Shared losses reduce sensitivity to risk: A laboratory study of moral hazard

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Moral hazards are said to occur when one party makes decisions that have potential negative consequences that will either be fully or partially experienced by another party. The present experiment sought to explore moral hazard in a laboratory setting. Participants made choices between certain and risky rewards. On some trials, participants bore the full brunt of a loss if the risky reward was chosen and lost. On other trials, participants believed losses would be shared with another party creating the opportunity for moral hazard. Our design allowed us to measure whether the presence of a moral hazard influenced participants' choice behavior and to quantify the magnitude of this influence. Results suggested that participants were more tolerant of risk when they believed losses would be shared with another party compared to choices when all of the loss would be experienced personally. More importantly, concern for the third party losses appeared to exert no influence on choices whatsoever. These results were found when the third party was anonymous (Experiment 1) but also when they met the third party face-to-face (Experiment 2). The relationship between the current results and real-life moral hazards, as well as possible future research directions, is discussed.

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1. Introduction

Moral hazard is a well known problem in the insurance industry. It is said to occur when individuals (as a result of the provision of insurance) adopt behaviors that make it more likely that the event being insured against will occur (Rowell & Connelly, 2012). Using the example of fire insurance, Crosby (1905) differentiated between two types of moral hazard: direct and indirect. Direct moral hazard would be when a property owner (e.g., restaurant owner, landlord), recognizes, as a result of depreciation, that she would gain more by setting the property on fire and collecting the insurance than by continuing to own and operate the property. Indirect moral hazard would occur when a property owner, as a result of being covered by insurance, decreases spending on fireproofing her property (e.g., failing to maintain the insulation of structural members against heat). In the former scenario, the individual directly commits a deliberate action to bring about a hazard, whereas in the latter it is an individual's indifference, negligence, or increased risk-taking that leads to a greater probability of the hazard occurring.

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1 Insurance agencies often refer to indirect moral hazards as morale hazards (McLeman & Smit, 2006).
Most empirical research on moral hazards has looked at the relationship between the presence or absence of a particular insurance (as well as varying levels of coverage of the insurance) and the behavior of policyholders regarding the event being insured against. These studies include, to name just a few, crop insurance (Quiggin, Karagiannis, & Stanton, 1993), workers’ compensation insurance (Butler & Worrall, 1991), sickness insurance (Khan & Rehberg, 2009), and automobile insurance (Cummins & Tennyson, 1996). Even though moral hazards are most often associated with individuals in insurance markets, moral hazards can also exist on an organizational or institutional level (Okamoto, 2009). An example is the behavior of banks and other depository institutions that have deposit insurance (Grossman, 1992; Roy, 2008). By having depositors’ accounts guaranteed by a third party (usually a government), the institution has an incentive to make more risky investments because any losses that result ultimately do not have an effect on the requirements the institution has to cover the costs of its funds (i.e., the accounts of its depositors).

The negative consequences of moral hazards in insurance markets can have large societal costs that are not solely confined to the insured individuals and their insurance agencies. One well-known example of this occurrence is the moral hazard created by government-subsidized flood insurance (Bagstad, Stapleton, & D’Agostino, 2007; Botzen & van den Bergh, 2008; Burby, 2001, 2006; Huber, 2004). Because of the low-probability/high-impact nature of floods, as well as the uncertainty surrounding the probability of floods occurring, private insurers have historically not covered this natural hazard without charging high premiums. As a result, the U.S. congress established the National Flood Insurance Program (NFIP) in 1968, which, among other things, sought to reduce long-term flood damage and shift land development away from flood-hazard areas (Anderson, 1974; Felton, Ghee, & Stinton, 1971). Instead, the percentage of U.S. residents living in coastal counties rose from 28% in 1980 to 53% in 2003 (Cutter & Emrich, 2006). Moreover, since the inception of the NFIP, development in flood-hazard areas has actually increased (an estimated 53% over the first three decades of the program’s existence, Burby, 2001). The NFIP currently insures 5.5 million policyholders with an estimated $1.2 trillion in provisional insurance coverage (Federal Emergency Management Agency, 2012). Elements of the program, such as heavily-subsidized premium rates by the federal government, have made development in flood-hazard areas more attractive and more affordable than they would be otherwise, which contributes to the moral hazard. Additionally, it has been found that more than 85% of policyholders took no additional action to reduce flood vulnerability prior to experiencing flooding beyond what is minimally required in order to receive the insurance (Burby, 2006). The result has been an increase in property damage, loss of lives, and ecological damage due to flooding over the past couple of decades (Bagstad, Stapleton, & D’Agostino, 2007; Birkland, Burby, Conrad, Cortner, & Michener, 2003; Cummins, 2006; Holladay & Schwartz, 2010).

