame after a superficial apology when competence was favored (58%) than when warmth was favored (28%), $\chi^2(1, N = 263) = 22.9$, $p < .001$. See Figure 6.

Results for Hypothesis 7: Preferences for speaking order from the game theoretic results. Lastly, we examined whether these preferences would translate into behavioral tendencies that aligned with our game-theoretic results. That is, in all cases that

involve more than two periods, the conversation should more often result in thanking and apologizing (rarely bragging or blaming). One way people may actually arrive at that outcome is if, for positive outcomes, Originators give the Receivers a chance to thank first and Receivers thank as soon as possible. For negative outcomes, this would mean that Receivers give Originators a chance to apologize before blaming them, and Originators apologize as early as they can. To get at this, we asked participants whether they would prefer to communicate first or wait and give the other person a chance to speak first.

Indicated preferences support the idea that thanking and apologizing would largely be equilibria: For positive outcomes, most Originators preferred to give the Receiver a chance to speak first (84%), $\chi^2(1, N = 276) = 124.0, p < .001$, whereas most Receivers preferred to thank immediately rather than give the Originator a chance to speak (75%), $\chi^2(1, N = 267) = 63.3, p < .001$, as illustrated in Figure 5. For negative outcomes, most Originators preferred to apologize immediately (63%), $\chi^2(1, N = 276) = 17.3, p < .001$, whereas most Receivers preferred to give the Originator a chance to speak first (90%), $\chi^2(1, N = 263) = 167.7, p < .001$).

This suggests that, for the most part, randomly pairing these individuals and putting them in similar situations should result in thanking and apologizing more often than bragging and blaming. In the next study, we bring people together in live interactions to examine whether this actually does happen.

Live Chat Study: Examining Predicted Behaviors

In this study, we paired individuals to interact and chat in real-time in order to observe whether the predicted behaviors would occur in natural interactions. We designed a paradigm such that each pair of individuals would experience a "positive outcome" that only one of the two was responsible for. Each pair of individuals completed an effort task on their own, were told that whoever had the higher score would be the "winner" (i.e., Originator), and were told that both people's earnings would be based on the winner's score. To examine the impact of communications on subsequent interactions between the pair, in a surprise follow-up round, we asked each if they would like to work with the same partner again.

From Results 1, 3, and 4 (i.e., those regarding interactions with more than two periods), we inferred that in this setup the most common outcome would be thanking/apologizing; we expected to rarely observe bragging/blaming or "total silence" (i.e., no responsibility communication at all). One caveat is that, in this setup, although we expected most communications to cast the outcome as positive (thanking and bragging), we also expected that the Receiver's poor performance could be construed as a negative outcome, and thus, lead to apologizing and blaming. In that case, we would expect the "Receiver" to be seen as the Originator of the transgression (e.g., they performed poorly), and so would be the one to apologize, where as the "Originator" would be seen as the victim of the transgression, and so would be the one to blame, were that to occur. Thus, we expect both thanking and apologizing to more often come from the "Receiver" in this study (i.e., the low-performer), and bragging and blaming to be largely sent by the "Originator" in this study (i.e., the high-performer).

In addition, we expected other conversational phenomena to arise that would help pairs arrive at the predicted equilibrium of thanking/apologizing. For instance, we expected that Receivers and Originators would start the conversation about the task in different ways: When bringing up the task first, the Receiver would be more likely to immediately give credit to the Originator, but when the Originator brought up the task first, they would engage in something we call "prompting." Prompting can be used as an attempt to elicit a thank-you without bragging. For instance, the Originator might start a conversation by asking a question like, "How did you like that task?"

Finally, because of the good will being thanked can engender in the Originator toward the Receiver and the boost in perceived warmth that thanking can achieve for the Receiver, we expected that the "high-performing" Originators would be more likely to choose to work again with their "low-performing" Receiver partner if they had had the chance to have a chat (and thus, be thanked or receive and apology) than if they had not had a chat.

This study and its hypotheses were preregistered and can be viewed online at the following link: http://aspredicted.org/blind .php?x=9bx4jr. Because the hypotheses in this study also required a chi-squared test of binary outcomes, we used the same power analysis as for the Scenario Study, meaning we needed 132 pairs per condition.

Method. Participants were recruited from MTurk and asked to participate in a 15–20 min study that involved being paired with another participant in real time for $2.00 plus a bonus based on their earnings. The real-time interactive study was designed through the iDecision Games platform. (Screenshots of the experiment and its exact instructions can be found in the online supplemental material). Participants clicked on a link to the study, and at the beginning were warned that they would need to be patient during the study as it would sometimes require waiting for their partner to catch up. After consenting and passing an attention check, participants were sent to a "waiting room" to be paired with another MTurk worker. The system automatically paired individuals into groups and assigned groups to one of the two between-subjects conditions: chat or no-chat. Within groups, the system also automatically assigned one person to the role of Originator and the other to the role of Receiver.

After being assigned a group, participants were informed that they would each work on an effort task for five minutes. Whoever got the higher score on the effort task would be the winner, and that score would determine the earnings for both individuals. The task involved finding the two numbers within a matrix of numbers that summed to 10. Each correct grid garnered 3 cents for the individual. There was a total of 35 grids that could be completed by each person. The Originator received an easy version of the task in which most of the grids were 2×2, whereas the Receivers received a more difficult version of the task in which most of the grids were 4×4 or 5×5. (This manipulation worked in 88% of cases. In 11% of cases the intended Receivers became the Originators, and in 1% the two individuals tied.) Following the task, the pairs learned what each person's score was and, to check comprehension, each person was asked to type the scores into a box and indicate who the winner was.

Following this, participants in the chat condition had a live chat for 2 min, whereas those in the no-chat condition skipped this part. Then, participants were confronted with a second surprise task that would involve completing similar grids as in the main task, but only for one minute. For this version of the task, earnings would be

based on the sum of the two individuals' scores and split equally between them. Before doing the task, they were asked to indicate whether they wanted to work with their partner again or work with a different, randomly chosen partner. Only if both people selected to work together again would pairs remain together for the second task. After the second task, participants were asked to answer a few questions (see below).

To create an environment in which thanking would be more difficult and bragging would be easier (i.e., to stack the deck against our hypothesis), the experimental setup was designed to emphasize competence. For instance, instead of using the word *partner*, we used the phrase *competitive peer*. And, even though the outcomes of the individuals in the pair were tied together, the effort task was framed as a competition, with one person being called the "winner" and the other person being called the "loser."

Questions. After the second task, participants answered a series of questions. Participants were asked to evaluate their partner in terms of their perceived competence and warmth. They were asked, "How competent (skilled, intelligent, etc.) is your competitive peer?" and "How warm (generous, likable, etc.) is your competitive peer?" Each response was on a 5-point Likert scale from 1 (*extremely incompetent*) to 5 (*extremely competent*) in the first case, and 1 (*extremely cold*) to 5 (*extremely warm*) in the second case. We included a few additional questions for exploratory analyses, and the details of those can be found in Appendix B.

