Disloyalty aversion: Greater reluctance to bet against close others than the self

Simone Tang [a,*], Carey M. Morewedge [b], Richard P. Larrick [a], Jill G. Klein [c]

[a] Department of Management and Organizations, Duke University, United States
[b] Department of Marketing, Boston University, United States
[c] Department of Marketing, University of Melbourne, Australia

A B S T R A C T

We examine the mechanisms by which loyalty can induce risk seeking. In seven studies, participants exhibited *disloyalty aversion*—they were more reluctant to bet on the failure of a close other than on their own failure. In contrast, participants were just as willing to bet on the failure of strangers as on their own failure. This effect persisted when bets were made in private, payouts were larger for betting on failure than success (Studies 1–4, 6), and failure was most likely (Studies 2–6). We propose that disloyalty aversion occurs because the negative identity signal to the self that hedging creates can outweigh the rewards conferred by hedging. Indeed, disloyalty aversion was moderated by factors affecting the strength of this self-signal and the payout of the hedge, including the closeness of the other person, bettors' trait loyalty, and payout magnitude (Studies 3–5). Disloyalty aversion strongly influences social preferences involving risk.

© 2017 Elsevier Inc. All rights reserved.

1. Introduction

In 1975, Stephen Hawking made a bet with fellow theoretical physicist, Kip Thorne. If Hawking's black hole theory were correct, Hawking would cover a one-year magazine subscription for Thorne. If Hawking's theory turned out to be incorrect, however, Thorne would instead cover Hawking's more costly four-year subscription to another magazine. In making this bet, Hawking "hedged" one of his most influential theories. He protected himself against potential personal disappointment by making a counterinvestment. If his hard work were disproven, he would at least have a consolation prize. This curious behavior is not unheard of. People readily invest in insurance and hedge in financial markets, even when their exposure to risk is low (e.g., Jones & Berglas, 1978; Malhotra, 1999; Norem & Cantor, 1986). If Thorne had been the one who came up with the theory of black holes, however, we suggest that Hawking would exhibit *disloyalty aversion*. He would have been much more reluctant to bet against his friend than against himself. This is because the potential to profit from Thorne's failure would create an uncomfortable loyalty conflict, a motivational conflict between Hawking's own pecuniary self-interest and his loyalty to Thorne.

Loyalty conflicts involving hedging are prevalent in consequential financial decisions. Employees decide whether to invest their savings in company stock or more wisely hedge against their employer's failure by investing in its competitors (Arthur & Sheffrin, 2007; Benartzi, Thaler, Utkus, & Sunstein, 2007; Markowitz, 1968; Meulbroek, 2005). Partners decide whether to purchase life insurance on the death of their loved one to pay for their own living expenses in case he or she dies. Similar dilemmas are present in more quotidian financial decisions, such as whether to bet against the house or against friends when playing craps at a casino. Hedges against others are not limited to financial domains. Parents decide whether to enroll their children in national fingerprinting programs, for instance, such as the National Child Identification Program, so that the child can be more easily found or identified if he or she is lost or killed in an accident.

Hedging not only addresses loss directly (e.g., reducing financial losses or risk), it also has the potential to buffer the bettor from the negative emotions incurred by the misfortune of a close other. Betting that his daughter's team will lose its soccer game, for instance, might buffer a father's disappointment if her team loses. Despite the potential tangible and emotional benefits of hedging, we suggest that people are reluctant to hedge against negative outcomes for close others, such as family and friends, even in cases where the payout of the hedge could be used directly for the close other's benefit.

* Corresponding author at: Department of Management and Organizations, Fuqua School of Business, Duke University, NC 27708, United States.
E-mail address: simone.tang@duke.edu (S. Tang).

We suggest that this reluctance to hedge against close others is due to the negative identity signal to the self incurred by hedging. Hedging would signal to the bettor that she favored her own self-interest when it conflicted with a loyalty motivation that binds close relationships (Graham & Haidt, 2010; Morewedge, Tang, & Larrick, 2016; Smith, Aquino, Koleva, & Graham, 2014). Moreover, we suggest that the diagnostic cost of this self-signal is sufficiently strong that people are not only reluctant to hedge against close others, but they are also more reluctant to hedge against close others than against themselves. We suggest people exhibit disloyalty aversion—that people are more willing to bet on their own failure than the failure of a close other, even if that close other never learns of their bet. In economic terms (Bodner & Prelec, 2003), betting against a friend has negative diagnostic utility that may outweigh the outcome utility (e.g., money) of hedging. In contrast, because betting against the self is in one's self-interest, it creates no negative self-signal. In seven studies, we test whether people exhibit disloyalty aversion and test our proposed loyalty signaling account of this phenomenon. We find people are indeed more reluctant to hedge the failures of close others than their own failures, and that a loyalty signaling mechanism better explains disloyalty aversion than other plausible psychological processes. We propose that loyalty signaling to the self is a key mechanism influencing social preferences involving risk.

1.1. Hedging against negative outcomes for the self

When people face a risky decision, they are usually risk-averse (Kahneman & Lovallo, 1993). They prefer a lower risk "safe option" to a risker option of equal expected value with more extreme negative and positive possible outcomes. In financial investments, hedging is a risk-minimizing strategy, whereby gains from one investment are used to offset potential losses in a companion investment (e.g., insurance; Smith & Stulz, 1985). Applied to desirable and undesirable outcomes like one's daughter's soccer game, betting on a desired outcome increases risk because it increases both the gains accrued if the desired outcome occurs (e.g., +$50 and daughter's win) and the losses incurred if the undesired outcome occurs (e.g., −$50 and daughter's loss). By contrast, hedging against the desired outcome is a more conservative option. It minimizes risk by reducing both the gains accrued if the desired outcome occurs (e.g., −$50 and daughter's win) and the losses incurred if the undesired outcome occurs (e.g., +$50 and daughter's loss). In classic economic terms, hedging maximizes utility because it decreases the variance that can result from an uncertain outcome.

Economic or decision theories that assume diminishing marginal utility predict that people should prefer an option that reduces losses and gains. People should prefer to hedge against rather than bet on desired outcomes (Edwards & von Winterfeldt, 1986; Fischer, Kamlet, Fienberg, & Schkade, 1986). People do employ hedging as a risk diversification strategy for many significant financial decisions, such as the composition of their investment portfolio and purchase of insurance. If people identify with close others and are emotionally affected by their outcomes (Batson, 1991; Decety & Ickes, 2009; Kelley & Thibaut, 1978; Singer et al., 2004), then absent a unique conflict arising from social preferences, these theories suggest that people should bet on rather than against the failure of close others.

1.2. Decisions involving the self and others

Although hedging minimizes exposure to risk, we suggest that it creates a loyalty conflict even when decided in private—a conflict between loyalty motives and self-interest (Morewedge et al., 2016). Consistent with the interdependence literature involving economic games, we define self-interest as financial self-interest (although we acknowledge that utility can be increased through other means, including strengthening a relationship). Classic interdependence literature (e.g., game theory) has focused on actors in two-sided relationships whose individual decisions impact each other simultaneously (von Neumann & Morgenstern, 1947/2007). The economic approach to analyzing interdependent settings assumes that participants are motivated to pursue their own self-interest and maximize their payoffs. In the prisoner's dilemma game, for example, Player 1 must decide to cooperate or defect. Player 1's final payoff is dependent upon whether Player 2 decides to cooperate or defect as well (Axelrod, 2006). In a one-shot game, defecting is the dominating strategy, but mutual defection yields a worse average outcome than if both parties cooperate (Axelrod, 2006). Despite the dominating strategy of defecting, non-pecuniary considerations, including how friendly, attractive, and trustworthy the other player seems, affect these decisions by reducing defection rates (Rapoport, Diekmann, & Franzen, 1995; Scharlemann, Eckel, Kacelnik, & Wilson, 2001; Solnick & Schweiter, 1999).

Social considerations play a significant role in interdependence decisions. Kelley and Thibaut (1978) argued that objective payoff structures in such games are transformed by a concern for others. Monetary payoffs are subsequently not experienced at their face values because they are changed by relational concerns. When the desires of partners in a relationship are in conflict, each partner considers his or her self-interest and the other's interests in the decision making process. They may even sacrifice their own goals in pursuit of their partner's goals (McClintock & Liebrand, 1988; Rusbult & Buunk, 1993). If John wants to vacation on the beach but Mary wants to hike in the mountains, for example, Mary's preferences may alter the value of both options for John. John may perceive hiking to be the more desirable vacation when accounting for his utility, her utility, and their coaction (Rusbult & Van Lange, 2003).

Two kinds of decisions have been tested by previous research examining interdependence dilemmas in decision-making affecting relationships: coordinated decisions that affect both persons (e.g., decisions by both players in prisoner's dilemma determine their final payoffs; Dawes, McTavish, & Shaklee, 1977; Rapoport & Chammah, 1965), and decisions made by one person that affect both persons (e.g., how much a dictator keeps and gives in a dictator game determines both player's payoffs; Bohnet & Frey, 1999; Charness & Gneezy, 2008; Cryder, Springer, & Morewedge, 2012; Van Vugt & Hart, 2004). Social considerations in these cases include predictions about the choice of the other player, guilt, and inequity aversion.

1.3. Loyalty conflict as an explanatory mechanism

In our research, we make a novel contribution by focusing on decisions that only affect the self but that are still influenced by social preferences for others. In the case of hedging, we examine how concern for others influence choices that only affect the decision maker. Even if close others are unaware that one has bet on their misfortune, betting should create a feeling of conflict between the bettor's self-interest and loyalty to the close other. We describe this tradeoff as a *loyalty conflict*, a case in which loyalty motives conflict with other attractive courses of action (Morewedge et al., 2016; Van Vugt & Hart, 2004). Loyalty conflicts precede behavioral acts of loyalty, where actors sacrifice personal interests in support of the interest of a group or person (Brody & Rubin, 2011; Van Vugt & Hart, 2004).