Although most often associated with behavior in insurance markets, the concept of moral hazard can be applied more generally to situations where risk and losses can be shared. Specifically, any situation where an individual or institution is making decisions that have potential negative consequences that will be fully or partially shared with other parties, moral hazard is possible. For instance, if an investment firm increases its risk-taking behavior because it knows that excessive losses will be bailed out by an intervening government, the potential losses of the firm will be shared with the government (i.e., taxpayers) and a moral hazard will have occurred (Okamoto, 2009). However, one does not have to look at the level of modern finance to see this principle at work. Even something as simple as driving more recklessly when using a rental car can be viewed as an example of a moral hazard.

As mentioned above, most of the empirical research on moral hazards has consisted of econometric studies investigating changes in behavior due to insurance coverage. However, there have been a small number of laboratory studies examining risk-sharing and distributed losses (Berger & Hershey, 1994; Deck & Reyes, 2008; Di Mauro, 2002). For example, Deck and Reyes (2008) had undergraduate business students play a costly investment game. In the game, a participant was to make an investment (ranging from $0 to $10). The larger the investment, the greater the probability that a $10 reward (minus the investment) was received by the participant. For instance, an investment of $4 might result in a 50% chance of earning $6 total (10 – 4 = 6), with a 50% chance that no reward would be received (and the investment being subtracted from an initial endowment). In this example, investments greater than $4 would lead to a greater chance of receiving the reward, but the reward would be smaller, whereas the opposite was true for investments smaller than $4. Importantly, on some trials, there was a second investor present. Their role was to make an investment that would be added to the initial investment. This would increase the overall probability of the $10 rewards (minus the investment costs) being received by the two participants. Deck and Reyes (2008) found that participants’ investments were reduced when they knew that a second investor was present. Presumably, this occurred because participants believed that the second investor would compensate for their reduced initial investment. These results are relevant for the study of moral hazard because they show that participants were more tolerant of risk (by making lower initial investments) when the risk was shared with another party. However, the task used by Deck and Reyes is not entirely consistent with the concept of moral hazard. Specifically, even though risk was shared

2 Moral hazard is most often associated with changes in risky behavior in the insured (e.g., less fireproofing of a building when fire insurance is present), but this is not exclusively the case. For instance, more generous health insurance policies can often lead to an increased consumption of medical services (e.g., Abraham, DeLeire, & Royalty, 2010; Joseph, 1972). Increased use of health and medical services is not necessarily associated with risky behavior (with risky behavior referring to behavior that leads to a greater probability of some negative consequence occurring), but the increased demand of the services increases the cost paid for by the insurance agency, so a moral hazard is said to occur. Situations where policyholders increase/exaggerate the size of an insurance claim (such as stemming from overconsumption of a medical service) are usually referred to as ex post moral hazards (Di Mauro, 2002).

3 See Hooks and Robinson (2002) for empirical evidence that the introduction of state-sponsored deposit insurance in Texas led to increased risk-taking by banks and subsequent bank failures in the 1920s. See Wheelock (1992) and Wheelock and Kumbhakar (1995) for similar results in Kansas.

4 In the sample that they studied, Blanchard-Boehm, Berry, and Showalter (2001) found this number to be 97%.
in the two-investor trials. Losses were not. That is, on the two-investor trials, if the joint investment resulted in a loss, a participant still fully experienced the loss of her initial investment and did not share this loss with the second investor.