Coding. The chat data was coded by two individuals blind to hypotheses. For each message within each chat, coders assigned categories based on the information conveyed in the message. Each message was allowed to be associated with multiple categories. *Thanking/giving credit* was defined as any communication

that acknowledged the better performance of the other person. *Bragging/taking credit* was defined as communication that involved acknowledging one's own good performance. *Apologizing/taking blame* was defined as communication that acknowledged one's own poor performance. *Blaming* was defined as communication that acknowledged the other person's poor performance. All of these codes could be assigned to messages from both the Originator and Receiver. In addition, coders were asked to indicate a variety of other elements such as whether a message was the first mention of the task that participants had just completed, whether the message related to the task or not, and the valence of the message (1 = very negative to 7 = very positive), among others. More details on these additional measures, as well as specific instructions given to coders, can be found in the online supplemental material. When disagreements between coders on the binary variables occurred, consensus was reached through discussion. Example messages associated with each category can be found in Table 3.

Results on the prevalence of communications. There were 207 pairs (chat: 106, no-chat: 101) that successfully completed the survey and passed the comprehension checks (i.e., both people in the group correctly identified the winner). See Appendix B for information on attrition rate. Two groups in the no-chat condition involved ties between the scores of the two people in the group, leaving no clear winner for either group (i.e., no clear "Originator"). These two groups were excluded from all analyses, leaving 205 groups (chat: 106, no-chat: 99). To rule out selection effects, we restricted our analysis to the 183 groups (chat: 91, no-chat: 92) for which the role manipulation worked, that is, the groups in which the person with the easier task won. However, the results do

Table 3

Example Messages From Each Coded Category

Category	Originator	Receiver
Thanking	Good effort! It was a hard thing.	Hi, nice job!
	Thank you. Good effort.	Hello, thank you for your effort
	Yes, good job too	hi, What are you, a math genius.
	thanks, I am sure you tried hard though	thanks for getting a high score!
Bragging	Boo ya!	I averaged about one every 30 seconds and thought I did pretty decent
	I hate math but that was pretty easy	Did better than I thought though so I have to give myself that. Nice job by the way:)
	I have to ice down my shoulders after carrying this team.	Fantastic job! I tried hard and ALMOST met your score, off by one. Bravo to you!
	I am glad I could help us out with the good score	
Apologizing	Lol sorry that I didn't get more, my computer locked up just a little bit while I was working on them	Yeah. I'm no good at those squares. Great job. ^^
	Yeah. I'm such a perfectionist, though. It kind of crushed me that I couldn't finish the entire page.	You did really well on that, apparently I'm awful. Haha
	I didn't. I could pretty well guess but was slowed way down by the keyboard entry.	i'm terrible at this task.
	I wish I had got them all, but numbers make my brain hurt	I was the loser and you outperformed me greatly
Blaming	What were you sleeping during the task?	(NONE)
	9! What the hell	
	Maybe they want me to rub it in your face that you lost	
	did you try on the task?	
Other	Hi there! That was intense, eh?	How did you get 23?
	How did you feel about this . . . test?	That was harder than I anticipated.
	that task . . . was funnn	I also don't understand how you got a half point.
	my eyes hurt lol	how did you guys guess correctly

Note. Some messages may be associated with multiple categories. The symbol ^^ contained in one of the quotes in the table is being used by the participant as a type of emoji indicating smiling eyes.

not change if we include the 22 groups (chat: 15, no-chat: 7) in which the person with the harder task won. (See Appendix B and Tables B1 and B3 for the analysis including these groups.)

The coding results for the 91 conversations from the chat condition are summarized in Figure 7, as well as in column four of Table B1. Collapsing across the Originator and Receiver, thanking and apologizing occurred at least once in 68% and 27% of chats, respectively, whereas bragging and blaming only occurred in 14% and 5% of chats, respectively. Receivers were more likely to thank (66% of chats) than Originators were to brag (13% of chats), $\chi^2(1, N = 182) = 54.5, p < .001$. This was not just because thanking was equally common for both—Receivers were much more likely to thank than Originators were to thank (18%), $\chi^2(1, N = 182) = 43.7, p < .001$. Receivers were also more likely to apologize (24% of chats) than Originators were to blame (5% of chats), $\chi^2(1, N = 182) = 12.6, p < .001$. Again, this is not because apologizing was generally more common—Originators were also less likely to apologize (4%), $\chi^2(1, N = 182) = 14.5, p < .001$. These findings are in line with our predictions.

Results on starting the conversation about the task. The task was first brought up for discussion by the Originator in 35% of chats and by the Receiver in 54% of chats. (The task was not discussed at all in 9% of the chats, and in 2% of the chats no communication occurred at all.) However, the nature of the messages was quite different. (See Figure 8, which illustrates the breakdown.) Of the 32 times the Originator brought up the task first, they thanked in 19% of cases, bragged in 16%, apologized in 0%, blamed in 6%, and did something completely different (which we label as "other") in 59% of those cases. In contrast, of the 49 times the Receiver brought up the task first, 82% of those involved thanking, 0% involved bragging, 8% involved apologizing, 0% involved blaming, and 14% were labeled as "other." This "other" category included any first messages about the task that did not contain one of the four responsibility communications. These are the messages we consider to be "prompting," and, consistent with our prediction, when being the one to bring up the task first, the Originator was more likely to prompt (59%) than the Receiver was (14%), $\chi^2(1, N = 81) = 18.1, p < .001$; instead, the Receiver
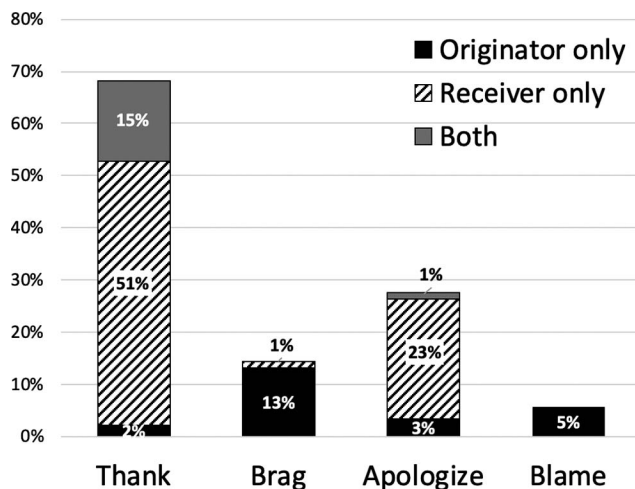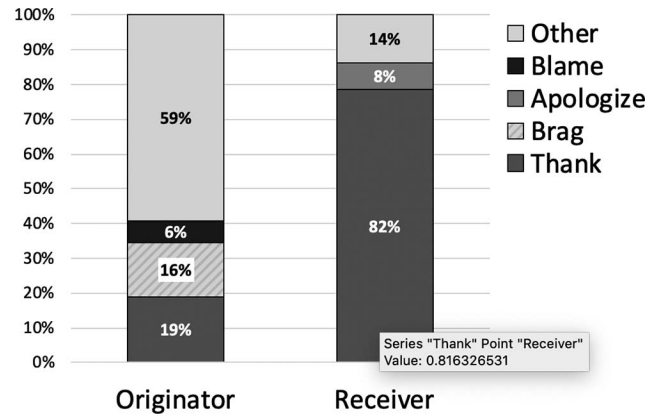

Figure 8. What each person says when they bring up the task for the first time in the chat.

almost always immediately thanked the Originator when bringing up the task first (82%), which is also consistent with the model's predictions.