There are two main reasons why people are motivated to be loyal. One motivation is social signaling to external audiences (Spence, 1973). These social signals influence observers' impres-

sions of the character and trustworthiness of the actor (e.g., Boone & Buck, 2003; Van't Wout & Sanfey, 2008). Second, people value loyalty for its own sake (Adler & Adler, 1988). Even private actions that are disloyal provide a negative self-signal, a negative diagnostic cue about one's character (Bodner & Prelec, 2003; Dunning, 2007; Quattrone & Tversky, 1984). Given that loyalty is an important intrinsic motivation (Elegido, 2013; Havercamp & Reiss, 2003; Reiss, 2004), the value of signaling to oneself that one is a loyal person may be sufficiently strong for one to forego attractive options requiring disloyalty (Morewedge et al., 2016; Van Vugt & Hart, 2004). People may refuse to benefit from a close other's misfortune even if their decision is made in private, and that other person is unaware of their opportunity or decision.

Paradoxically, loyalty conflict should be less prevalent, or even absent, when deciding whether to accept a hedge against the self. Outcomes involving only the self can be evaluated with regard to self-interest alone, so there is no negative self-signal because betting against the self is in one's self-interest. One can either profit from the outcome if one succeeds or from the bet if one fails. Similarly, loyalty conflict should be absent when deciding whether to accept a hedge against a stranger. In this case, there should be no negative self-signal from acting according to self-interest because doing so is not betraying a commitment to another person. This is important, as a greater proclivity to bet on a stranger's failure than the failure of a close other is a useful way to distinguish loyalty conflict from other general prosocial motivations and dispositions.

We suggest that loyalty conflict leads people to be more reluctant to bet on the failure of a close other than on either their own failure or the failure of a stranger. Furthermore, because loyalty conflict is based on the relationship with a close other, the closer someone is to another person, the more loyal she feels towards that person. Holding payoffs (i.e., outcome utility) constant, loyalty conflict will increase with relational closeness. Betting against a best friend, for example, should induce more conflict due to the stronger negative self-signal that it generates than betting against an acquaintance. Similarly, individual differences in trait loyalty, which should determine the strength of the negative self-signal created by disloyalty, should moderate the reluctance to bet against close others. A person who is generally high on trait loyalty should thus be less likely than a person low in trait loyalty to bet on her friend's failure. Differences in the propensity to be loyal should not, however, affect decisions about the self or about distant others because the negative signal is absent. In short, our focus on loyalty signaling can explain why people exhibit disloyalty aversion, and why people do not exhibit the same aversion when making choices for their self and distant others. We report seven studies that examine whether people exhibit disloyalty aversion, test our loyalty account, and address compelling alternative explanations.

2. Overview of the experiments

To induce loyalty conflicts, we used betting paradigms. Betting is a concrete, observable behavior for which the probabilities of outcomes and rewards are flexible and quantifiable. Bets can be varied so that the expected value of hedging against or betting on an outcome can be made equal, and bets can also be modified so that one bet has a higher expected value than the other.

Studies 1 and 2 tested whether people would exhibit disloyalty aversion—whether they would be more reluctant to bet on the failure of a close other than on their own failure. Both were run in incentive-compatible field settings with real payouts. Study 2 also examined whether this disloyalty aversion is stronger for close others than for strangers. Studies 3A, 3B, and 4 tested our loyalty

signaling hypothesis against other possible accounts by manipulating and measuring relational closeness to the person on whom participants were betting. This allowed us to test how loyalty signaling mediated and moderated the greater reluctance to bet against close others than against the self or strangers. In Study 5, we compared loyalty signaling and alternative moral accounts of disloyalty aversion by testing whether the tradeoff between the strength of the negative signal for betting on failure and the size of the payoff for betting on failure was compensatory or taboo. Finally, in Study 6, we compared loyalty signaling against a superstition account by directly measuring superstitious beliefs and their influence on hedging.

3. Study 1: betting against the self or a friend

We first tested whether people exhibit disloyalty aversion or not—if they are less willing to bet on their friend's failure than on their own failure. To reduce the influence of other factors that might vary between self and friend, such as actual control over the outcome, we examined betting preferences for a chance event. Groups of participants bet on a series of games of Rock-Paper-Scissors (RPS) in which one participant played against the researcher while the others watched. All participants were given an opportunity to bet whether the player or the researcher would win. Given that the outcome of RPS is random, any differences in betting behavior between the participant playing against the researcher and the participants watching the series should not be attributable to a greater ability to "throw" the series by the player than the observers. Our loyalty signaling theory predicts that players should exhibit disloyalty aversion. Observers should be more reluctant than the player to bet the player lose the series to the researcher.

3.1. Method

3.1.1. Participants and exclusions

One hundred and fifty-five undergraduates from a large private university recruited on campus (51% women) received $1 for participating and had a chance to earn additional money in the experiment. Sample size was determined by a power analysis for a medium effect size of $w = 0.30$, in which a sample size of at least 108 is needed to detect an effect. Because we recruited student participants during the final days of the semester, it coincided with the Last Day of Class celebrations, in which senior students could drink alcoholic drinks. To avoid our results being influenced by inebriated students, we decided in advance to avoid recruiting them.

Of the 155 students recruited, only nine were excluded from the analyses: four who made decisions after consulting their friends, three who were visibly intoxicated (but they still participated as the groups they were with were not), one who did not understand the payment scheme, and one who stated the hypothesis of the study during funneled debriefing, resulting in a total 146 participants. The results of the study are similar even including these excluded students.[1]

3.1.2. Procedure

Students in groups of two to four were approached on campus and offered a chance to play a game of Rock-Paper-Scissors (RPS) for money. Those who agreed to participate received $1 each for participating and could earn additional money based on their choices and the outcome of the experiment. One participant in the group was randomly assigned to the role of the contestant.

---

[1] Participants were still more likely to bet on their friends' success than their own, $p = 0.09$.

The contestant played three games of RPS with the researcher. The winner of two out of these three games won the series. The other participants were randomly assigned to the role of observers. Observers watched the three games of RPS that the contestant played with the researcher.

All participants were given a chance to make a private bet on the outcome of the game by circling one of two choices on a separate sheet of paper: (1) Pick contestant [self/friend] to win: If the contestant won the series, the bettor would earn $2. If not, the bettor would earn $0; (2) Pick contestant [self/friend] to lose: if the contestant lost the series, the bettor would earn $3. If not, the bettor would earn $0. Thus, the expected value of betting on the contestant to lose (EV = $3 × 50% = $1.50) was higher than betting on the contestant to win (EV = $2 × 50% = $1). In the contestant condition, the contestant was the self. In the observer conditions, the contestant was the friend. Thus, all participants could win money by betting on the right outcome of the series between the contestant and the experimenter.

Before betting, participants were told to make their decision alone and not to consult anyone or share their decision (see Appendix A). The details of their bet were not shared with the other participants. Payments were public, although we gave no information to the player or the observers regarding this aspect before compensation. These instructions appeared at the top of the sheet and the choice of bets appeared at the bottom. After the game, participants were debriefed and paid according to the outcome of the series and their wager.

3.2. Results and discussion

Exhibiting disloyalty aversion, participants were more reluctant to bet against their friends than against themselves. Out of the 76 students observers who bet on a friend, 57% bet that their friend would lose to the experimenter. In contrast, out of the 70 contestants who bet on themselves, 74% bet that they would lose to the experimenter, Fischer's two-sided exact test $p = 0.037$, Cohen's $d = 0.44$ (Table 1). This greater reluctance to accept an attractive gamble against a friend than the self provides initial evidence of disloyalty aversion in a context that cannot be explained by objective differences in the probability of outcomes for the self and others, or cheating.

4. Study 2: the self is more like a stranger than a friend

We interpret the greater reluctance to bet against a friend than the self as due to loyalty signaling. However, a plausible alternative account is that people may simply find profiting from another's misfortune morally objectionable or taboo (Inbar, Pizarro, & Cushman, 2012; Tetlock, Kristel, Elson, Green, & Lerner, 2000). Benefiting from another's misfortune may be considered immoral, even if the other person does not know about it and there is no intention to directly harm the other person (Inbar et al., 2012; Levav & McGraw, 2009). A second alternative account is that this reluctance is due to a motive to act altruistically or prosocially (Batson & Powell, 2003), which applies to others but not to the self.

To test our loyalty signaling account against these plausible alternatives, we compared reluctance to hedge against the self, a friend, and a stranger. Both moral and altruistic accounts predict that people should be more averse to betting on the failure of any other person than the self, whether that other person is a friend or stranger. Our loyalty signaling account makes a different prediction. Because loyalty conflict is proportional to the strength of the negative identity signal that hedging would create, loyalty conflict should increase with relational closeness. Consequently, our loyalty signaling account predicts that people should be more reluctant to bet against a friend than a stranger, even when by doing so, the bettor would profit from the misfortune of that other person.

We tested our account and these competing explanations by offering students a gamble at a large private university's Campout event for NCAA basketball tickets. Campout is an annual event where graduate students spend 36 consecutive hours camping out in tents for a chance to win season tickets to the school's basketball games. At the end of Campout, season tickets are awarded based on the outcome of a lottery. The chance of any student winning season tickets is about 40% each year. Relative to bets on the self and on a stranger, we predicted that participants would be more reluctant to bet that a close other would not be awarded season tickets for that year's Campout event.