Even though laboratory studies of moral hazard have been scarce, there has been a recent interest in exploring social influences on risk preferences more generally (for a review, see Trautmann & Vieider, 2011, chap. 29). This has included studying risk taking in situations where choices are made on behalf of other individuals (Hsee & Weber, 1997; Humphrey & Renner, 2011; Pahlke, Strasser, & Vieider, 2012a). For instance, it has been found that decision makers are less risk averse when making choices on behalf of others than when making choices for themselves (Chakravarty, Harrison, Haruvy, & Rutström, 2011). Other recent work has explored how other-regarding preferences involving risk or uncertainty differ from those under certainty (Brennan, González, Güth, & Levati, 2008; Güth, Levati, & Ploner, 2008). This line of research is important because other-regarding preferences have traditionally been studied in riskless situations where payoffs are delivered deterministically (e.g., the dictator and ultimatum games, Hoffman, McCabe, & Smith, 1996). This contrasts with many real-world situations in which social decisions involve varying degrees of risk, such as a financial portfolio manager entrusted to invest her clients’ funds. Studying moral hazard in a controlled, laboratory setting has the ability to contribute to both of these lines of research. That is, moral hazard involves risky choices in a situation where specific payoffs, namely losses, are jointly experienced by two individuals. Moreover, the study of moral hazard also sheds light on the degree to which concern for other’s losses affects preferences in the presence of risk.

The goal of the current study is to explore moral hazard in a laboratory setting. In particular, we are interested in how the sharing of potential losses with a third party affects individuals’ sensitivity to risk. By including instances in which an individual’s losses are asymmetrically shared with a third party, our study accurately simulates real-life moral hazards (cf. Deck & Reyes, 2008). Specifically, the present study offers choices between certain and mixed gambles. The mixed gambles vary in the magnitude of the potential rewards and the level of risk involved. On some of the trials participants must bear the full brunt of a loss if the risky gamble is chosen and lost (i.e., the entire loss is subtracted from their total earnings). Importantly, on other trials, losses (but not gains) are split with a third party (creating a moral hazard since participants only have half of the loss subtracted from their total earnings). Our design allows us to investigate whether individuals are less sensitive to risk when negative consequences will be shared with a third party, but it also allows us to quantify the magnitude of any such change. Furthermore, because of the nature of moral hazard, our results may also be interpreted as reflecting the relative balance between individuals’ self-interest and their concern for others.

2. Experiment 1

2.1. Method

2.1.1. Participants

Participants were 20 Stony Brook University undergraduates. In exchange for participating in the study, participants received partial course credit and monetary compensation of $5.

2.1.2. Task

The decision making task contained three types of trials: Standard, Shared Loss, and Matched. Each trial type consisted of a choice between $15 to be delivered with certainty and a risky gamble consisting of a larger amount that could be gained with some probability and lost with some probability. For the Standard trials, risky gambles offered wins/losses of $20, $30, $40, $50, and $60. These amounts were paired with the following probabilities (in percentages) of winning the gamble: 50%, 60%, 70%, 80%, and 90%. An example of a Standard trial is shown in Fig. 1. This specific trial presents a choice between the certain $15 and a gamble offering a 70% chance of gaining $30 and a 30% chance of losing $30. Whether the certain reward or the risky reward was presented on the left or right side of the screen was randomized on each trial (the same was true for the other two trial types described below).

The Shared Loss trials were the same as the Standard trials, except that the words “Shared Loss” were included beneath the risky gamble. Participants were instructed that choosing the risky gamble and losing on such trials would result in the loss being shared equally between them and another participant that would be run in the experiment exactly one week later (i.e., the third party). Choosing the risky gamble on Shared Loss trials and winning resulted in the gain being added fully to participants’ total earnings (just as on the Standard trials). For the Shared Loss trial displayed in Fig. 1, if a participant chose the risky gamble and won, the entire $30 would be added to her total earnings. However, if she chose the risky gamble and lost, only half of the loss (in this case $15) would be subtracted from her total earnings. Participants were instructed that the other half (the remaining $15) would be subtracted from the total earnings of the third party.

