Risky Choices on Behalf of Others

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Abstract

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The goal of this dissertation was to compare risky choices on behalf of others relative to the self and whether accountability plays a role. To that end, three hypotheses were proposed: the risk-as-feelings hypothesis: deciding on behalf of others who we do not know decreases cautiousness; the system 2 activation hypothesis: deciding on behalf of others leads to better decisions; playing-it-safe hypothesis: deciding on behalf of others increases cautiousness. Participants in both experiments took part in a lab-simulation task in which they were given a virtual budget and were required to make crop-choices (Experiment 1) or road-salting choices (Experiment 2) based on weather-forecasts to either maximize their budget (E1) or minimize their losses (E2) on their own behalf or on behalf of another participant. In addition, half of all participants were held accountable such that they needed to justify their decisions. Although none of the hypotheses were supported in E1, in E2 the risk-as-feelings was supported. In addition, accountability reduced cautiousness among those deciding on behalf of unknown participants.

Introduction

Imagine that you have just earned a bonus from your employer and you are deciding whether to deposit it in your savings account or invest in stock options. Your decision might be influenced by the current economy, your current financial situation, or even past similar experiences. Now imagine that a friend of yours has earned a similar bonus and asks you to decide on her behalf. Would you do the same for her as you would for yourself because you can empathize with her? What if she is someone you do not know? Would you make riskier choices because, unlike your friend, you cannot empathize with her? Alternatively, would you make better decisions than you would for yourself because deciding on someone else's behalf, anybody, forces you to think better or would you be more cautious because you do not want to feel responsible for a bad outcome? In the research presented here, I ask whether and how the risky decisions we make for ourselves compare to the risky decisions we make on behalf of someone else and what might explain that difference.

Many people are called upon to give advice to others about which choice to make such as the school official who has to advise school administrators on whether schools should close given a snowy forecast; a lawyer who advises her client on whether to sue her employer; or the doctor who has to suggest a course of treatment for his patients. These examples all have one thing in common: the people giving advice are all professionals and are presumably experts in their fields and the assumption is that their expertise will help their clients make sound decisions. However, what if the person we seek advice from is a non-expert? For example, you might ask a friend about where to vacation, what hike to go on, or what restaurants to go to. What about more consequential questions? Would you ask a friend for investment advice or even ask that person to invest on your behalf? In fact, while 76% of Americans manage their own money 20%

report that a non-professional does it for them (Fox, 2019). Are people who rely on a non-professional other better off than they would be managing that money themselves? Before answering that question, I first discuss how people in general tend to make decisions in risky contexts.

Managing money or deciding where to allocate funds for future returns usually involves a safe and a riskier option. For example, a farmer who is thinking about what type of crop to plant for the upcoming season might consider between a crop that is resistant to droughts but yields lower earnings relative to a crop that yields higher earnings but only in non-drought outcomes. If he needs money now, then the drought-resistant crop is the better option of the two and the alternative crop while more profitable is also probabilistic and in the event of a drought or a sequence of drought might yield a loss. However, if he is trying to maximize his wealth over a longer time span and is making many such crop-choice decisions then he should opt in favor of the riskier crop when the chance of drought is relatively low and the drought-resistant crop when the chance of drought is relatively high. These decisions are based on the expected value (EV; Laplace & Truscott, 1951) of these crops given a probability, as seen in Equation (1);

$$EV = \sum p_i x_i, \tag{1}$$

According to this formula, p_i and x_i are the probability and the amount of money, respectively, associated with each possible outcome. The point here is that it is in the farmer's best interest to follow the norm if his goal is to maximize his wealth.

However, evidence suggests that people deviate from this norm (Tversky & Kahneman, 1979). For example, consider one study in which participants were given drought forecast and had to make crop choices like the one described above (Demnitz & Joslyn, 2020). In this study, the drought-resistant crop cost $200 and paid $300 regardless of the outcome while the alternative, riskier crop, cost $100 and paid $300 in non-drought outcomes. According to the normative standard (i.e. equation 1), the optimal strategy in this task is to choose the riskier crop when the percent chance of drought is below 33% and choose the riskier crop otherwise. However, results were such that people opted for the drought-resistant crop more often than was warranted. That is, they were more cautious than they ought to be based on the normative standard.

In another study participants were required to make road-salting decisions based on the percent chance of the overnight freezing temperature (Grounds & Joslyn, 2018; LeClerc & Joslyn, 2015). In this task participants were given a budget and while sating the roads cost $1,000 not salting it resulted in a $6,000 in the event of overnight freezing temperatures. The results were such that participants salted less often than is normatively warranted. That is, they were less cautious than they ought to be based on the normative standard.

Although these results might appear conflicting, they are not: while people are more cautious in mixed-gambles (when winning and losing are possible) and less cautious in losses (when winning is not possible) this difference can be explained by prospect theory.