4.1. Method

4.1.1. Participants

230 business school students at a large private university (34.2% female, 64.5% male, 1.3% unreported; age not collected) participated in this study. The business school students included Master of Business Administration (MBA) and Master of Management Studies (MMS) students. They were recruited around the business school campus and asked to volunteer for a study on decision-making. We aimed to recruit as many participants in the Campout event as possible.

4.1.2. Operationalization of targets
4.1.2.1. Close other. We operationalized the close other target as a section mate. When the business school students matriculate, each is placed into a section until they graduate. Section members are typically very close. They do academic group work and participate in and organize social events together. Students did not know which specific section mate they were betting on. They only knew that they were betting on a student in their section. A benefit of this design is that because no specific section mate was identified, participants would have little fear of future retaliation or relationship loss with the target.

4.1.2.2. Stranger. We operationalized the stranger target as a non-business school student whom the participants did not know, a law school student from the same university who was participating in Campout.

4.1.3. Design and procedure
Business school students involved in Campout were approached on campus and asked if they would answer a short survey. The students received a form with instructions (Appendix B). It first requested that they not share or consult anyone about their decision. Then, participants were randomly assigned a target participating in Campout: self ("you"), friend ("your section mate"), or a stranger ("a non-[name of business school] student whom you

Table 1
Percentage of participants betting target to failure (hedging) in Studies 1, 2, 3A, 4, 5, and 6.

	Target		
	Self	Close Other	Distant Other
Study 1: Rock, Paper, Scissors	74%[a]	57%[b]	
Study 2: NCAA Season Tickets	56%[a]	30%[b]	66%[a]
Study 3A: Job Promotion	65%[a]	37%[b]	61%[a]
Study 4: Job Promotion	68%[a]	52%[b]	75%[a]
Study 5: Trivia Contest (*means*)	74%[a]	62%[b]	70%[a]
Study 6: Job Promotion	68%[a+]	51%[b]	80%[a+]

Note: Columns within rows that do not share a subscript differ significantly at $p < 0.05$. Columns sharing subscript + differ at the level of marginal significance.

do not know"). Participants were offered an opportunity to receive money based on the target's Campout results. They could choose from two options: (1) Receive $5 if they bet on the target to win tickets and the target was awarded season tickets, or (2) receive $8 if they bet on the target to receive no tickets and the target was not awarded season tickets. In both cases, if the outcome did not match the prediction, they would receive $0. Thus, the expected values for bets were $2 for betting on success (i.e., $5 × 40%) and $4.80 for betting on failure (i.e., $8 × 60%).

Students then indicated their section number, email addresses, and whether they had participated in a previous Campout. If they did, they also indicated whether they won Campout lottery tickets before. After Campout was over, we collected information on the Campout results and paid students accordingly.

4.2. Results

4.2.1. Manipulation check of closeness

We conducted a post-test, in which we asked a separate group of MBAs ($N = 50$) how close they felt towards a section mate versus a graduate student not in the business school at their university. Each participant answered, "How close do you feel towards a section mate in your classes at [business school]?" and "How close do you feel towards other non-[name of business school] graduate students at [name of university]?" on a scale of 1 (*Not at all*) to 7 (*Extremely*). The manipulation was successful. Participants reported being closer to a section mate ($M = 5.40$, $SD = 1.29$) than to a non-business graduate student ($M = 2.60$, $SD = 1.58$), $t(49) = 8.37$, $p < 0.001$.

4.2.2. Previous participation and winnings

Participation in previous Campouts did not affect whether students bet the target to win or lose, Fischer's two sided exact test $p = 0.55$. Whether the student had won tickets previously also had no effect on betting behavior, Fischer's two-sided exact test $p = 0.71$.

4.2.3. Effect of target identity

As predicted by the loyalty conflict hypothesis, students were more reluctant to bet against their friends than against themselves or strangers, $X^2(2, N = 230) = 23.67$, $p < 0.001$ (Fig. 1). Whereas a minority (30%) of students bet that a close other would lose, a majority of students bet that they (56%) or a stranger (66%) would lose. We then analyzed the data in a logistic regression with the self as the omitted category and using separate dummy variables for the section mate and for the non-business school student. Students were less likely to bet on a close other to lose than on themselves to lose, $B = -1.16$, $\chi^2 = 11.16$, Exp(B) = 0.32, $p = 0.001$. When the stranger was the omitted category, we found that participants

were less likely to bet on a close other to lose than a stranger to lose, $B = -1.65$, $\chi^2 = 21.42$, Exp(B) = 0.19, $p < 0.001$. Furthermore, participants were no less likely to bet on themselves to lose than on a stranger to lose, $B = -0.49$, $\chi^2 = 2.24$, Exp(B) = 0.61, $p = 0.13$. The results were not different when controlling for prior Campout experience and a win in the past (self versus close other, Exp(B) = 0.33, $p = 0.003$; close other versus stranger, Exp(B) = 0.22, $p < 0.001$; self versus stranger, Exp(B) = 0.70, $p = 0.26$).

4.3. Discussion

In an incentive-compatible design, participants again exhibited disloyalty aversion. Moreover, whereas participants were more reluctant to bet against close others than themselves, participants were just as likely to bet against strangers as themselves. In other words, they did not exhibit disloyalty aversion for strangers. In addition to supporting our loyalty signaling theory, the results provide evidence against moral aversion and taboo accounts of disloyalty aversion. Both of these alternative accounts would suggest that participants should have been more reluctant to bet against a stranger than the self.

Whereas all participants betting against another person in Study 1 knew the person against whom they were betting, and that person might know how they bet, this was not the case in Study 2. Targets were anonymous members of a particular category, so the bettors did not know the identity of the target and the targets did not know whether someone was betting on their outcome. Thus, disloyalty aversion in this setting suggests that it is unlikely to be based on the bettor signaling loyalty to the target or a fear of future social rejection, damaged relationship, or damaged reputation.

5. Studies 3A and 3B: closeness to target and reluctance to hedge

In Studies 3A and 3B, we began process testing to determine if loyalty signaling is the mechanism driving disloyalty aversion. Our theory suggests that the closer someone feels to another person, the stronger the negative self-signal for being disloyal. Thus, the closer one is to a person, the more conflict disloyalty should engender, and stronger the aversion to be disloyal to that person. In Study 3A, we manipulated relational closeness by examining the propensity to bet on the failure of the self, a close friend, or an acquaintance. In Study 3B, we conducted a conservative test of our hypothesis by having participants focus on friends alone, and tested whether the strength of disloyalty aversion varied with closeness to the friend. Specifically, we examined whether the propensity to bet on a friend's failure would vary according to how close or how distant participants felt to that friend. Our loyalty signaling account suggests that participants should be less likely to bet on the failure of a friend than an acquaintance, and should be less likely to bet on the failure of a friend to whom they feel closer than more distant. In contrast, the alternative moral, taboo, and altruism accounts of disloyalty aversion suggest that participants should feel equally hesitant to bet on the failure of a friend or an acquaintance, and should be no more hesitant to bet on the failure of friend who is closer than more distant.

Studies 3A and 3B also address an alternative explanation of our results—that people are more optimistic about the success of a close other than their own success. If people do believe that others are more likely to succeed than themselves, this would increase the expected value of betting on the success of close others to a greater extent than the self. To address this alternative possibility, we explicitly stated the odds of success and failure for all targets in Studies 3A and 3B. If the reluctance to bet against others relative to

Fig. 1. Business school students were more reluctant to bet that a friend would not win basketball season tickets than that they or a stranger would not win tickets.

the self persisted, it could not be attributed to different degrees of optimism for the self and others.

6. Study 3A

6.1. Method

6.1.1. Participants
One hundred and nineteen Amazon Mechanical Turk workers (49% female, age M = 31.68, SD = 11.59) participated online and were compensated $0.50.

6.1.2. Design and procedure
Using a one-factor, three-level design, we manipulated the target (the self, a friend, or an acquaintance) on which participants placed a bet. Participants in the friend condition were first prompted to identify a friend to whom they are close but do not interact with frequently, whereas participants in the acquaintance condition were first prompted to identify a person whom they met in the last two days (see Appendix C). The names of the targets were piped into subsequent prompts or questions. Participants in the self condition skipped the above prompts.

Then, all participants made a hypothetical betting decision in which they bet on the success or failure of the target in a promotion decision. They imagined that the target was one of ten equally qualified job candidates being considered for a promotion at work. Thus, the target had a 1/10 chance of being promoted. Then, participants were asked to imagine that they were offered a chance to bet on the target's outcome. They could choose from two options. The first option was to bet on success, in which they would win $5.50 if the target were promoted, but $0 if not. The second option was to bet on failure, in which they would win $0 if the target were promoted, but $50 if not.

We deliberately strengthened the attractiveness of betting on failure by making failure more probable than success and yielding a higher payout. The expected value (EV) of betting on the target's success was $0.55 (EV = $5.50 × 0.10 = $0.55), whereas the expected value from betting on the target's failure was $45 (EV = $50 × 0.90 = $45.00). Clearly, betting on the target to fail was a far superior option for any participant who was maximizing expected value or who was risk averse.

After participants made their choice, we asked them the extent to which loyalty conflict motivated their betting behavior. The items were: "I wanted to be loyal to [target]" and "If I had won money betting on [target] not getting promoted, the money would have felt like ill-gotten gains" (α = 0.85). These items were rated on a 7-point scale with endpoints, 1 (*strongly disagree*) to 7 (*strongly agree*). Finally, as a manipulation check, participants in the friend or the acquaintance condition rated how close they were to the target ("I am close to [target]") on a 7-point scale with endpoints, 1 (*Not at all*) to 7 (*Very much*).