Matched trials were trials that contained risky gambles with an expected value (EV) that was equivalent to the risky gambles on Shared Loss trials assuming that participants considered the personal portion of the loss but completely disregarded the third-party’s portion of the loss. For the Matched trials, simply dividing the losses in the Standard and Shared Loss trials...
in half resulted in the same EVs of the Shared Loss trials if participants only considered the personal losses (see Fig. 1 for an example trial). Fig. 2 presents the EVs of the risky gambles in both the Standard and Matched trial types. For the Shared Loss trials, the subjective value of the risky gambles would be the same as the Standard trials if participants seek to avoid third party losses exactly as they seek to avoid personal losses. If participants instead considered only the personal loss and ignored the third party loss, the subjective value of the risky gambles on the Shared Loss trials would be the same as the EVs of the Matched trials. If participants seek to avoid third party losses, but only to some extent, the subjective value of the risky gambles on the Shared Loss trials would fall somewhere in between the Standard and Matched trials. As a result, participants’ concern for third party losses on Shared Loss trials can be measured by comparing choices on Shared Loss trials to the two extremes (i.e., choices on the Standard trials on the one hand and choices on the Matched trials on the other).

2.1.3. Procedure

Participants signed a consent form upon entering the lab. They were then directed to a small room where they were tested individually. Next, the experimenter gave instructions to participants. The instructions included descriptions of the different types of trials. Participants were also informed that if they accumulated an unspecified amount of earnings during the experiment they would receive $5 in real money. This compensation scheme was used to incentivize participants so that they made choices that were aligned with their actual risk preferences. Moreover, by having real money rewards, participants would believe that the Shared Loss trials could have real consequences for the third party. By leaving the earning requirement unspecified, participants could not compute where their earnings were relative to the required amount needed to receive the $5 reward (further aiding in trials being treated independently).

After receiving instructions, participants completed a brief practice session. Participants were told that their choices during practice did not contribute to their chance of receiving the $5; the practice session was solely to familiarize participants with the task. The practice session contained 18 trials, with 6 Standard trials, 6 Shared Loss trials, and 6 Matched trials. After practice, the experimenter answered any remaining questions. Participants were then told that they would begin the actual

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**Fig. 1.** Example trials for the three types of trials in the decision making task. Choices were always between a certain $15 and a larger risky reward that varied in magnitude and the probability that it would be won or lost. On Shared Loss trials, 50% of the loss associated with the risky reward would be experienced personally, with the other 50% being shared with the third party.

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**Fig. 2.** The expected values of the various risky gambles on both the Standard and Matched trials. Darker shades of green (red) mean the expected values of the risky gambles were increasingly higher (lower) than the certain $15. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)
task and that all subsequent choices would contribute to their accumulated earnings and would thus influence whether or not they received the $5. The experiment contained 75 trials, with 25 Standard trials, 25 Shared Loss trials, and 25 Matched trials. Participants made choices on each trial by pressing the left or right arrow key on the computer keyboard. After each choice, the screen was cleared and the next trial began two seconds later. Feedback was not given to participants after each trial. This was to prevent participants’ choices from being influenced by the outcomes of past risky gambles (again to prevent inter-trial dependencies). After completion of the task, participants were thanked and debriefed. All participants received the $5 compensation regardless of their choices.

2.2. Results

Fig. 3A presents the proportion of trials on which participants chose the risky gamble. A repeated measures analysis of variance (ANOVA) revealed a significant effect of trial type ($F(2,38) = 4.537, p < .05$). Paired-samples $t$-tests showed that the proportion of risky choices on the Standard trials ($M = .43, SD = .16$) was significantly lower than the proportion of risky choices on both the Shared Loss trials ($M = .52, SD = .18$) ($t(19) = 2.726, p < .05$) and Matched trials ($M = .52, SD = .20$) ($t(19) = 2.483, p < .05$). Choices on the Shared Loss and Matched trials did not differ significantly ($t(19) < 1$). These results suggest that participants were more tolerant of risk when losses were believed to be shared with another party. Furthermore, the similarity between choices made on Shared Loss and Matched trials means that participants made choices on the Shared Loss trials as if they only factored in the amount of a loss they would personally experience, entirely discounting the shared portion of the potential loss.