Results on choosing a partner for a follow-up task. Chatting had a significantly positive effect on the Originator's interest in working with the Receiver again: 67% of Originators chose to work with their partner again when they chatted, compared to only 40% when they did not chat, $\chi^2(1, N = 183) = 13.2, p < .001$. In contrast, most Receivers wanted to work with the Originator again in both the chat condition (82%) and in the no-chat condition (90%), $\chi^2(1, N = 183) = 2.3, p = .125$. We conducted mediation analysis using bootstrapping to determine whether the difference across conditions for the Originators could be explained by their perceptions of Receivers' warmth and competence (Tingley, Yamamoto, Hirose, Keele, & Imai, 2014). After controlling for the task scores of both people in the group, we found that perceptions of the Receiver's warmth significantly mediated the effect of condition on the Originator's choice to work again with the Receiver ($b = 0.10$, 95% confidence interval [CI; 0.045, 0.17], $p < .001$), explaining 43% of the effect of condition. In contrast, ratings of the Receivers' competence did not mediate the effect ($b = 0.03$, 95% CI [−0.008, 0.07], $p = .17$). This suggests that chatting with the Receiver led the Originator to see the Receiver as warmer (but not more competent) and this partially explains why Originators were more likely to want to work with the Receiver after chatting with them. (Regressions of the Originator's choice to work again with the Receiver can be found in Table B2.)

Discussion of Studies

The above studies demonstrated that people not only have the preferences predicted by RET (scenario study) but also that these preferences led the Originator and Receiver to coordinate in live chats (live chat study) such that conversations resulted in thanking more often than they resulted in bragging and resulted in apologizing more often than they resulted in blaming. That is, the two studies showed that not only did predicted behavior emerge, but so too did the preferences consistent with producing that behavior. In the scenario study, individuals exhibited the expected preferences for speaker, speaking order, communicating after the other person

Figure 7. Number of chats that contained each type of message, by who sent it.

has conveyed full information, and communicating after only superficial communication. Another important demonstration was that by simply manipulating how much people cared about projecting warmth versus competence in the scenario study, we were able to shift participants' preferences regarding responsibility communication in predicted directions. Finally, the live chat study showed that RET can even be helpful in predicting the nuances of conversations: We predicted and found that when bringing up the task for the first time in the conversation, Receivers would thank, but Originators would "prompt," that is, they would avoid allocating responsibility but instead simply express their feelings about the task or ask what the Receiver thought of the task.

In combination, these two studies show that RET—a theory based on descriptive evidence from the literature about how people actually respond to thanking, apologizing, bragging, and blaming—makes predictions that are, on average, descriptive of preferences and behavior. This support gives credence to the idea that, in contexts with the basic dyadic setup to which the model applies, the underlying dynamics of RET are likely to be at play. If people make mistakes, RET can help decipher what the mistakes are and how to address them. For instance, in an autobiographical recall study (Chaudhry & Loewenstein, 2017), we found that interpersonal conflict can be the result of failing to thank and failing to apologize, and that these omissions stem from not fully appreciating their value to the other party. In other work, it has been demonstrated that failing to apologize can indeed be driven by perpetrators' misestimation of the costs and benefits of apologizing: They tend to overestimate the costs and underestimate the benefits of apologizing (Leunissen, De Cremer, van Dijke, & Folmer, 2014). As long as the basic setup applies, RET offers a framework that can help navigate a host of situations involving interpersonal communication and conflict.

General Discussion

In this article, we have proposed a theory of responsibility exchange that draws connections between thanking, apologizing, bragging, and blaming, integrating these four forms of communication in a single framework that identifies their functional relationship to one another. Combining this framework with evidence generated from past research on these communications, we propose a utility-based model to explain why these communications are so valued and consequential despite the fact that their physical utterance is virtually costless. RET casts these four communications as tools used to transfer responsibility from one person to another in a way that results in an image-based tradeoff: Bragging and blaming can be used to enhance a speaker's perceived competence, but usually at a cost to her perceived warmth; in contrast, thanking and apologizing can be used to enhance her perceived warmth, but usually at a cost to perceived competence. Because people place value on their social and self-image, this dynamic transforms these seemingly simple communications into an image-based currency with the power to encourage and discourage various behaviors. The formal model allows us to specify preferences and to make predictions about how preferences vary with features of the context. Critically, it provides the necessary ingredients to conduct a game theoretic analysis through which we make predictions about whether, when, and how people will communicate. We provide empirical evidence supporting the most basic predictions of the theory regarding people's preferences around these commu-

nications and evidence from real interactions supporting the key game theoretic result: That, because of these preferences, people most often coordinate on the predicted equilibrium outcome (thanking and apologizing) and avoid the alternative (bragging and blaming). We now relate the model to other theoretical frameworks and consider future extensions of the theory and areas of application.

Related Theories and Perspectives

This theory builds on and merges insights from a range of literatures producing novel insights not yet encapsulated by any other line of research. Casting thanking, apologizing, bragging, and blaming as signals that affect how a person is perceived by others means that they represent tools of impression management and self-presentation. An idea made popular by Goffman (1959, 1967), it is now well established that people try to control the information they communicate to audiences to achieve particular goals (for reviews see Baumeister, 1982; Schlenker & Weigold, 1992). In developing the theory, we incorporated key lessons from this literature, including: that the values people care about and the impressions they try to make vary across audiences and contexts (e.g., Leary & Allen, 2011), that assessments of warmth and competence often move in opposite directions and people know this (e.g., Holoien & Fiske, 2013; Kervyn, Judd, & Yzerbyt, 2009), that people are expected not only to manage their own impression but also to not offend or insult the image others are trying to project (P. Brown & Levinson, 1987; Goffman, 1967), and that people often behave as if someone is watching even when they are alone whether it is because they are imagining an audience (e.g., Baldwin & Holmes, 1987) or because they treat themselves as an audience they need to impress (Baumeister, 1993; Gur & Sackeim, 1979).