6.2. Results

6.2.1. Manipulation check
The manipulation of target was successful. Participants reported feeling closer to the friend (M = 5.05, SD = 1.16) than to the acquaintance (M = 2.73, SD = 1.98), $F(1,77)$ = 39.72, p < 0.001.

6.2.2. Betting decisions
A Pearson chi-square analysis revealed that betting behavior differed significantly with respect to the target's identity, $\chi^2(2, N = 119)$ = 7.25, p = 0.027, d = 0.41 (Fig. 2). We then analyzed the data in a logistic regression with the self as the omitted category

Fig. 2. Participants were more reluctant to bet that a close friend would fail an interview than that they or an acquaintance would fail it.

and using separate dummy variables for the friend and for the acquaintance (Table 2).

Participants were less likely to bet on their friend's failure (37%) than on their own failure (65%; B = −1.16, χ^2 = 6.01, Exp(B) = 0.31, p = 0.01). However, participants were equally likely to bet on their acquaintance's failure (61%) as on their own failure (65%), B = −0.17, χ^2 = 0.14, Exp(B) = 0.84, p = 0.71. Importantly, participants were more likely to bet on their acquaintance's failure than on their friend's failure (61% vs. 37%), B = −0.99, χ^2 = 4.50, Exp(B) = 0.37, p = 0.03.

6.2.3. Loyalty conflict
There was a main effect of target on reported loyalty conflict, $F(2,116)$ = 3.85, p = 0.024. A planned contrast with weights in parentheses revealed that participants experienced significantly more loyalty conflict for the friend (+1; M = 4.67, SD = 1.90) than for the self (−1; M = 3.69, SD = 1.67, acquaintance weighted 0), $t(116)$ = 2.34, p = 0.02. They also experienced more loyalty conflict for the friend (+1) than for the acquaintance (−1; M = 3.63, SD = 1.97, self weighted 0), $t(116)$ = 2.48, p = 0.01. Consistent with our loyalty conflict account, there was no difference in loyalty conflict between the self and the acquaintance, $t(116)$ = 1.23, p = 0.90.

6.2.4. Mediation
Given that there was no difference in betting behavior and loyalty conflict for the self and the acquaintance, we grouped the two conditions together to form one overall, non-friend condition. We coded this condition as 0 and the friend condition as 1. Using the bootstrap method in the PROCESS macro (Hayes, 2013), we found that the relationship between target and betting behavior was mediated by loyalty conflict towards the target (95% CI [−3.30, −0.30]; Fig. 3). The results suggest that the greater loyalty conflict that participants betting on a friend felt underlay their greater reluctance to bet on failure, relative to participants betting on themselves or an acquaintance.

7. Study 3B

In Study 3A, we manipulated the strength of loyalty signals by manipulating the kind of target participants made bets on or

Table 2
Logistic regression for target on betting on failure compared to the self.

	B	SE	Exp(B)	p-value
Friend	−1.16	0.47	0.31	0.014
Acquaintance	−0.17	0.46	0.84	0.708
Constant	0.62	0.33	1.86	0.062

Fig. 3. Aversion to hedging on friend's outcome was mediated by loyalty conflict.

Fig. 4. Loyalty conflict mediated the greater reluctance to bet on the failure of a friend.

against. In Study 3B, we allowed the strength of loyalty signals to vary naturally by having all participants name a friend whom they could bet on or against. We predicted that even amongst friends, the closer a participant felt to her friend, the less likely she would be to bet on her friend's failure.

7.1. Method

7.1.1. Participants

One hundred and twenty Amazon Mechanical Turk workers (53% female, age M = 33.66, SD = 11.98) participated in exchange for $0.50. Three participants reported that they were not paying attention in the comments section (e.g., watching television) and one participant reported not seeing the information about the bet, leaving 116 participants.

7.1.2. Design and procedure

Participants first identified a friend to whom they were close. Then, they responded to 5 items measuring closeness to the named friend (α = 0.87). In addition to the original item, "I am close to [friend]" in Study 3A, we also added, "I like [friend]", "[friend] is a dear friend of mine", "I feel very attached to [friend]", and "I feel connected to [friend]".

Next, all participants made a betting decision, in which they bet whether the friend would succeed or fail in a promotion interview (as in Study 3A). After participants chose a bet, they reported the extent to which loyalty conflict motivated their betting behavior on the same scales as those used in Study 3A (α = 0.85).[2]

7.2. Results

7.2.1. Betting decisions

Replicating the results of Study 3A, the closer participants felt towards a friend, the less likely they were to bet on the friend's failure, B = −0.44, SE = 0.24, χ^2 = 3.50, Exp(B) = 0.65, p = 0.06.

7.2.2. Loyalty conflict

The closer participants felt towards their friend, the more loyalty conflict they experienced, r(116) = 0.22, p = 0.02.

7.2.3. Mediation

Loyalty conflict significantly mediated the relationship between closeness to friend and betting decisions using the bootstrap method (Hayes, 2013) with 5000 samples (95% CI [−1.65, −0.10], Fig. 4). As predicted, the more distant a participant felt to her friend, the less loyalty conflict she experienced, which increased her willingness to bet on failure.

---

[2] We ran a separate study and found that the order of rating closeness using the 5-item scale and betting does not matter. We replicated the results of Study 3B when we asked about closeness. after participants made their bet.

7.3. Discussion

The results of Studies 3A and 3B provide support for our loyalty signaling account. Relationship closeness both moderated and mediated disloyalty aversion. In Study 3A, participants were more reluctant to bet on the failure of a close friend than on their own failure, but were as willing to bet on the failure of a casual acquaintance as on their own failure. Our mediation analyses suggest that this greater reluctance to bet against a close friend was due to the greater loyalty conflict that the bet engendered. In a more conservative test that only examined betting against friends, in Study 3B we found that the propensity to bet on the failure of a friend was determined by closeness to that friend because bets against closer friends engendered greater loyalty conflict.

In addition to providing evidence for our loyalty signaling account, the results of Studies 3A and 3B provide evidence against alternative accounts of disloyalty aversion. Because participants bet as frequently on their own failure as they did on the failure of an acquaintance, the greater reluctance to hedge against a friend does not appear to be driven by a moral aversion or taboo to betting on someone else's failure or altruistic considerations. Moreover, the studies directly tested our process account and found that loyalty conflict mediated the greater reluctance to hedge against a friend than the self (and acquaintances), as predicted. In both self and acquaintance conditions, participants were more likely to bet that the target would fail because those gambles engendered less loyalty conflict.

8. Study 4: trait loyalty of the bettor and reluctance to hedge

In Study 4, we tested whether disloyalty aversion would be moderated by individual differences in the strength of the negative self-signal that being disloyal would create. We hypothesized that people high on trait loyalty will be less likely than people low on trait loyalty to bet on a friend's failure, because that bet would produce a stronger negative self-signal. In contrast, because loyalty signals do not underlie the decision to bet against the self or an acquaintance, trait loyalty should not affect decisions to bet against either of these targets. Thus, we predicted an interaction in which those high on trait loyalty should treat friends differently than the self or an acquaintance (as we saw in Studies 2, 3A and 3B). Those low in trait loyalty, however, should exhibit similar betting behavior for all three targets.

8.1. Method

8.1.1. Participants

One hundred and ninety-nine Amazon Mechanical Turk workers (32% female, age M = 30.25, SD = 10.64) participated in exchange for $0.50.

8.1.2. Design and procedure

We used the same one-factor, three-level design from Study 3A, in which we manipulated the target on whom participants place a bet: themselves, a close friend, or an acquaintance. Participants were asked to place a hypothetical bet on whether the target would succeed in getting a job promotion given the odds of success were 1 in 10 and the expected payout was larger for betting on failure ($50) than on success ($5.50).

After making their bet, participants read a series of filler information thanking them for making the decisions and that they would answer more questions about how they make decisions in general. Then, they responded to items from the "Ingroup/Loyalty" subscale of the Moral Foundations Questionnaire (Graham et al., 2011) on 7-point scales with endpoints, 1 (not at all) and 7 (extremely). This subscale has two components, relevance and context. The relevance component has three questions asking the degree to which certain concerns factor into deciding whether something is right or wrong with respect to the group (e.g., "Whether someone did something to betray his or her group"). The contextual factor has three questions asking about how much participants agree with statements about ingroup/loyalty conflict when it is contextualized (e.g., "I am proud of my country's history").

Although these are standard items from the Moral Foundations Theory, they arguably measure a concept that is related, but distal, to loyalty. Taking pride in one's country is not necessarily equal to loyalty to close others. To address this concern, we added four new items (two for each component), namely, "Whether someone went out of his or her way for a friend", "Whether someone defended his or her friend", "People should support their friends when the friend is in trouble", and "People should never bad-mouth their friends for self-gain". Altogether, there were 10 items that measured loyalty preferences as an individual difference ($\alpha = 0.77$). The reliability for our four new items was $\alpha = 0.71$. The reliability of the six MFQ items with our items excluded was $\alpha = 0.69$.

8.2. Results

8.2.1. Loyalty measures

To address the possible concern that the betting decision affected how people answered the individual difference measures of loyalty, we examined whether those measures differed by condition. They did not ($M_{Self} = 4.70$, SD = 0.86; $M_{Friend} = 4.90$, SD = 0.95; $M_{Acquaintance} = 4.92$, SD = 0.81), $F(2, 196) = 1.32$, $p > 0.25$.