Though the main effect of trial type was the a priori interest of the current study, we also conducted exploratory analyses to evaluate whether the degree of risk affected risky choices. A 3 (trial type) by 5 (risk level) repeated measures ANOVA was performed. Sphericity could not be assumed for the risk level factor and the interaction between trial type and risk level, so the Greenhouse–Geisser correction was applied. Results indicate a significant main effect of risk level ($F(2.94,55.77) = 85.64, p < .001$) and a significant interaction between trial type and risk level ($F(5.00,95.08) = 3.72, p < .01$) (the main effect of trial type is reported in the previous paragraph). Comparing choices on the Standard and Shared Loss trials, significant differences were found for the 60% and 70% risk levels (both $t$s > 3.16, $p$s < .006), but not for the 50%, 80%, and 90% risk levels (all
two trial types were not significant predictors (trials was a marginally significant predictor of total expected earnings while simultaneously being bad for the third party (e.g., the insurer). Risk-taking in the presence of a moral hazard can be in the self-interest of a decision maker (e.g., the insured) while simultaneously being bad for the third party.

Loss trials was the strongest independent predictor of task performance. Specifically, participants with lower sensitivity to risk were brought to the lab at the same time and received instructions in the same room. Participants were told that there participants received partial course credit and monetary compensation of $5.

6 If the risky gamble was chosen on a Shared Loss trial, the expected value that was used was based on the amount of loss that would be personally experienced by the participant (i.e., not the half of the loss that would be shared with the third party).

Finally, we investigated how participants’ choices on the different trial types affected their expected earnings. Expected earnings were computed for each participant by summing the expected values across trials based on participants’ choices. OLS regression was then used with the proportion of risky choices for the three trial types as the predictors and total expected earnings as the criterion variable. As expected, the overall model accounted for a significant proportion of the variance in total expected earnings ($R^2 = .65, F(3, 16) = 10.084, p < .001$). Further, it was found that the proportion of risky choices on Shared Loss trials was a marginally significant predictor of total expected earnings ($β = .418, t = 1.82, p = .088$), whereas choices on the other two trial types were not significant predictors ($ts < 1.23, ps > .238$). This means that participants’ sensitivity to risk on the Shared Loss trials was the strongest independent predictor of task performance. Specifically, participants with lower sensitivity to risk on the Shared Loss trials were expected to earn more than participants with higher sensitivity. This illustrates why increased risk-taking in the presence of a moral hazard can be in the self-interest of a decision maker (e.g., the insured) while simultaneously being bad for the third party (e.g., the insurer).

2.3. Discussion

The results of Experiment 1 show that individuals’ sensitivity to risk is reduced when losses are shared with a third party. Importantly, it was found that participants made choices on Shared Loss trials as if they completely disregarded the shared portion of the losses. This was evidenced by the finding that choices on the Shared Loss trials were indistinguishable from choices on the Matched trials. Instead of tempering their own self-interest with concern for the third party, participants in Experiment 1 made choices that maximized their own earnings at the expense of third parties. This finding stands in contrast to the extensive body of work that has found individuals to exhibit strong other-regarding preferences (for reviews, see Cooper & Kagel, 2009; Fehr & Schmidt, 1999; Sobel, 2005). To pursue this finding further, Experiment 2 sought to investigate whether individuals would show concern for others’ losses under moral hazard when the social distance between the parties was dramatically reduced.

3. Experiment 2

In Experiment 1, participants were instructed that choices on the Shared Loss trials would have potential negative consequences for themselves as well as another participant that would be run in the experiment a week later (the third party). The nature of the third party was intended to simulate real-life moral hazard situations. That is, the two (or more) parties that are sharing losses (e.g., an insurance company, a government) can often have little-to-no direct contact with each other (Akerlof, 1997; Buchan, Johnson, & Croson, 2006). However, it could be argued that the social/temporal distance between participants and the third parties in Experiment 1 may have artificially caused participants to disregard the shared portion of the losses on the Shared Loss trials. For instance, some participants may have doubted that there was actually a third party, which would lead those participants to ignore the amount of the shared losses that would be experienced by the third party. Experiment 2 sought to explore whether the results of Experiment 1 generalize to situations in which participants had direct contact with the third party. To do so, two participants were brought to the lab simultaneously and instructed that the shared losses would be experienced by the other participant.

3.1. Method

3.1.1. Participants

Participants were a new sample of 20 Stony Brook University undergraduates. In exchange for participating in the study, participants received partial course credit and monetary compensation of $5.