Prospect theory attempts to explain people's deviation from optimality by positing that people's suboptimal performance results because losses are weighted more heavily than gains, people derive less utility from changes in wealth beyond the reference point, and the probabilities of outcomes along a continuum are not weighted linearly (Tversky & Kahneman, 1979). These three principles are discussed next.

Prospect theory posits that losses are weighted more heavily than gains (i.e., *loss aversion*; Tversky & Kahneman, 1979). In fact, there is evidence to suggest that the vmPFC and the striatum, brain regions associated with sensitivity to gains and losses, show significantly greater activation to changes in losses than to equivalent changes in gains (Tom, Fox, Trepel, & Poldrack, 2007). To put the robustness of this effect into perspective, a potential gain has to be on average twice as much as the potential loss to make people indifferent between the sure option and the risky option (Kahneman, Knetsch, & Thaler, 1990; Tversky & Kahneman, 1992). To illustrate loss aversion in the context of the agricultural task explained above, participants were more likely to opt in favor of the drought-resistant crop even if the expected value of the risky crop was greater because the drought-resistant crop was riskless. As the abovementioned research suggests, the potential gain of the riskier crop should be on average twice as much as the guaranteed gain of the drought-resistant crop to induce participants to change their crop preferences (Kahneman, Knetsch, & Thaler, 1990; Tversky & Kahneman, 1992). In the road-salting task loss aversion suggest that people prefer the risky choice of not salting because they avoid losing if the outcome is favorable while salting results in a guaranteed loss.

Prospect theory's second principle suggests that people have diminishing utility in changes of wealth from a given reference point. That means that adding one dollar to a wealth of $0 has a greater impact than adding one dollar to a wealth of $100, much like a candle that is lit in a room full of candles will have less effect than one candle lit in a dark room. In the context of the agricultural task, for example, the expected value of the risky crop given, say, a 10% chance of drought (=$170), is not treated as $70 greater than the value of the drought-resistant crop but some amount less than that. Conversely, the expected loss of not salting given, say, a 20% chance of freezing (= -$1,200), is not treated as $200 costlier than of salting but some amount less than that.

Finally, prospect theory's third principle suggests that probabilities are not treated objectively as they are stated. In fact, people tend to overestimate low probabilities and underestimate high probabilities (Tversky & Kahneman, 1992). This suggests that when given a 10% chance of drought people overestimate its likelihood which partly explains their preference for the riskless crop.

To summarize, over-cautiousness is the tendency in mixed gambles and under-cautiousness is the tendency in loss contexts. Although I will attempt to use the term cautiousness for the sake of simplicity, the term *risk-aversion* is used to imply errors in mixed gambles (or pure gain domains, domains in which losing is not possible) and *risk-seeking* is used to imply errors in loss domains.

The emphasis so far has been on prospect theory and that it might help explain why people are risk-averse in mixed gambles and risk-seeking in losses. This leads to the question that is central to this paper: if people make decisions on behalf of others, are they influenced by these same principles as well or might other factors influence their choices? Here I introduce the terms self and other. The former is used to describe people who make decisions on their own behalf while the latter describes people who makes decisions on behalf of someone else.

Research exploring differences in risky choices between self and others has not reached consensus. Sometimes the same biases observed when making decisions for oneself are seen when making decisions for others, sometimes they are not. As can be seen in table 1 below, the experimental paradigms have varied widely but they do not seem to account for the differences even when controlling for everything else. What follows next is a brief summary of these findings in mixed gambles, gain domains, and domains.

Table 1

Self vs Others in Risky Contexts

Domain	Paper	Paradigm	Incentive	Risk-Averse	Risk-Seeking	Design
Mixed	Andersson, Holm, Tyran, & Wengström, (2014)	Variation of MPL task by Holt and Laury[1](2002)	Payout of 1 gamble to self and recipient	Self > Other	NA	between
	Polman, (2012) (experiment 2)	Binary Choice Problem	Win $200 (self and agent)	S > O	NA	between
	Polman, (2012) (experiment 3)	Binary Choice Problem	Payout of 1 gamble to self and recipient	S > O	NA	between
	Pahlke, Strasser, & Vieider, (2015)	Binary choice problem	Payout of 1 gamble to self and recipient	S = O	NA	between
	Pollmann, Potters, &Trautman, (2014)	Gneezy and Potters (1997) investment risk	Agent rewarded by recipient after outcome	S = O	NA	between
	Vieider, Villegas-Palacio, Martinsson, Mejia, (2015)	Certainty equivalence choice list	Payout of 1 gamble to self and recipient	S = O	NA	between
	Eriksen and Kvaloy, 2010	Gneezy and Potters (1997) investment risk	Fixed reward	S < O	NA	between
	Pollmann, Potters, & Trautman, (2014)	Gneezy and Potters (1997) investment risk	Agent rewarded by recipient before outcome or no reward	S < O	NA	between