8.2.2. Betting decisions

Whereas 68% of participants in the self condition and 75% of participants in the acquaintance condition bet on the target's failure, only 52% of participants in the friend condition bet on the friend's failure. As evidence of disloyalty aversion, a Pearson chi-square analysis revealed that betting behavior differed significantly depending on the target's identity, $\chi^2(2, N = 199) = 8.00$, $p = 0.02$. We then used logistic regression to analyze the data, in which the self was the omitted category with separate dummy variables for friend and for acquaintance. As in Studies 1, 2, and 3A, participants were less likely to bet on their friend's failure than on their own failure ($B = -0.67$, S.E. = 0.36, $\chi^2 = 3.46$, $Exp(B) = 0.51$, $p = 0.06$). However, participants were no less likely to bet on their acquaintance's failure than on their own failure, $B = 0.36$, S.E. = 0.39, $\chi^2 = 0.87$, $Exp(B) = 1.43$, $p = 0.35$. To compare the results between the friend and the acquaintance condition, we created dummy variables for the self and friend with acquaintance as the omitted category. We found that participants were less likely to bet on their friend's failure than on their acquaintance's failure, $B = -1.03$, S.E. = 0.38, $\chi^2 = 7.29$, $Exp(B) = 0.36$, $p = 0.007$.

To investigate interactions between trait loyalty preferences and target, we averaged the 10 loyalty preference items and cen-

tered the scores. Then, we created dummy variables for the friend and acquaintance conditions and multiplied the centered scores with each of the two dummy variables. As hypothesized, we discovered an interaction between trait loyalty and friend ($B = -1.22$, S.E. = 0.48, $\chi^2 = 6.55$, $Exp(B) = 0.30$, $p = 0.01$), but not for trait loyalty and acquaintance ($B = 0.66$, S.E. = 0.49, $\chi^2 = 1.84$, $Exp(B) = 1.93$, $p = 0.18$; Fig. 5). These results held even when we excluded our custom items ($p = 0.05$ for the friend × loyalty preferences interaction). A spotlight analysis (+1 and −1 SD of trait loyalty; Spiller, Fitzsimons, Lynch, & McClelland, 2013) revealed that participants with stronger loyalty preferences were less likely to bet on their friend's failure than the self's ($B = -1.63$, S.E. = 0.56, $\chi^2 = 8.30$, $Exp(B) = 0.20$, $p = 0.004$), but no such difference was observed between an acquaintance and the self, $B = 0.95$, S.E. = 0.62, $\chi^2 = 2.34$, $Exp(B) = 2.58$, $p = 0.13$. At low levels of trait loyalty, there were no differences in betting decisions between the friend and self ($p = 0.36$) or between the acquaintance and self ($p = 0.70$). Additionally, as participants became higher in trait loyalty, they were less likely to bet on a friend's failure ($B = -1.24$, S.E. = 0.37, $\chi^2 = 11.16$, $Exp(B) = 0.29$, $p = 0.001$) and marginally more likely to bet on an acquaintance's failure, $B = 0.64$, S.E. = 0.38, $\chi^2 = 2.84$, $Exp(B) = 1.90$, $p = 0.09$.

These results remained the same when we included only our own loyalty items. There was a significant interaction between friend and trait loyalty, ($B = -1.24$, S.E. = 0.47, $\chi^2 = 7.06$, $Exp(B) = 0.29$, $p = 0.01$), in which the higher the trait loyalty, the less likely participants were to bet on a friend's failure. There was no interaction between acquaintance and trait loyalty ($B = 0.25$, S.E. = 0.45, $\chi^2 = 0.32$, $Exp(B) = 1.29$, $p = 0.57$).

8.3. Discussion

Disloyalty aversion was moderated by individual differences in trait loyalty. Overall, participants were less likely to bet on a friend's failure than on their own failure. In contrast, they were just as likely to bet on an acquaintance's failure as their own failure. This disloyalty aversion, however, was moderated by trait loyalty. Participants low in trait loyalty were more willing to bet on the failure of all targets. However, participants high in trait loyalty were the least likely to bet on the failure of a friend, but were just as likely to bet on the failure of an acquaintance as on their own failure. Considered together with the results of Studies 3A and 3B, the results provide strong evidence of the role loyalty signaling plays in disloyalty aversion. Disloyalty aversion was moderated by closeness of the target and by the decision makers' aversion to be disloyal.

Fig. 5. Probability of betting against target by trait loyalty motivation. Individual differences in ingroup/loyalty considerations moderate the effect of betting on a friend's failure with standard error bars. Participants were less likely to bet on a close friend's failure if they were high on trait loyalty.

9. Study 5: increasing payment reduces reluctance to bet on failure

In Study 5, we further compared our loyalty account to the moral aversion and taboo accounts. We propose that people are reluctant to bet on a friend's misfortune because their choice of bet entails a loyalty conflict, a tradeoff between self-signaling that they are loyal to their friend and the pecuniary rewards the bet might provide them. This kind of compensatory tradeoff is notably different from taboo tradeoffs, in which people refuse to compromise sacred values for any amount of money (e.g., quantifying the monetary value of a human life, paying for an intimate relationship, or receiving money to physically harm a child; Tetlock et al., 2000; Fiske & Tetlock, 1997; McGraw, Schwartz, & Tetlock, 2012; Graham, Haidt & Nosek, 2009). To test whether this tradeoff is compensatory or taboo, we asked participants to name one target and then make multiple betting decisions with increasing payoffs for betting that the target would fail.

In its purest form, a sacred value argument would assume that money and values are non-compensatory and cannot be traded off. If people consider betting against a close other to be a taboo-tradeoff, then people should be unwilling to bet against a close other regardless of the size of the payoff they are offered. In general, we agree that people find betting against close others to be an undesirable and aversive behavior. However, our loyalty signaling hypothesis takes a different conceptual form. We propose that loyalty signals and money are compensatory. Thus, although people should be more reluctant to bet against a close other compared to the self (or an acquaintance), they should be less reluctant to bet against a close other as the payoff increases, and they will all trade loyalty for money if the payoff is sufficiently high.

9.1. Method

9.1.1. Participants

Two hundred and ninety-nine Amazon Mechanical Turk workers (42% female, age $M = 32.26$, $SD = 10.01$) participated in exchange for $0.50.

9.1.2. Design and procedure

We used a mixed design. As in Study 3A, we manipulated the target on whom participants placed a bet – the self, a close friend, or an acquaintance – and asked them to make multiple betting decisions for the same target. For the sake of expanding our results to a broader set of stimuli, we set the scene in a trivia game. At the beginning of the study, participants in the friend and acquaintance conditions named a close friend or an acquaintance, respectively, whose name was subsequently piped into the relevant remaining text. In the self condition, participants did not name any target.

Next, participants imagined the target at a bar playing a weekly trivia contest along with many other contestants. The target was described as a big trivia fan who was eager to win the prize. The target believed that his or her chance of winning the prize was 30%. Participants were then asked whether they would accept or reject nine hypothetical bets: (1) Receive $0 if [target] loses; (2) Receive $0.10 if [target] loses; (3) Receive $1 if [target] loses; (4) Receive $10 if [target] loses; (5) Receive $100 if [target] loses; (6) Receive $1000 if [target] loses; (7) Receive $10,000 if [target] loses; (8) Receive $100,000 if [target] loses; (9) Receive $1,000,000 if [target] loses. Participants were told that accepting or rejecting the bet would not cost them money. They would only stand to gain money if they accepted the bet and the target lost. Additionally, no one other than them would know about the bet.

9.2. Results

9.2.1. Betting decisions

We examined betting decisions in a 9 (payoff size) × 3 (target: self, friend, stranger) generalized estimating equations model, with payoff as a within subjects factor and target identity as a between subjects factor.

9.2.2. Target identity

Participants exhibited disloyalty aversion. On average, they accepted 74% of the bets against the self, 62% of the bets against the friend, and 70% of the bets against the acquaintance. Replicating our findings from Study 3A, the target affected betting behavior. In our analyses, the self was the omitted category and we used separate dummy variables for friend and for acquaintance. Compared to the self, participants were more reluctant to accept bets against the friend (B = −0.12, S.E. = 0.04, B = −0.26, t = 3.13, p = 0.002). However, participants were just as likely to accept bets against the self as against the acquaintance (B = −0.05, S.E. = 0.04, B = −0.09, p = 0.252).

9.2.3. Payment amount

Participants were more willing to bet against the target as the payoff increased, χ^2 = 197.72, df = 8, $p < 0.001$.

Fig. 6. Reluctance to bet against friend (compared to the self and acquaintance) reduces as the expected rewards increase

9.2.4. Interaction

Using generalized estimating equations, these results were qualified by an interaction between the two factors, $\chi^2 = 213.11$, df = 24, $p < 0.01$ (Fig. 6). Specifically, participants were more reluctant to bet against a friend at $0, $0.1, $1, $10, $100, $1000 compared to the self ($B = -0.89$, $\chi^2 = 3.23$, $p = 0.072$; $B = -0.70$, $\chi^2 = 2.94$, $p = 0.087$; $B = -1.23$, $\chi^2 = 10.68$, $p = 0.001$; $B = -0.90$, $\chi^2 = 5.76$, $p = 0.016$; $B = -1.54$, $\chi^2 = 6.72$, $p = 0.010$; $B = -1.89$, $\chi^2 = 2.98$, $p = 0.084$, respectively). However, except for the $1000 bet ($B = -2.31$, $\chi^2 = 4.59$, $p = 0.032$), there was no difference between betting on the self and on the acquaintance, all $ps > 0.10$.

Beyond $1000, the target made no difference in betting behavior, all $ps > 0.15$, such that all participants were equally willing to bet on failure for the self, friend and acquaintance. In other words, participants were compensatory in their betting decisions. Although participants were less willing to bet on the failure of a close other than on failure of the self and the acquaintance at lower payout values, starting at $10,000, participants were similarly willing to bet on the failure of a friend, their own failure, and the failure of an acquaintance.