3.1.2. Task and procedure

The task and procedure of Experiment 2 were the same as Experiment 1, with the following exceptions. Pairs of participants were brought to the lab at the same time and received instructions in the same room. Participants were told that there were two types of players in the task, one who would be presented the Shared Loss trials (referred to as Player A) and another (referred to as Player B). Player B, on the
other hand, was not presented any Shared Loss trials (and as a result could not affect Player A’s earnings). Participants were instructed that the computer would randomly assign one of the two participants to be Player A and the other to be Player B. Moreover, participants were told that, at the end of the experiment, Player B would see how much was deducted from her total earnings as a result of Player A’s choices on the Shared Loss trials. After receiving instructions, the two participants were led to adjacent rooms where they performed the task individually. At the start of the task, both participants were told by the computer that they were assigned to be Player A (i.e., the player that was presented Shared Loss trials).

3.2. Results

Fig. 4A presents the proportion of trials in which participants chose the risky gamble broken down by trial type. A repeated measures ANOVA revealed a significant effect of trial type ($F(2,38) = 5.538, p < .01$). Paired-samples $t$-tests showed that the proportion of risky choices on the Standard trials ($M = .41, SD = .18$) was significantly lower than the proportion of risky choices on both the Shared Loss trials ($M = .49, SD = .20$) ($t(19) = 2.108, p < .05$) and Matched trials ($M = .52, SD = .20$) ($t(19) = 4.439, p < .001$). Choices on the Shared Loss and Matched trials did not differ ($t(19) < 1$). These results suggest that the moral hazard effect found in Experiment 1 (i.e., increased risk-taking when losses are shared) was not confined to situations in which large social/temporal distance separated the parties. Furthermore, the equivalent choices on Shared Loss and Matched trials imply that participants entirely disregarded the portion of the losses shared by the third party, despite having met this party in person.

We again performed exploratory analyses to assess how the level of risk affected the likelihood of choosing the risky gamble for each of the three trial types. A 3 (trial type) by 5 (risk level) repeated measures ANOVA was performed. Sphericity could not be assumed for the risk level factor, so the Greenhouse–Geisser correction was applied. The main effect of risk level was significant ($F(2.66,50.45) = 65.51, p < .001$) (the main effect of trial type is reported in the previous paragraph), but the interaction between trial type and risk level was not ($F(8,152) < 1$). Fig. 4B presents the differences between choices on the Standard and Shared Loss trials (the moral hazard score) broken down by risk level. As is displayed, the moral hazard effect was not as confined to the moderate risk levels (i.e., 60% and 70%) as it was in Experiment 1.

Finally, we were interested to see how participants’ choices on the different trial types affected their task performance. OLS regression was used with the proportion of risky choices for the three trial types as the predictors and total expected earnings as the criterion variable. As expected, the overall model accounted for a significant proportion of the variance in total expected earnings ($R^2 = .62, F(3,16) = 8.570, p < .001$). Further, it was found that the proportion of risky choices on Shared Loss trials was a significant predictor of total expected earnings ($β = .522, t = 2.60, p < .02$), whereas choices on the other two trial types were not significant predictors ($t_s < 1.20, p_s > .25$).

3.2.1. Cross-experimental analysis

Because the only substantive difference between Experiments 1 and 2 was the social/temporal distance between the two parties, we wished to more directly explore whether reducing the distance between parties had any effect on participants’ choices. The mean moral hazard scores were similar across the two experiments (Experiment 1 = .082, Experiment 2 = .080; $t(38) < 1$). The similarity in choice behavior across the two experiments was also evidenced by the finding that participants’ choices on the Shared Loss trials led to the third party incurring similar expected losses (Experiment 1 = $61.50$, Experiment 2 = $59.93$; $t(38) < 1$). Despite observing no overall differences in the moral hazard scores across the two experiments, we do note that visual inspection of the data suggest that there was a subset of participants in Experiment 2 who were much more risk-seeking on the Standard trials compared to the Shared Loss trials, with 15% of the sample in Experiment 2 having a moral hazard score less than $−0.10$ vs. 0% of the sample in Experiment 1.