In addition to incorporating existing insights, RET also contributes to the literature on self-presentation. Researchers in the field have described the reputational effects communication tools of impression management can have and how they can be used to achieve different goals (e.g., self-handicapping, ingratiation, self-promotion, etc.), but they have not addressed why or how these tools may work. We believe the signaling perspective advanced in this article can be useful for exploring the dynamics of other self-presentational communications.

Our specific theoretic approach follows the lead of prior research analyzing social communications using a simple utility maximization framework (Goodman & Frank, 2016; Goodman & Stuhlmüller, 2013; J. J. Lee & Pinker, 2010; Pinker et al., 2008; van Rooij, 2003; Yoon et al., 2016), building off the foundational idea that speakers are rational decision-makers who make tradeoffs between costs and benefits (Grice, 1975). Furthermore, we follow a common practice in the study of language (see Benz, Jäger, & van Rooij, 2006 and Jaeger, 2008) by using a game theoretic analysis to make predictions about strategic communication behavior which we then test. Just as others have done, we analyze communication as a transfer of valuable information (see Krauss & Fussell, 1996), which in our case is the attribution of responsibility. Like the utility model of Goodman and Frank (2016), we describe the utility functions of both the speaker and the listener and make the simplifying assumptions that the listener believes what the speaker says, and that the speaker is rational.

However, our work differs from most previous models in that the goal of the speaker is not the lower-order goal of simply being understood—we assume that part—but instead to manage one's impression and to self-present in a way that is consistent with one's goals in the situation (Baumeister, 1982; Goffman, 1959, 1967; Schlenker & Weigold, 1992). Identifying goals other than being understood helps to explain why communication often violates Grice's maxims of conversation to be simple and efficient, as with polite and indirect speech (P. Brown & Levinson, 1987; J. J. Lee & Pinker, 2010; Pinker et al., 2008).

Another similar model to ours proposes that polite speech involves the cost of a social debt and/or a lowering of social status (van Rooij, 2003), a trait that is highly correlated with and often influences perceptions of competence (e.g., Fiske et al., 1999, 2002). However, this model primarily concerns the speech acts of requests and demands, the context of which is very different from the exchange of responsibility, and the model does not consider an impact of communication on the listener, and so does not open the door to the type of dyadic, game theoretic analysis that we conduct.

Theories that specifically focus on responsibility communication tend not to use modeling, are limited in scope—that is, they tend to focus on only one of these four communications—and tend to ignore the costs associated with these communications. Theories of gratitude (Algoe, 2012; McCullough, Kilpatrick, Emmons, & Larson, 2001), for instance, offer a compelling reason for the value of thanking—that gratitude is an evolutionarily valuable emotion—but do not propose that there is any cost in expressing gratitude, and thus are unable to explain why thanking is not cheap talk. In fact, to our knowledge, there have been no theories proposing any cost behind thanking other than Brown and Levinson's (1987) theory of politeness, which proposes that, by thanking, the speaker "accepts a debt, humbles his own face." The idea that thanking is costly because it implies some future material cost ("a debt") cannot explain why thanking has an impact even in one-shot situations, that is, those in which the thanker will not have a chance to repay the benefactor (e.g., Maheux et al., 1989; McGovern et al., 1975). Brown and Levinson (1987) proposed that apologizing is costly because it threatens the speaker's image. However, the authors neither connect thanking and apologizing through their shared function, as we do, nor draw a connection to bragging and blaming.

The formal analysis of apologizing that is most similar approach to ours was articulated by Ho (2012), who proposes that apologies are costly (rather than cheap talk), and develops a formal utility-based theory of apologies as costly signals in a repeated principal-agent setting. In the model, when a negative outcome occurs, because of a combination of the agent's efforts and noise, the agent can send the principal an apology, which is cheaper for agents of higher quality, or "high types." In this way the principal can attribute the bad performance to external factors rather than the agent's type. Ho's model is general enough that the "cost" of the apology can take many different forms (e.g., money spent, status lost, emotional pain, etc.), which makes it broadly applicable. However, Ho's model requires repeated interactions, and, although it does capture many dynamics of apologies in repeated interactions, it cannot explain the desire for and effectiveness of apologies in one-shot interactions when people do not expect to continue the relationship, nor does it connect apologies to other forms of communication.

Our approach combines the variety of insights from social psychological research on person perception and self-presentation across all of these different communications, which have largely been analyzed independently. We form a cohesive framework in which all four fit and relate to each other. Furthermore, by using approaches similar to others in the cognitive psychological analysis of communication as well as signaling theory, we are able to elucidate the costs behind these communications that make them valuable, explain why they matter in one-shot situations, and introduce a novel set of game-theoretic dynamics not considered previously in research on communication. Furthermore, our model introduces ramifications for both speakers' and listeners' reputations, giving communication an impact on downstream consequences both within (e.g., bragging in response to not being thanked) and outside (e.g., increased favor-doing for strangers) the dyad.

Extended Considerations and Predictions

Individual differences. Because the model makes different predictions based on whether an individual finds a situation to favor warmth or competence, understanding features of audiences, contexts, and individuals that affect that element will help yield specific predictions about real world situations. We manipulated these elements in the scenario study, but there are some clear candidate features that provide examples of naturally occurring versions of that manipulation. For instance, a person's gender could affect whether signaling warmth or competence matters more for him/her. A common finding in the literature is that women are expected to appear warm (e.g., Eagly & Mladinic, 1989; Rudman & Glick, 1999, 2001; Rudman, Moss-Racusin, Phelan, & Nauts, 2012), and as the model would predict based on this expectation, women not only tend to apologize more than men (Schumann & Ross, 2010), but they also experience backlash when bragging compared to men who do the same (Rudman, 1998). Knowing someone's personality could also be useful in predicting a preference for appearing warm over appearing competent. In one paper, researchers found that the more "prestige-oriented" a person in a leadership position was (as compared with being group-performance-oriented), the more likely they were to make choices that prioritized being liked by their group members (Case, Bae, & Maner, 2018).

Differences in culture and status are also likely to provide predictable patterns of communication. Collectivist cultures are known for valuing modesty and warmth-related traits more highly than individualistic cultures (Cuddy et al., 2009; Kurman, 2003), and as would be predicted by the model, there is evidence that apologies are used more frequently in collectivist cultures (Maddux, Kim, Okumura, & Brett, 2011), and that people from collectivist cultures compared to those from individualistic cultures are less likely brag (Kurman, 2001, 2003). With regard to status, people tend to infer higher competence or ability from higher status (Darley & Gross, 1983; Fiske et al., 1999, 2002). When it comes to impression management, therefore, people in high status positions, who are already considered competent, may have less need to project competence compared to low status individuals, resulting in more thanking and apologizing, and less bragging and blaming, particularly when the target of communication is a low-status person. Consistent with this, some evidence shows that when participants were asked to say which

of their traits they wanted a lower status person to know, they tended to play up their warmth and downplay their competence; the opposite occurred when the target was a higher status person (Swencionis & Fiske, 2016).