First point of betting on a target's failure. We also examined the first point at which participants bet on the target's failure. 98.4% of them switched at some point from betting on the target's success to betting on their failure. Of those who switched, the median values for switching were $1, $1, and $10 for self, acquaintance, and friend, respectively. We further analyzed whether the first points of betting against the target differed significantly between targets. Because the scale was exponential, we log base 10 transformed the values. There were 34 participants who bet on failure at $0. Since it is impossible to calculate the log of 0, we added 1 to each value, so that betting on failure at $0 remained 0 after the transformation. Three participants (1.6%) never bet against the target at any value and were left out of the analysis. On average, participants were more inclined to bet on failure for themselves ($M = \$7.02$, $SD = 8.92$) and the acquaintance ($M = \$10.07$, $SD = 28.60$) than on their friend's failure ($M = \$29.11$, $SD = 15.78$), $F(2,182) = 4.47$, $p = 0.013$. A contrast test showed that there was no difference between the self and the acquaintance, $t(1,182) = 0.71$, $p = 0.476$. The friend differed from the self, $t(1,182) = 2.89$, $p = 0.004$, and from the acquaintance, $t(1,182) = 2.09$, $p = 0.038$.

9.3. Discussion

The results of Study 5 demonstrate disloyalty aversion in a new context. Participants were more reluctant to bet on the failure of a friend in a contest than on their own failure or that of a stranger. More importantly, their reluctance waned in all cases as the incentive for betting on failure increased. The results suggest that the tradeoff between loyalty signals and rewards is a compensatory tradeoff, not a taboo tradeoff. If betting on close friends were a moral taboo, then participants should have been equally likely to bet on the failure of a friend whether the payout was $1, $100, or $1,000,000. They were not.

10. Study 6: Trait loyalty, magical thinking and reluctance to hedge

Magical thinking and superstition can, in some cases, influence betting and performance decisions (e.g., Hamerman & Morewedge, 2015; Langer, 1975). There are several ways that superstitious beliefs might influence betting behavior. After purchasing insurance, people believe the event they have insured against is less likely to occur (Tykocinski, 2008). Conversely, after "tempting fate" people believe that the event they have tempted is more likely (Risen & Gilovich, 2008). In addition, people believe that supernat-

ural influence is stronger over an outcome (e.g., rolling a 6 on a die) if the outcome has yet to be determined (e.g., the die has not yet been rolled) than if the outcome has been determined but is unknown (e.g., the die has been rolled but the result is still hidden; e.g., Morris, Sim, & Girotto, 1998; for a review, see Langer, 1983).

Although we acknowledge that magical thinking can influence gambling decisions, we believe that superstition does not fully account for disloyalty aversion. In Study 6, we examined if superstition might contribute to disloyalty aversion by testing whether people are more reluctant to bet on the failure of a friend because they believe that a gamble on the success of failure of another person will have a greater influence on that outcome than a gamble on their own success or failure. As a more general measure of the influence of superstition, we examined whether the resolution of the outcome influenced the perceived chance of a positive outcome. We predicted that superstition would not explain disloyalty aversion.

10.1. Method

10.1.1. Participants

We recruited 274 (49% female, age M = 35.40, SD = 11.65) participants from Amazon Mechanical Turk in exchange for $0.50.

10.1.2. Procedure

We used the same paradigm as Study 3A, in which participants made a bet on the outcome of a target's hiring interview. In addition to manipulating the target, we manipulated the timing to create a 3 × 3 experimental design. To manipulate target, participants bet on the self, a friend they named, or an acquaintance they named. To manipulate timing, participants made a bet before the hiring interview ("*before*": "Imagine that [target] is about to go for a job interview"), after the hiring interview but when the interviewer decision has not been made yet ("*unresolved*": "Imagine that target went to a job interview, but the interviewers have not yet made a decision") and after the hiring interview and when the interviewer decision has been made but not yet revealed ("*resolved*": "Imagine that target went to a job interview, and the interviewers have already made a decision but have not released the result yet"). Participants read that they believed ("you believe") that the target has a 10% chance of succeeding. If superstitious beliefs played a role, participants should be least likely to bet on failure before the promotion had been resolved than afterwards (e.g., Langer, 1975, 1983; Risen & Gilovich, 2008).

Next, participants were told to imagine that they had a chance to make a bet on the outcome of the interview. Before they made a decision, they answered two questions related to magical thinking; namely, the probability of succeeding if they bet on success and probability of succeeding if they bet on failure: "If you decide to bet that [target] will be hired, how would it affect the chances of [target] getting hired" and "If you decide to bet that [target] will NOT be hired, how would it affect the chances of [target] getting hired?" on a scale from 1 (*It would make it less likely*) to 7 (*It would make it more likely*).

Next, they made a betting decision as in Studies 3A and 3B, where they could win $5.50 if they bet correctly on success or win $50.00 if they bet correctly on failure. Finally, they answered the loyalty questions from Studies 3A and 3B and completed demographic questions.

10.2. Results

10.2.1. Belief in probability of success if bet on success

There were no main effects of target ($F(2,264) = 0.15$, $p = 0.86$) or timing, $F(2,264) = 1.94$, $p = 0.15$. There was also no interaction, $F(2,264) = 1.90$, $p = 0.11$.

10.2.2. Belief in probability of success if bet on failure

Whereas there was no interaction between target and timing, $F(4, 264) = 0.63$, $p = 0.64$, there was a main effect of target, $F(2, 264) = 4.34$, $p = 0.01$, such that participants believed that the self would be least likely to succeed if they bet on failure. That is, participants believed that if they chose to bet on failure, the self ($M = 3.64$, $SD = 1.23$) would be less likely to get hired compared to the friend ($M = 3.92$, $SD = 0.60$, $t(270) = 2.34$, $p = 0.02$) and compared to the acquaintance ($M = 3.98$, $SD = 0.42$, $t(270) = 2.76$, $p = 0.01$). There was no difference between the friend and the acquaintance, $t(270) = 0.44$, $p = 0.66$.

There was also a main effect of timing, $F(2, 264) = 3.17$, $p = 0.04$. Curiously, participants believed that the target was less likely to get hired if they bet on failure if the decision had already been made ("*resolved*", $M = 3.70$, $SD = 0.85$) compared to if the decision had not been made yet ("*unresolved*", $M = 4.01$, $SD = 0.81$, $t(270) = 2.52$, $p = 0.01$). There was no difference in perceived influence of betting on the likelihood of getting hired between before going into the interview ("*before*", $M = 3.82$, $SD = 0.84$) and before the decision is made ("*unresolved*"), $t(270) = 1.52$, $p = 0.13$, and no difference between before going into the interview ("*before*") and after the decision has been made ("*resolved*"), $t(270) = 1.00$, $p = 0.32$.

10.2.3. Betting decisions

Examining general betting behavior, there was a main effect of target, $X^2(2, N = 273) = 17.23$, $p < 0.001$, $d = 0.47$ (see Tables 1 and 3). We then analyzed the data in a logistic regression with the self as the omitted category and using separate dummy variables for the friend and for the acquaintance (Table 2). Participants were less likely to bet on their friend's failure (51%) than on their own failure (68%; $B = -0.72$, $\chi^2 = 5.43$, $\text{Exp}(B) = 0.49$, $p = 0.02$). They were also marginally more likely to bet on their acquaintance's failure (80%) than on their failure (68%), $B = 0.63$, $\chi^2 = 0.35$, $\text{Exp}(B) = 1.88$, $p = 0.07$. Importantly again, participants were more likely to bet on their acquaintance's failure than their friend's failure (80% vs. 51%), $B = 1.35$, $\chi^2 = 16.00$, $\text{Exp}(B) = 3.85$, $p < 0.001$. After controlling for perceived success (if participants bet on success or on failure), participants remained less likely to bet on their friend's failure compared to both their own failure and their acquaintance's failure. When controlling for perceived success, however, participants were just as likely to bet on their own failure as their acquaintance's failure, $B = 58$, $SE = 0.37$, $\chi^2 = 2.49$, $B = 1.78$, $p = 0.11$.

There was no significant main effect of timing, $\chi^2(2, N = 273) = 0.87$, $p = 0.65$ or interaction between target and timing, $\chi^2(4, N = 273) = 8.01$, $p = 0.091$.

Perceived probability of success (if bet on success) did predict betting on failure. The more participants believed that betting on success will increase the target's success, the less likely they were to bet on the target's failure, $B = -0.85$, $SE = 0.23$, $\chi^2 = 13.49$, $B = 0.43$, $p < 0.001$. Perceived probability of success (if bet on failure) did not predict betting on failure, $B = -0.06$, $SE = 0.17$, $\chi^2 = 0.11$, $B = 0.95$, $p = 0.75$.

10.2.4. Loyalty conflict

There was a main effect of target on reported loyalty conflict, $F(2, 264) = 20.34$, $p < 0.001$. A planned contrast with weights in parentheses revealed that participants experienced significantly more loyalty conflict for the friend ($+1$; $M = 4.60$, $SD = 1.59$) than for the self (-1; $M = 3.69$, $SD = 1.55$, acquaintance weighted 0), $t(270) = 3.84$, $p < 0.001$, and for the acquaintance (-1; $M = 3.08$, $SD = 1.70$, self weighted 0), $t(270) = 6.35$, $p < 0.001$. Participants also reported experiencing more loyalty conflict when betting against the self than the acquaintance, $t(270) = 2.51$, $p = 0.01$. There was no main effect of timing, $F(2, 264) = 0.77$, $p = 0.46$, and there was no interaction, $F(4, 264) = 1.67$, $p = 0.16$.