3.3. Discussion

Just as in Experiment 1, the results of Experiment 2 demonstrated that individuals’ sensitivity to risk is reduced when losses are shared with a third party. Furthermore, it was again found that participants’ choices on the Shared Loss trials were indistinguishable from choices on the Matched trials. This is evidence that concern for the losses of the third party played no role in choices made under moral hazard. Because previous research has shown that reducing social distance between parties encourages other-regarding preferences (e.g., Charness & Gneezy, 2008), it is surprising that a similar manipulation failed to exert any obvious influence on the results of Experiment 2. Participants in Experiment 2 were put in direct contact with the individual they believed was the third party, but made choices that were indistinguishable from those observed in Experiment 1 (in which the third party was an unknown individual). This may suggest that the social aspects of moral hazards are psychologically distinct, or at least weaker, than those involved in more traditional behavioral economic tasks that involve social factors (e.g., the Dictator game). Other possible explanations are reviewed in Section 4.

4. General discussion

The concept of moral hazard is well known in the insurance industry and in economics more generally (Grubel, 1971; Kunreuther & Slovic, 1978; Rowell & Connelly, 2012). The present experiment sought to create a moral hazard situation
in which participants made risky choices but would not bear the full brunt of a loss. It was found that participants were more risk-seeking on Shared Loss trials that provided the opportunity for moral hazard compared to choices on Standard trials that did not. This finding, in and of itself, may not be particularly surprising. However, the present experiment also included trials that matched the moral hazard trials in expected value if participants only considered the personal portion of the loss on the Shared Loss trials. Because choices were equivalent on the Shared Loss and Matched trials, we are able to additionally conclude that participants made choices exclusively reflecting the magnitude of the personal loss.

Though it would have been implausible to expect that choices on Shared Loss trials would resemble choices on Standard trials (implying that participants valued their partner’s losses as much as their own), one might have reasonably expected that choices on Shared Loss trials would fall somewhere between those on Standard trials and those on Matched trials. Such a pattern would have suggested that choices under moral hazard reflect a compromise between self-interest and concern for the third party; a pattern commonly observed in behavioral economic settings (Charness & Rabin, 2002; Cooper & Kagel, 2009; Fehr & Schmidt, 1999; Hoffman et al., 1996). In contrast, the observed pattern of results suggested that participants were maximizing their own earnings by exposing third parties to losses.

It was also found that the proportion of risky choices participants made on the Shared Loss trials was related to their total expected earnings. It could be argued that this was a result of the structure of the task. This is because the majority of the risky gambles had expected values that were larger than the certain $15 (see Fig. 2). Thus, more risky choices might naturally be expected to lead to greater total earnings. However, this explanation holds true for all three trial types. But as the OLS regression analyses in both experiments showed, earnings were mostly strongly predicted by the number of risky gambles accepted on Shared Loss trials. This appears to be evidence that participants who saw the Shared Loss trials as an opportunity to “take advantage” of the situation, were better able to increase their expected earnings in comparison to participants who failed to capitalize on this opportunity. These findings are often representative of real-life moral hazard situations. That is, when two parties agree to share losses (or risk), the increased risk-taking that follows can often result in short-term profits for one (or both) of the parties. However, there are many real-world situations where the moral hazard created by the sharing of losses can lead to long-term negative consequences (e.g., bank failure, Hooks & Robinson, 2002; Wheelock & Kumbhakar, 1995). As a result, future research may consider exploring situations in which there are tradeoffs between short-term gains stemming from increased risk-taking (in the presence of a moral hazard) and long-term repercussions.
The results of Experiment 2 showed that decreasing the distance between parties did not have a substantial influence on overall risk-taking on the Shared Loss trials. That is, in Experiment 1, participants believed that the third party that would potentially be affected by their choices on the Shared Loss trials would be run in the experiment one week later. In Experiment 2, participants believed that the third party was the person who was in lab with them, received the instructions with them, and performed the task in an adjacent room. The results of Experiment 2 showed that sharing potential losses induced greater risk-taking in participants even with the added social pressure of possibly affecting the chance that another person whom they have interacted with will earn a monetary reward. The results of Experiment 2 are especially surprising because increased risk-taking on the Shared Loss trials can be seen as a lack of generosity. That is, by choosing the risky gamble on the Shared Loss trials, a participant was exposing the third party to losses that she was not directly responsible for. Past research in experimental economics and social psychology has found a strong influence of distance (whether temporal, social, or spatial) on generosity in economic and bargaining behavior (Charness, Haruvy, & Sonsino, 2007; Handgraaf, Van Dijk, & De Cremer, 2003). This is especially the case with ultimatum and dictator games, in which one player is asked to divide a sum of money between herself and another player\(^7\) (for a review of these games, see Camerer & Thaler, 1995; Thaler, 1988). Previous research has found that reducing social distance between the two players (e.g., having participants meet face-to-face) leads to increased offerings in the dictator game (i.e., more equitable divisions of the allotted money) (Bohnet & Frey, 1999; Hoffman et al., 1996). Charness and Gneezy (2008) found that simply providing participants with the names of their counterparts in a dictator game led to more generous divisions. Given that our participants took advantage of moral hazards even when we decreased the social distance between participants and third parties, it may be the case that decision makers do not see the sharing of losses as an issue of fairness or generosity.