Emotions and social exchange. The costs and benefits associated with each of the four communications are likely experienced most commonly through emotions, rather than analytic thinking. Because these communications involve making or acknowledging causal attributions for positive and negative outcomes, we can use the attributional theory of emotions (Weiner, 1985) to predict the specific set and pattern of emotions people are likely to feel in these exchanges. Bragging and being thanked are likely to elicit feelings of pride; giving thanks to someone is likely to be motivated by gratitude (e.g., Algoe & Haidt, 2009); apologizing or being blamed is associated with guilt and shame (Baumeister et al., 1995; Behrendt & Ben-Ari, 2012; McGarty et al., 2005); and anger or indignation is likely to motivate a person to blame a transgressor who failed to apologize. The extent to which a given emotion is felt may be a predictor of whether people will choose to communicate the associated message.

Although communications and their absence can be the result of emotions, they can also be the cause of emotions. For instance, expressing gratitude may cause feelings of pride or satisfaction in the favor-doer, whereas failing to express gratitude could lead to feelings of anger in that same person. In cases when the speaker is reluctant to admit weakness, thanking and apologizing could be followed by feelings of embarrassment. According to the "affect theory of social exchange" (Lawler, 2001), the emotions people feel in response to a social exchange informs their willingness to strengthen or weaken their relationship with the other actor in the exchange. Positive emotions inspire repeated interaction, cooperation, and generally collectively oriented behavior, whereas negative emotions do the opposite. If the nature of communication following the exchange can influence the emotions the two people in the interaction feel, then it follows that thanking, apologizing, bragging, and blaming can influence the overall evaluation of the exchange and can have an influence on whether and how the actors want to continue to interact in the future.

Based on this we would expect, for instance, that thanking and apologizing would enhance relationships in most cases. As we demonstrated in the live chat study, communication following a task—largely polite communication that involved thanking—resulted in greater liking of the partner and also a greater proportion of people choosing to work again with their partner. This is consistent with the fact that thanking acts as a reinforcer of future behavior (e.g., Grant & Gino, 2010; Panagopoulos, 2011; Rind & Bordia, 1995), expressing gratitude strengthens relationships (Algoe et al., 2008, 2010; Algoe & Zhaoyang, 2016), and apologizing helps elicit forgiveness, which can help mitigate harm done to relationships (e.g., Darby & Schlenker, 1982; Fehr et al., 2010; McCullough et al., 1997). We would also predict the opposite for failing to thank and failing to apologize, that is, that these omissions would harm relationships. In a study in which we asked people to recall instances of failing to thank and apologize, we found that this indeed was the case, particularly in the eyes of the potential recipient of the thank-you or the potential recipient of the apology (Chaudhry & Loewenstein, 2017). Bragging and blaming should also have a

negative impact on relationships if they result in negative feelings like anger and shame, though these are predictions which have yet to be tested.

Perhaps more interestingly, these communications may be used or withheld in response to having already made an evaluation about the relationship or as a way to control the other person's evaluation of the relationship. For example, after an extreme conflict, two friends may feel negative enough about the relationship that they do not want to continue it nor even try to repair it. Although apologizing could potentially help the relationship, both may be reluctant to do it at this point, and prefer to engage in blaming, having already decided the relationship is not worth saving. Considering that emotions can also "cool down" over time and lead to different preferences (see, e.g., Gneezy, Imas, & Madarász, 2014), these two friends may later decide to reverse their decision about not apologizing, or at the least, they may regret having harshly blamed the other. In another example, an employee who wants to maintain a positive working relationship with their supervisor might choose not to take credit for an idea that the supervisor mistakenly thinks is hers. Bragging could leave the supervisor with a negative feeling about the relationship, which could harm the employee in the long-run.

Communication as emotion regulation and self-esteem maintenance. Several of the emotions that we have identified as either the cause or the consequence of these communications, for example, pride, guilt, and shame, are self-directed, and thus, have impacts on self-esteem (Tracy & Robins, 2004). Because people have a very strong urge to protect their self-esteem (see Banaji & Prentice, 1994 for a review) and since self-esteem can be thought of as a proxy for others' evaluations of them (Leary & Baumeister, 2000), thanking, apologizing, bragging, and blaming may be used in ways that help maintain or manage one's self-esteem, or even the self-esteem of the other person (out of either empathy or as a way to avoid retaliation). For example, receiving expressions of gratitude and apology, should help elevate self-esteem. Actively seeking this could be done through prompting the Receiver to give thanks (as seen in the live chat study) or by doing favors in anticipation of being thanked (e.g., Grant & Gino, 2010). And if making others happy and motivated confers a selfish benefit, then one may work to actively boost the self-esteem of others: Work on leadership styles has shown that employees are motivated by "humble" leaders, who engage in behaviors that are likely to boost or protect the self-esteem of their employees, that is, giving away credit for success (thanking) and taking on blame (apologizing; J. Collins, 2001; Morris, Brotheridge, & Urbanski, 2005; Owens & Hekman, 2012).

Another way to maintain self-esteem would be to avoid self-esteem threatening experiences. Although receiving thanks may be ego-enhancing, giving thanks may be an experience people try to avoid if they find that admitting to having received help elicits feelings of humiliation and incompetence for them (Fisher & Nadler, 1974; Gergen, 1974). This may aid in explaining why people avoid asking for help (e.g., Bohns & Flynn, 2010; N. L. Collins & Feeney, 2000; Cowie, Naylor, Talamelli, Chauhan, & Smith, 2002), why an effective strategy for gaining status within a social group is to become a helper, but to avoid asking for or accepting any help (Flynn et al., 2006), and why it has been predicted that leaders with low or unstable self-esteem will be

reluctant to exhibit the "humble" leadership style mentioned above (Morris et al., 2005).