10.2.5. Mediation

Following the procedures of Study 3A, we collapsed the self and acquaintance conditions to form one overall, non-friend condition. We coded this condition as 0 and the friend condition as 1. Using the bootstrap method in the PROCESS macro (Hayes, 2013), we found that the relationship between target and betting behavior was mediated by loyalty conflict towards the target (95% CI = $[-2.32, -1.02]$) suggesting that the greater conflict participants in the friend condition felt reduced their willingness to bet on the failure of their friend relative to participants in the self and acquaintance conditions. The results held even after controlling for perceptions of success (following betting on failure or success), 95% CI = $[-2.37, -1.02]$.

We also entered loyalty conflict, perceptions of success following betting on failure and perceptions of success following betting on success simultaneously as mediator variables, and only loyalty conflict (95% CI = $[-2.33, -1.00]$), but not perceptions of success (following betting on failure, 95% CI = $[-0.20, 0.14]$ and 95% CI = $[-0.18, 0.03]$, following betting on success), mediated the decision to bet on failure.

10.3. Discussion

Participants did report harboring superstitious beliefs related to betting behavior. In particular, they believed that betting on their own failure and resolved outcomes would have the greatest negative influence on being promoted. More importantly, our loyalty signaling account more parsimoniously explained their reluctance to bet against a close other. Loyalty concerns, but not superstitious beliefs, mediated the greater reluctance that participants exhibited to bet against a close other than the self or a stranger.

If the idiosyncratic superstitious beliefs reported by participants in this study played a key role in their betting decisions, participants should have been least likely to bet against the self and least likely to bet against promotion decisions that had been resolved. If more common forms of superstitious beliefs played a role, one would expect participants to be least likely to bet on failure before the promotion had been resolved than afterwards (e.g., Langer, 1975, 1983; Risen & Gilovich, 2008). Neither of these patterns of betting were observed (Table 3), although these deviations from expectation may be worth further exploration. In sum, participants exhibited disloyalty aversion. They were more likely to bet against the self or an acquaintance than a close other. No effect of timing or target by timing interaction was observed.

11. General discussion

Across seven studies, participants exhibited disloyalty aversion for both real and hypothetical bets. They were more reluctant to bet on the failure of a close other than on their own failure. Participants appeared to place the interest of close others before self-interest because of the stronger negative self-signal that betting against a close other evoked. Hedging against a close other created a conflict between their motive to be loyal and their motive to receive a financial reward.

Table 3
Percentage betting on target's failure.

	Before Interview (%)	After, Unresolved (%)	After, Resolved (%)
Self	67	60	77
Friend	52	48	53
Acquaintance	70	94	76

Four kinds of evidence support our loyalty signaling hypothesis. Betting was affected by manipulating the target of betting decisions in six studies. It was affected by measured natural variation in the bettor's closeness to the target (i.e., a friend; Study 3B), and it was affected by natural variation in the trait loyalty of the bettor (Study 4). When the negative self-signal evoked by betting on a target's failure was weak or absent because the target was the self, an acquaintance, or a distant friend, bettors were more willing to bet that the target would fail. Likewise, when the bettor was less dispositionally motivated by loyalty, participants were more willing to bet that a close other would fail.

Disloyalty aversion is difficult to attribute to optimism, altruism, a moral aversion towards betting against others, a taboo tradeoff, or magical thinking. Addressing optimism, disloyalty aversion was present whether odds were explicitly stated or measured. Altruism does not appear to be responsible for disloyalty aversion because people were not averse to betting on the failure of distant friends or strangers. Disloyalty aversion did not appear to be due to a moral aversion, as when the payout was sufficiently high, almost every participant bet on the failure of their friend, an acquaintance, or their own failure. Finally, disloyalty aversion was not explained by participants' idiosyncratic superstitious beliefs or those more generally observed in the literature on superstition. Of course, these other motives may play a role in a broader reluctance to bet on the failure of any target, an avenue we encourage future research to explore.

One concern is that the real or implied presence of a close friend or acquaintance might influence betting decisions. In Study 1, this may have influenced betting behavior. Although participants made their bets in private on paper, their friends were present, and participants might have been concerned that their choices would lead to an awkward interaction later if their choices were revealed. In Study 2, this could not have influenced betting behavior. We masked the identity of the close other and stranger. Not only were the bets made privately, but bettors also had no knowledge of which section mate they were betting on, and the target had no knowledge that a bet was being placed on their outcome. Furthermore, we conducted Studies 3–6 online in a hypothetical context, so targets other than the self did not know about the bets that participants preferred.

11.1. Implications and future directions

We believe our results offer four theoretical contributions. First, we have shown a novel case in which people are more motivated by interest for others than by self-interest, even when their decisions do not directly affect those others. Participants in our experiments were more willing to profit at their own expense than at the expense of a friend or classmate. Consequently, they were more risk-seeking when betting on the outcome of friends than themselves, even when this meant choosing bets with lower expected values. This behavior stands in contrast to the preference for risk-minimizing safe options when betting for the self, even when expected values of safer and riskier options are the same. In their reluctance to hedge the misfortune of a close other, participants preferred options that increased both their potential losses and gains.

Second, standard game theory approaches assume that the motive underlying choices in game matrices is self-interest. However, as Kelley and Thibaut (1978) have discussed and as newer research on social decision-making and signaling has shown (Bodner & Prelec, 2003; Lee & Harris, 2013; Morewedge et al., 2016; Rilling & Sanfey, 2011), relationships and other social motivations change the perceived values in such matrices. Previous work on interdependence has focused on two types of interactions – those in which a player's decision affects both herself and others

(e.g., dictator game or social dilemma game), and those in which a player's decision only affects others (e.g., rewards allocation). We explore a novel context by examining how feelings about a close other influence choices that affect *only* the self. Our results contribute to an understanding of social motives by demonstrating that loyalty can be a strong motivator even if the friend is not present and cannot benefit or suffer from the choice. In this case, the negative diagnostic utility of the self-signal that disloyalty engenders is sufficiently great to outweigh the positive utility of a more attractive gamble (Morewedge et al., 2016).

Third, given the group-binding function of loyalty (Graham et al., 2011; Van Vugt & Hart, 2004), the concern for loyalty can go beyond existing relationships as long as there is a motivation to be loyal. Our results imply that the salience of loyalty can affect behavior in a short-term relationship, particularly in contexts of partnerships and alliances. In the original story of the one-shot prisoner's dilemma game, for example, each prisoner must decide whether to stay loyal to the other prisoner and cooperate, or to betray the other prisoner and defect. A player may choose the cooperative option if he is reminded of the need to remain loyal to his accomplice than if he is reminded of the economic benefits of defecting. When a player feels disloyal from benefiting from their partner, they should be more likely to cooperate. Furthermore, people in an interdependent or organizational setting may be more likely to dole out punishment when loyalty is salient in their minds. In an altruistic or a third party punishment paradigm in which an observer punishes a defector (e.g., Fehr & Gächter, 2002), punishment is costly and yields no material gain. In these particular group settings, reminders of loyalty, given its function as social glue, may increase punishment aimed at a defector to increase future cooperation (Fehr & Gächter, 2002).

Fourth, the role of loyalty signaling in the greater reluctance to profit from the failure of a friend than the self has important implications for other interpersonal and organizational behavior. Loyalty conflicts are strong motivators to sacrifice one's interest for the benefit of a close other. For example, when a pair of friends are seeking similar jobs, they may end up competing directly for the same job, in which one friend's good outcome is contingent on the misfortune of the other. If they are really close, then one of them might decide to opt out of interviewing because of the loyalty conflict experienced and because she would enjoy the good outcome less if it came at the expense of a friend. She may then focus on a different and smaller pool of job applications, thus increasing the risk of not getting a job. Feelings of loyalty may also increase ethical risk taking. Some ethical dilemmas can create a loyalty-fairness trade-off, such as when a co-worker must decide whether to blow the whistle on unethical behavior and uphold fairness principles or not report the unethical behavior because of loyalty concerns (Waytz, Dungan, & Young, 2013). Conceptually consistent with our findings, people are more likely to keep quiet and protect a friend than a stranger when both targets commit the same transgression at the workplace. By staying silent for a friend at work, they may end up incurring a larger cost, such as lost earnings and social standing in the case of graft or corruption.

12. Conclusion

We find that people exhibit disloyalty aversion. In their greater reluctance to bet on the failure of close others than on their own failure, we find an interesting case in which people place other-interest before self-interest. Disloyalty aversion also leads to risk-seeking behavior. They prefer to increase rather than minimize risk, increasing both the potential gains and losses that their future might hold. The disloyalty aversion we observe is explained by the loyalty conflict that hedging would engender, a conflict between

the negative self-signal incurred by hedging and the rewards it would offer, rather than because of altruistic motives, optimism, moral aversion, or magical thinking. The results illustrate a curious phenomenon and elucidate when and why people are likely to consider others' interests before their own.

Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.obhdp.2017.02.001.

References

Adler, P. A., & Adler, P. (1988). Intense loyalty in organizations: A case study of college athletics. *Administrative Science Quarterly, 33*(3), 401–417.

Arthur, O., & Sheffrin, S. M. (2007). *Economics: Principles in action*. Prentice-Hall.

Axelrod, R. (2006). The evolution of cooperation: revised edition.

Batson, C. D. (1991). *The altruism question: Toward a social psychological answer.* Hillsdale, NJ: Erlbaum.

Batson, C. D., & Powell, A. A. (2003). Altruism and prosocial behavior. In *Handbook of psychology*. .

Benartzi, S., Thaler, R. H., Utkus, S. P., & Sunstein, C. R. (2007). The law and economics of company stock in 401 (k) plans. *Journal of Law and Economics, 50*, 45–79.

Bodner, R., & Prelec, D. (2003). Self-signaling and diagnostic utility in everyday decision making. *The Psychology of Economic Decisions, 1*, 105–126.