One reason for this difference is that there may be a difference in how social distance affects other-regarding preferences in riskless situations (e.g., allotments in the dictator game) and situations that involve risk or uncertainty (e.g., moral hazard). For example, Güth et al. (2008) conducted an experiment in which participants evaluated certain and risky rewards, some of which would be personally experienced and some of which would be experienced by another, anonymous partner. Whereas manipulating the level of risk of participants’ own payoffs affected participants’ evaluations, manipulating the level of risk of the other partners’ payoffs did not. In a follow up study, Güth, Levati, and Ploner (2011) included a condition in which participants first viewed a two-minute silent video of the person they believed was their partner. This manipulation was designed to make the other partner more identifiable and reduce social distance. However, it did not influence participants’ evaluations. This is similar to the results of our Experiment 2, in which reducing the social distance between parties did not alter risky choices on Shared Loss trials.

One reason that other-regarding preferences may differ in risky environments is because it is easier to justify selfish behavior when payoffs are stochastic. This is because an individual can claim that inequitable outcomes were not a certain consequence of their self-serving choices. This stands in contrast to inequitable allotments in the dictator game in which inequitable outcomes are a direct and certain consequence of dictators’ choices. This explanation would suggest that increased accountability for decisions would be an effective way to influence risk preferences in social situations (Vieider, 2009, 2011). For example, it has been found that increasing accountability reduces harvesting amounts in a resource dilemma involving uncertainty (de Kwaadsteniet, van Dijk, Wit, De Cremer, & de Rooij, 2007). It was also recently found that increasing accountability led to reduced levels of loss aversion when decision makers made risky choices for themselves and a second recipient (Pahlke, Strasser, & Vieider, 2012b). It is important to note that participants in our Experiment 2 were told that Player B would see how much was deducted from her earnings as a result of Player A’s choices on the Shared Loss trials. Yet, participants’ choices on Shared Loss trials were still significantly riskier than choices on Standard trials (and did not differ from the choices made by participants in Experiment 1). The belief that Shared Loss outcomes would be made public to Player B can be seen as outcome accountability, which contrasts with process accountability (Lerner & Tetlock, 1999). Outcome accountability refers to when decision outcomes are made public, whereas process accountability refers to when decision processes and reasons have to be explained by a decision maker. It has recently been found that a process accountability manipulation (compared to an outcome accountability manipulation) has a stronger effect on reducing self-serving decisions when individuals are entrusted to make decisions that affect another’s payoffs (Pitesa & Thau, 2013). As a result, it would be prudent for future research to explore whether including process accountability affects risk sensitivity under moral hazard.

5. Conclusions

The current study found that participants make riskier choices when they believe that the negative consequences that could result from their choices will be shared with a third party. This moral hazard effect was found when participants had no direct contact with the third party, as well as when they met the third party face-to-face. Importantly, concern for the losses shared with the third party appeared to exert no influence on choices made by participants under moral hazard. This lack of concern, though detrimental to the third party, had substantial, positive benefits on participants’ earnings.

\(^7\) In the ultimatum game the recipient player can choose to reject the division (in which case both players receive nothing), whereas in the dictator game the recipient player has no choice and must accept the division.