In the case of apologizing, though people who feel guilt may be motivated to apologize, those who feel shame may avoid apologizing or even blame others as a way to protect their self-esteem (e.g., Tangney et al., 1996; Stuewig et al., 2010; Wolf, Cohen, Panter, & Insko, 2010). This may explain why transgressors who have not yet apologized—and perhaps do not want to—are more likely to avoid the victim than those who have apologized (Chaudhry & Loewenstein, 2017), and also why borrowers of personal loans who were delinquent were more likely to avoid their lenders than those who were not delinquent (Dezsō & Loewenstein, 2012). Some researchers have even found that transgressors who refuse to apologize experience increased self-esteem and feelings of power/control (Okimoto, Wenzel, & Hedrick, 2013). This suggests that there might be a link between the level of self-esteem a person is experiencing at a given moment and their willingness to apologize (i.e., to engage in a self-esteem threatening act). For instance, it has been found that engaging in actions shown to increase momentary self-esteem, such as generating self-affirmations, can increase the willingness of transgressors to send more satisfactory, less defensive—and perhaps, more personally costly (although potentially socially beneficial)—apologies (Schumann, 2014). Individual differences, also, can influence whether apologizing feels threatening to a person's self-esteem, and, hence, by extension, their willingness to apologize. When confronted with criticism, people who believe that personality is malleable are more likely to accept the criticism and try to address the underlying cause of the criticism (i.e., to engage in remediation) compared to people who believe personality is fixed (Nussbaum & Dweck, 2008). The reason is that remedial strategies (like apologizing) are more threatening to the self-esteem of the latter group, who prefer defensive strategies that deny the truth of the criticism. Consistent with this, it has also been found that people who believe personality is malleable are, indeed, more likely to apologize than people who believe personality is fixed (Schumann & Dweck, 2014).

Preserving self-esteem for a victim of a transgression may sometimes mean blaming others or demanding an apology. It has been shown that victims who fail to engage in this behavior, by forgiving transgressions without blaming or without demanding an apology exhibit reduced self-respect—a phenomenon authors aptly call the "doormat effect" (Luchies et al., 2010). The tendency to "blame the victim," like, for instance, in cases of sexual assault (Bieneck & Krahé, 2011; George & Martínez, 2002; Idisis, Ben-David, & Ben-Nachum, 2007), may exacerbate this negative self-esteem impact for the victim. This provides a strong reason why victims value confessions or apologies from their abusers, and why apologies can reduce the victim's aggression and desire to punish the perpetrator (Abeler et al., 2010; Darby & Schlenker, 1982; Ho, 2012; Ho & Liu, 2011; Ohbuchi et al., 1989).

Alternatively, people can self-servingly reconstrue the situation entirely such that they either are more responsible for a positive outcome (boosting pride) or that they are less responsible for a negative outcome (avoiding guilt/shame) than the other person thinks, as people are commonly known to do (Bradley, 1978; D. T. Miller & Ross, 1975). This type of cognitive process could lead people to be less likely to thank and apologize, and more likely to brag and blame, a communication strategy that could be disruptive

to personal relationships. This may explain why the receivers of help try to reconstrue it as "deserved" (Gergen, Morse, & Bode, 1974), and why gift-givers often feel unappreciated (Zhang & Epley, 2009).

When thanking and apologizing backfire.   Until now, we have generally discussed thanking and apologizing as communications that are perceived to be polite and generally relationship-enhancing. However, there are some cases when such communications can have the opposite of the intended impact or can be manipulated and cause alternative (potentially unintended) consequences. Because there is very little empirical work on these phenomena, in this section, we describe such phenomena largely with anecdotes and hypotheticals. We briefly discuss them using the framework of RET, providing hypotheses that may shed some light in those instances, but we leave testing these hypotheses to future work.

There are several ways in which thanking and apologizing might annoy or be offensive to the recipient of communication, without any malintent necessary on the part of the communicator. One way that thanking could backfire in this way is if it threatens an ongoing exchange-based relationship, freeing the speaker from future obligations. RET ascribes value to thanking that accrues immediately to the target of a thank-you, which means that thanking could sometimes serve as a substitute for returning a favor. As a result, thanking may be seen as undesirable when there is a strong expectation that favors will be repaid. One journalist described this as one of the cultural differences between the United States, where thanking the host after a dinner is customary, and India, where it would be seen as rude. The journalist notes that, "In India, people—especially when they are your elders, relatives, or close friends—tend to feel that by thanking them, you're violating your intimacy with them and creating formality and distance that shouldn't exist. They may think that you're closing off the possibility of relying on each other in the future" (Singh, 2015).

Thanking can also backfire in situations in which the recipient of the communication does not want to be given credit. For example, thanks after a sexual encounter might suggest that the recipient of the thanks did it as a favor to the communicator, and not for their own gratification—that is, an expression of their attraction to their partner. A potentially more acceptable communication is "prompting" (the phenomenon we observed in the live chat study), in which one partner asks the other whether they enjoyed themselves. This latter communication conveys that the prompter hopes and expects that the other person has also received benefit from the sexual act, rather than implying that they were the sole beneficiary.

In a similar vein, apologizing may backfire when the recipient was not (or does not want others to believe they were) hurt by the communicator. According to RET, receiving an apology would imply that the recipient was negatively impacted by the apologizer, which also implies the apologizer had some power over the recipient's emotional state. For instance, if an ex-romantic partner wants to apologize for hurting the recipient for so many years, the recipient, out of spite, might want to deny that any harm had been done at all. In addition, because politeness usually obligates that forgiveness follow an apology, receiving an apology might cause anger or annoyance if the recipient is not ready to forgive the perpetrator (see Freedman, Williams, & Beer, 2016).

How the communicator uses, or intends to use, thanking and apologizing can also result in these communications backfiring or having impacts other than what we discuss in the simplified model. This may be the case when the communicator is seen as manipulative. Politicians, who are infamous for managing their image, may seem opportunistic when issuing a public apology for a gaffe or for offering public thanks, if the public believes these communications are put forth only to make the speaker seem generous and honorable. As a result, refusing to thank and apologize could make a politician seem comparatively authentic, and thus, more appealing to particularly suspicious segments of the population. Similar suspicion could also be directed at people who do favors or good deeds; it might seem like they are only doing it to reap the "kudos." In anticipation of this, potential favor-doers may avoid doing good deeds in cases when the thank-you will be too ostentatious. For instance, it has been found that people donate less to charity when they are offered a "thank you" gift compared to when no gift is offered, and this was only reversed when the potential donors were told that the gift was a means of raising awareness for the cause, and thus, was not a selfish benefit (Newman & Shen, 2012).

Sometimes, thanking may be used by the communicator to remove credit from the recipient of the thanks rather than bestow it upon them, in effect, backfiring for the recipient. This can be done with a sarcastic "thanks" uttered by the person who perceives themselves as deserving more of the credit, or by thanking someone in a way that conveys the recipient was less involved than others assumed they were. An infamous (and perhaps apocryphal) case of this occurred when authors of an economics paper acknowledged the helpful contributions of one of the coauthors listed on the paper, implicitly hinting that the target person had not really provided input to the paper commensurate with authorship. Acknowledgments are usually reserved for people who helped but did not substantially contribute to ideas in the paper, so by thanking their coauthor (who was already listed as an author) in the acknowledgments, the authors were making it obvious that the thanks was not really conferring credit, but the opposite.