Bohnet, I., & Frey, B. S. (1999). The sound of silence in prisoner's dilemma and dictator games. *Journal of Economic Behavior & Organization, 38*(1), 43–57.

Boone, R. T., & Buck, R. (2003). Emotional expressivity and trustworthiness: The role of nonverbal behavior in the evolution of cooperation. *Journal of Nonverbal Behavior, 27*(3), 163–182.

Brody, C. J., & Rubin, B. A. (2011). Generational differences in the effects of insecurity, restructured workplace temporalities, and technology on organizational loyalty. *Sociological Spectrum, 31*(2), 163–192.

Charness, G., & Gneezy, U. (2008). What's in a name? Anonymity and social distance in dictator and ultimatum games. *Journal of Economic Behavior & Organization, 68*(1), 29–35.

Cryder, C. E., Springer, S., & Morewedge, C. K. (2012). Guilty feelings, targeted actions. *Personality and Social Psychology Bulletin, 38*(5), 607–618.

Dawes, R. M., McTavish, J., & Shaklee, H. (1977). Behavior, communication, and assumptions about other people's behavior in a commons dilemma situation. *Journal of Personality and Social Psychology, 35*(1), 1.

Decety, J., & Ickes, W. J. (2009). *The social neuroscience of empathy*. Cambridge, MA: MIT Press.

Dunning, D. (2007). Self-image motives and consumer behavior: How sacrosanct self-beliefs sway preferences in the marketplace. *Journal of Consumer Psychology, 17*(4), 237–249.

Edwards, W., & von Winterfeldt, D. (1986). Public disputes about risky technologies stakeholders and arenas. In *Risk evaluation and management* (pp. 69–92). US: Springer.

Elegido, J. M. (2013). Does it make sense to be loyal to an employer? *Journal of Business Ethics, 116*(3), 495–511.

Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature, 415*, 137–140.

Fischer, G. W., Kamlet, M. S., Fienberg, S. E., & Schkade, D. (1986). Risk preferences for gains and losses in multiple objective decision making. *Management Science, 32*, 1065–1086.

Fiske, A. P., & Tetlock, P. E. (1997). Taboo trade - offs: reactions to transactions that transgress the spheres of justice. *Political psychology, 18*(2), 255–297.

Graham, J., & Haidt, J. (2010). Beyond beliefs: Religions bind individuals into moral communities. *Personality and Social Psychology Review, 14*(1), 140–150.

Graham, J., Haidt, J., & Nosek, B. A. (2009). Liberals and conservatives rely on different sets of moral foundations. *Journal of personality and social psychology, 96*(5), 1029.

Graham, J., Nosek, B. A., Haidt, J., Iyer, R., Koleva, S., & Ditto, P. H. (2011). Mapping the moral domain. *Journal of Personality and Social Psychology, 101*(2), 366–385.

Hamerman, E. J., & Morewedge, C. K. (2015). Reliance on luck identifying which achievement goals elicit superstitious behavior. *Personality and Social Psychology Bulletin, 41*(3), 323–335.

Havercamp, S. M., & Reiss, S. (2003). A comprehensive assessment of human strivings: Test–retest reliability and validity of the Reiss Profile. *Journal of Personality Assessment, 81*(1), 123–132.

Hayes, A. F. (2013). *Introduction to mediation, moderation and conditional process analysis: A regression-based approach*. The Guilford Press.

Inbar, Y., Pizarro, D. A., & Cushman, F. (2012). Benefiting from misfortune: When harmless actions are judged to be morally blameworthy. *Personality and Social Psychology Bulletin, 38*, 52–62.

Jones, E. E., & Berglas, S. (1978). Control of attributions about the self through self-handicapping strategies: The appeal of alcohol and the role of underachievement. *Personality and Social Psychology Bulletin, 4*, 200–206.

Kahneman, D., & Lovallo, D. (1993). Timid choices and bold forecasts: A cognitive perspective on risk taking. *Management Science, 39*(1), 17–31.

Kelley, H. H., & Thibaut, J. W. (1978). *Interpersonal relations: A theory of interdependence* (p. 341). New York: Wiley.

Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology, 32*(2), 311–328.

Langer, E. J. (1983). *The psychology of control*. Beverly Hills: Sage Publications.

Lee, V. K., & Harris, L. T. (2013). How social cognition can inform social decision making. *Frontiers in Neuroscience, 7*, 259.

Levav, J., & McGraw, A. P. (2009). Emotional accounting: How feelings about money influence consumer choice. *Journal of Marketing Research, 46*, 66–80.

Malhotra, D. (1999). Betting that i will fail, when success is more likely: A test of alternative theoretical explanations. *Kellogg Journal of Organization Behavior*, 1–25.

Markowitz, H. M. (1968). *Portfolio selection: Efficient diversification of investments* (Vol. 16). Yale University Press.

McClintock, C. G., & Liebrand, W. B. (1988). Role of interdependence structure, individual value orientation, and another's strategy in social decision making: A transformational analysis. *Journal of Personality and Social Psychology, 55*(3), 396.

McGraw, A. P., Schwartz, J. A., & Tetlock, P. E. (2012). From the commercial to the communal: Reframing taboo trade-offs in religious and pharmaceutical marketing. *Journal of Consumer Research, 39*(1), 157–173.

Meulbroek, L. (2005). Company stock in pension plans: How costly is it? *Journal of Law and Economics, 48*, 443–474.

Morewedge, C. K., Tang, S., & Larrick, R. P. (2016). Betting your favorite to win: Costly reluctance to hedge desired outcomes. *Management Science*. http://pubsonline.informs.org/doi/pdf/10.1287/mnsc.2016.2656.

Morris, M. W., Sim, D. L., & Girotto, V. (1998). Distinguishing sources of cooperation in the one-round prisoner's dilemma: Evidence for cooperative decisions based on the illusion of control. *Journal of Experimental Social Psychology, 34*(5), 494–512.

Norem, J. K., & Cantor, N. (1986). Defensive pessimism: Harnessing anxiety as motivation. *Journal of Personality and Social Psychology, 51*(6), 1208.

Quattrone, G. A., & Tversky, A. (1984). Causal versus diagnostic contingencies: On self-deception and on the voter's illusion. *Journal of Personality and Social Psychology, 46*(2), 237.

Rapoport, A., & Chammah, A. M. (1965). *Prisoner's dilemma: A study in conflict and cooperation* (Vol. 165). University of Michigan press.

Rapoport, A., Diekmann, A., & Franzen, A. (1995). Experiments with social traps IV reputation effects in the evolution of cooperation. *Rationality and Society, 7*(4), 431–441.

Reiss, S. (2004). Multifaceted nature of intrinsic motivation: The theory of 16 basic desires. *Review of General Psychology, 8*(3), 179–193.

Rilling, J. K., & Sanfey, A. G. (2011). The neuroscience of social decision-making. *Annual Review of Psychology, 62*, 23–48.

Risen, J. L., & Gilovich, T. (2008). Why people are reluctant to tempt fate. *Journal of Personality and Social Psychology, 95*(2), 293–307.

Rusbult, C. E., & Buunk, B. P. (1993). Commitment processes in close relationships: An interdependence analysis. *Journal of Social and Personal Relationships, 10*(2), 175–204.

Rusbult, C. E., & Van Lange, P. A. (2003). Interdependence, interaction, and relationships. *Annual Review of Psychology, 54*(1), 351–375.

Scharlemann, J. P., Eckel, C. C., Kacelnik, A., & Wilson, R. K. (2001). The value of a smile: Game theory with a human face. *Journal of Economic Psychology, 22*(5), 617–640.

Singer, T., Seymour, B., O'doherty, J., Kaube, H., Dolan, R. J., & Frith, C. D. (2004). Empathy for pain involves the affective but not sensory components of pain. *Science, 303*(5661), 1157–1162.

Smith, I. H., Aquino, K., Koleva, S., & Graham, J. (2014). The moral ties that bind…Even to out-groups: The interactive effect of moral identity and the binding moral foundations. *Psychological Science, 25*(8), 1554–1562.

Smith, C. W., & Stulz, R. M. (1985). The determinants of firms' hedging policies. *Journal of Financial and Quantitative Analysis, 20*(04), 391–405.

Solnick, S., & Schweiter, M. (1999). The influence of physical appearance and gender on ultimatum game decisions. *Organizational Behavior and Human Decision Processes, 22*(5), 199–215.

Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics, 87*(3), 355–374.

Spiller, S. A., Fitzsimons, G. J., Lynch, J. G., Jr., & McClelland, G. H. (2013). Spotlights, floodlights, and the magic number zero: Simple effects tests in moderated regression. *Journal of Marketing Research, 50*(2), 277–288.

Tetlock, P. E., Kristel, O. V., Elson, B., Green, M., & Lerner, J. (2000). The psychology of the unthinkable: Taboo trade-offs, forbidden base rates, and heretical counterfactuals. *Journal of Personality and Social Psychology, 78*(5), 853–870.

Tykocinski, O. E. (2008). Insurance, risk, and magical thinking. *Personality and Social Psychology Bulletin, 34*(10), 1346–1356.

Van Vugt, M., & Hart, C. M. (2004). Social identity as social glue: The origins of group loyalty. *Journal of Personality and Social Psychology, 86*, 583–598.

Van't Wout, M., & Sanfey, A. G. (2008). Friend or foe: The effect of implicit trustworthiness judgments in social decision-making. *Cognition, 108*(3), 796–803.

Von Neumann, J., & Morgenstern, O. (2007). *Theory of games and economic behavior*. Princeton University Press.

Waytz, A., Dungan, J., & Young, L. (2013). The whistleblower's dilemma and the fairness–loyalty tradeoff. *Journal of Experimental Social Psychology, 49*(6), 1027–1033.