Lastly, thanks and apologies are unlikely to confer much value when they are offered in advance of the action that should elicit the communication, as epitomized by the commonplace "thanks in advance." Thanking in advance clearly does not convey credit for help that has already been provided, but instead often seems intended to make it more uncomfortable for the potential help-provider to decline, given that they have already, in effect, received credit for the action. Although this is common enough that thanking in advance may be tolerated for small favors (e.g., reviewing a report), this may seem presumptuous when the favor is large or the potential favor-doer is reluctant to oblige (e.g., helping with moving furniture to a new apartment). It is an empirical question but thanking in advance may even seem insolent enough to discourage the person from taking up the favor. (This may also explain why people tend to only do it for small favors.) The same may be true of apologizing in advance, which seems to assume the other person will be forthcoming with forgiveness, that is, the "ask for forgiveness, not permission" approach. However, for especially large transgressions, the premeditated intention to take the action may lead to forgiveness being more elusive. Future work is needed to investigate these hypotheses.

Conclusion

The predictions generated by RET span a wide range of behaviors, including when people will choose to communicate, when people will accept or turn down favors, what types of thank-you's and apologies will be more effective than others, how cultures and individuals might vary in when and how frequently they thank, apologize, brag, and blame, and what emotions might underlie interactions involving these communications or their absence. To our knowledge, there is no single alternative theory that produces the same breadth and range of predictions regarding these communications—many of which are supported by existing evidence. Many of the predictions of the theory have not been spelled out in the article but can be derived by considering the dynamics of the utility model, and the predictions can be expanded by combining RET with other existing, relevant theories (as illustrated in the General Discussion). Furthermore, relaxing assumptions and introducing additional elements to the context could produce predictions suited to additional (perhaps more complex) environments. Because attributions of credit and blame are important across a wide range of domains, and because this theory produces a broad range of novel predictions, RET can open up new avenues for research. The theory provides not only a structured way to define and think about thanking, apologizing, bragging, and blaming, but also specific hypotheses that can be tested, as well as insights relevant in many applied domains including teams in organizations, leadership, personal relationships, legal disputes, conflict resolution, negotiation, gender dynamics, and cross-cultural differences.

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(Appendices follow)

Appendix A

Scenario Study

Table A1
Scenario for Competence-Favoring Conditions (PosOrigComp, NegOrigComp, PosRecComp, NegRecComp).

*Imagine that you work at a large publishing company called Paper Press, Inc. At Paper Press, you and a coworker, John, have the same supervisor. Both of you work remotely for the publishing company. **You don't really know or interact with John, so you feel pretty indifferent towards him. Though, sometimes he can be a bit rude.***
Every month, you must attend a seminar that reminds you of the company values:
Dominance: Have a will to win, and focus on success.
Accountability: If it is to be, it's up to me.
Quality: Great just isn't good enough.
Speed: Fast is better than slow.
Hard Work: Desire to be the best.
Competition: Know your competitive advantage and leverage it.
Paper Press really cares that employees fit with the culture and values it puts forth, so much so, that promotion decisions are heavily influenced by whether you exhibit these values in your work and social interactions at the company. You feel lucky to work at a job like this because those are the exact values you care most about.
Recently, you have become aware of a new position opening up that would be a step up for you in the company, and you know that John is also considering applying.
***John has/You have** an important report due for the publishing company the following day and **he asks you/you ask him** to give **him/you** some feedback. **You/He reluctantly agree/agrees**. **You spend/He spends** a lot of time editing the report and **suggest/suggests** some radical changes to the report, which **John accepts/you accept**.*
*During your weekly joint-conference call, your supervisor at the publishing company reads the report in the presence of both of you and **effusively praises [harshly criticizes] John's/your** report, especially the parts that **you are/John is** primarily responsible for. Based on the quality of this report, your supervisor decides **to recommend John/you for the new position [John/you should not be recommended for the new position]**.*

Note. Differences from warmth-favoring scenarios (PosOrigWarm, NegOrigWarm, PosRecWarm, NegRecWarm) are underlined and bold-faced. Text that is only bold-faced indicates differences between the Originator and Receiver conditions. The parts in brackets appeared in the negative outcome scenario, replacing the bold-faced text that appears right before it.

Comprehension Check and Additional Questions

Four comprehension check questions were asked. (1) Which of the following occurred in the scenario? [choices: You helped John, John helped you]. (2) Which of the following were included in the set of company values: [choices: dominance and competition, teamwork and harmony]. (3) The supervisor: [choices: praised the report, criticized the report]. (4) Which of the following best describe your feelings toward John, as mentioned at the beginning of the scenario? [choices: You like John and consider him a close friend, You feel indifferent towards John, and even think he is somewhat rude]. Correct answers depended on condition. Participants were excluded from analyses if they got any of these four questions incorrect. Before collecting gender and age information, we asked participants to answer the following: "Personally, to what extent do YOU prefer to exhibit the following sets of traits in your everyday life?" [sliding scale: $-50 =$ You care only about exhibiting competence (skill, ability, intelligence, hardworking) to $50 =$ You care only about exhibiting warmth (generosity, friendliness, kindness, likability)]. This was intended to capture individual differences for exhibiting one trait over the other.

(Appendices continue)

Appendix B

Live Chat Study

Dropout Rate

Of those 869 who started the survey, 17% were never assigned to a group due to inactivity, 12% did not complete more than the main grids task, one person did not complete the demographics, and three people completed the survey, but their partner did not. Much of this attrition can be attributed to reasons like failing the attention check, technical difficulties on the participant's end, the participant's stepping away from the computer, low traffic and lack of availability of partners, voluntary dropping out of self or partner. This left us with 616 individuals (308 pairs), 71% of people who began the survey.

Because of server overload at iDecision Games, we initially experienced technical difficulties in the speed with which group scores were calculated. (This was eventually corrected by updating our user account to include more servers.) As a result, a subset of groups was not shown the correct score, and this caused some pairs to be misinformed about the actual score. These groups were identified by whether at least one of the partners failed to identify the correct winner, and they were excluded. In the end, there were 207 pairs (414 individuals; 67% of the groups that successfully completed the survey) in which both individuals correctly identified the winner.

Table B1
Summary of Coding Results

Variable	Who sent the message	Type of first message	Person with easy task won[a]	Person with hard task won	Total	Percent of total chats	Percent of first messages by that person
Total number of chats			91	15	106		
No communication occurred			2	0	2	2%	
Task discussed			81	12	93	88%	
Chats that contained at least one thanks			62	9	71	67%	
	Originator only		2	2	4		
	Receiver only		46	3	49		
	Both		14	4	18		
Chats that contained at least one brag			13	3	16	15%	
	Originator only		12	1	13		
	Receiver only		1	2	3		
	Both		0	0	0		
Chats that contained at least one apology			25	6	31	29%	
	Originator only		3	0	3		
	Receiver only		21	5	26		
	Both		1	1	2		
Chats that contained at least one blame			5	1	6	6%	
	Originator only		5	1	6		
	Receiver only		0	0	0		
	Both		0	0	0		
First message about task from Originator[b]			32	7	39	37%	
		Thank	6	3	9		23%
		Brag	5	0	5		13%
		Apologize	0	0	0		0%
		Blame	2	1	3		8%
		Other	19	3	22		56%
First message about task from Receiver[b]			49	5	54	51%	
		Thank	40	5	45		83%
		Brag	0	1	1		2%
		Apologize	4	1	5		9%
		Blame	0	0	0		0%
		Other	7	0	7		13%

[a] This column analyzes only groups contained in the main analysis, and thus, these are the numbers used to calculate the percentages referred to in the main text.   [b] The "first message" of a chat could be categorized as multiple of the communications (thank, apologize, brag, blame), but it could only be categorized as "other" if it did not contain any of the four communications.

(Appendices continue)

Table B2

Regression on Originator's Partner Selection Choice (Including Only Groups in Which the Person With the Easy Task Won, N = 183)

Variable	1		2		3	
	B	e^B	B	e^B	B	e^B
Intercept (no-chat condition)	.207 (.714)	1.23	−2.731* (1.106)	.07	−1.849 (.985)	.16
Chat condition	1.000** (.316)	2.72	.594 (.346)	1.81	.945** (.327)	2.57
Originator score	−.070* (.027)	.93	−.057* (.028)	.94	−.032 (.029)	.97
Receiver score	.116 (.078)	1.12	.112 (.081)	1.12	.025 (.085)	1.03
Warmth ratings of partner			.830*** (.234)	2.29		
Competence ratings of partner					.612** (.194)	1.84
Observations	183		183		183	
Log likelihood	−115.721		−108.667		−110.367	
Akaike information criterion	239.442		227.333		230.735	

Note. The dependent variable is the Originator's choice to work again with the Receiver (1 = yes, 0 = no). Logistic regression results are shown as both log odds (B columns) and as the odds ratios (e^B columns). Standard errors for the log odds are shown in parentheses below the estimates.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Additional Questions for the Live Chat Study

After the second task, participants were asked about their own individual preference for appearing competent or warm: "What do you care more about: being a competent (skilled, intelligent, etc.) person or being a warm (generous, likable, etc.) person?" Responses were on an 11-point Likert scale from "Only want to be a competent person" to "Only want to be a warm person." As an attention check, we asked participants in the Chat condition, "Did your peer send you a message during the live chat?" with possible responses "yes" and "no." To get a more developed view of how the chat may have affected partner impressions, we asked participants to provide a freeform text response to the following question: "Based on the live chat, what is your impression of your competitive peer?" To gain additional insight into why participants either chose to work with their partner again or not, we asked them to provide a freeform text response to the following: "Why did you or did you not choose to work again with your competitive peer on the short task?" Lastly, participants were asked to fill out the 5-item guilt-proneness scale (Cohen, Kim, & Panter, 2014) as well as gender and age.

Results Including Groups in Which the Person With the Difficult Task Won (N = 205)

Prevalence of Communications

When including the groups in which the person with the difficult task won, the results remain qualitatively the same. The coding results for all 106 conversations from the chat condition are summarized in column 6 of Table B1. Collapsing across the Originator and Receiver, thanking and apologizing occurred at least once in 67% and 29% of chats, respectively, while bragging and blaming only occurred in 15% and 6% of chats, respectively. Receivers were more likely to thank (63% of chats) than Originators were to brag (12% of chats), $\chi^2(1, N = 212) = 58.5, p < 0.001$. This was not just because thanking was equally common for both—Receivers were much more likely to thank than Originators were to thank (21%), $\chi^2(1, N = 212) = 39.2, p < 0.001$. Receivers were also more likely to apologize (26% of chats) than Originators were to blame (6% of chats), $\chi^2(1, N = 212) = 17.0, p < 0.001$. Again, this is not because apologizing was generally more common—Originators were also less likely to apologize (5%), $\chi^2(1, N = 212) = 19.0, p < 0.001$. These findings are in line with our predictions.

Starting the Conversation

The task was first brought up for discussion by the Originator in 37% of chats and by the Receiver in 51% of chats. The task was not discussed at all in 10% of the chats, and in 2% of the chats no communication occurred at all. Of the 39 times the Originator brought up the task first, they thanked in 23% of cases, bragged in 13%, apologized in 0%, blamed in 8%, and did something completely different ("other") in 56% of those cases. In contrast, of the 54 times the Receiver brought up the task first, 83% of those involved thanking, 2% involved bragging, 9% involved apologizing, 0% involved blaming, and 13% were labeled as "other." When being the one to bring up the task first, the Originator was more likely to prompt (56%) than the Receiver was (13%), $\chi^2(1, N = 93) = 19.9, p < 0.001$.

(*Appendices continue*)

Table B3

Regression on Originator's Partner Selection Choice (Including Both Groups in Which the Person With the Easy Task Won and Those in Which the Person With the Hard Task Won, N = 205)

Variable	1		2		3	
	B	e^B	B	e^B	B	e^B
Intercept (no-chat condition)	.221 (.590)	1.25	−2.262* (.948)	.1	−1.812* (.863)	.16
Chat condition	.996*** (.302)	2.71	.632 (.327)	1.88	.951** (.313)	2.59
Originator score	−.075** (.024)	.93	−.068** (.025)	.93	−.04 (.026)	.96
Receiver score	.13 (.070)	1.14	.123 (.073)	1.13	.04 (.077)	1.04
Warmth ratings of partner			.737*** (.219)	2.09		
Competence ratings of partner					.622*** (.185)	1.86
Observations	205		205		205	
Log likelihood	−127.318		−121.119		−121.203	
Akaike information criterion	262.635		252.239		252.405	

Note. The dependent variable is the Originator's choice to work again with the Receiver (1 = yes, 0 = no). Logistic regression results are shown as both log odds (B columns) and as the odds ratios (e^B columns). Standard errors for the log odds are shown in parentheses below the estimates.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Working Together Again

Chatting impacted partner selection: 69% of Originators chose to work with their partner again when they chatted, compared to only 41% when they did not chat, $\chi^2(1, N = 205) = 15.6, p < 0.001$. Table B3 and mediation analysis demonstrates that this is largely explained by chatting leading to elevated perceptions of the Receiver's warmth (b = 0.09, 95% CI [0.036, 0.16], $p < 0.001$), which explains 39% of the effect of condition. It cannot be explained by elevated perceptions of the Receiver's competence (b = 0.02, 95% CI [−0.010, 0.07], $p = 0.16$). Receivers were equally likely to want to work with the Originator again in the chat (82%) and no-chat conditions (88%), $\chi^2(1, N = 205) = 0.9, p = 0.335$.