Gains	Chakravarty, Harrison, Haruvy, & Rutstrom, (2011)	Holt & Laury task	Recipient receives earnings	S > O	NA	within
	Hsee & Weber, (1997)	Preferences for gambles	NA	S > O and S = O	NA	within
	Andersson et al., (2014)	Variation of MPL task by Holt and Laury (2005)	Payout of 1 gamble to self and recipient	S = O	NA	between
	Eriksen, Kvaloy, Luzuriaga, (2020)	Hypothetical lottery scenario	NA	S = O	NA	within
	Pahlke et al., (2015)	Binary choice problem	Payout of 1 gamble to self and recipient	S < O	NA	between
	Vieider et al., (2015)	Certainty equivalence choice list	Payout of 1 gamble to self and recipient	S < O	NA	between
	Eriksen, Kvaloy, Luzuriaga, (2020)	Gambling decisions	NA	S < 0	NA	within
Losses	Hsee & Weber, (1997)	Preferences for gambles	NA	NA	S < O and S = O	within
	Pahlke et al., (2015)	Binary choice problem	NA	NA	S < O	between
	Vieider et al., (2015)	Certainty equivalence choice list	Subtract of 1 gamble to self and recipient	NA	S = O	between

Although mixed gambles research has used between-subjects design such that participants made decisions on their behalf or on behalf of others, the paradigms and types of incentive given to participants in these studies have varied. The Gneezy and Potters investment task is one of the most popular paradigms (Gneezy & Potters, 1997). In this paradigm participants are given an initial endowment (virtual points) and decide whether to keep or invest it. While investing it has a better return than keeping it based on the expected value, evidence suggests that participants making the decisions on behalf of others were found to be more risk-averse than self (Eriksen & Kvaloy, 2010; Pollman, Potters, & Trautmann, 2014) and equally risk-averse (Pollman, Potters, & Trautmann, 2014). These conflicting findings could be attributed to differences in how participants were paid; in the former two studies participants were given a fixed reward regardless of their performance, or were rewarded before the outcome was known, while in the latter study those making decisions on behalf of others were not rewarded or rewarded after the outcome was known.

Other studies that controlled for incentive-type have shown conflicting results as well suggesting that the abovementioned conflicting findings might not be attributable to differences in how participants were incentivized. For example, when the binary choice problem was used - a paradigm in in which participants have to choose between safe and risky prospects - authors found that those who made decisions on behalf of others were less risk-averse than the self (Polman, 2012) but also equally risk-averse (Pahlke, Strasser, & Vieider, 2015). In both studies participants were incentivized by being told that one of their gambling choices in the binary choice problem would be played out and that they would receive the earnings in cash.

While the MPL task (Holt & Laury, 2002 in Andersson, Holm, Tyran, & Wengstrom, 2014) and the certainty equivalence task (Vieider, Villegas-Palacio, Martinsson, & Mejia, 2015) are different tasks they are fundamentally similar. In these tasks, experimenters measure participants' preference reversals. For example, participants might be asked to choose between a 50/50 chance of earning $11 or $65 or a 50/50 chance of losing $25 or earning $65 in decision point 1. While the safe prospect stays constant, the risky prospect becomes increasingly more attractive such that on trial 10 there might be a 50/50 chance of losing 25 DK or earning 370 DK. Again, results differ such that those who made decisions on behalf of others were found to be less risk-averse than the self (meaning that they switched earlier to the risky prospect; Andersson, Holm, Tyran, & Wengstrom, 2014), but also equally risk-averse (Vieider, Villegas-Palacio, Martinsson, & Mejia, 2015). Again, differences in how participants were incentivized cannot explain differences since both groups of authors adopted the same method used in the binary choice problem (preceding paragraph) to pay participants.

In gain domains usually the risky prospect is risky because there is more variability in the outcome compared to the sure prospect. That is, a larger gain and a smaller gain (or no gain) are possible relative to the sure prospect. When the MLP task was used, authors found no differences (Andersson, Holm, Tyran, & Wengstrom, 2014) but also less risk-aversion on behalf of others than self (Chakravarty, Harrison, Haruvy, & Rutstrom, 2011). The studies did not only differ in how participants were incentivized but also in their study design: the significant finding could be attributed to the greater power since it used a within-subjects design compared to a between-subjects design of the study that found no difference.

In the certainty equivalence choice list (Vieider, Villegas-Palacio, Martinsson, & Mejia, 2015) and the binary choice problem (Pahlke, Strasser, & Vieider, 2015), evidence suggests that those making decisions on behalf of others are more risk-averse than self in gain domains.

Interestingly, the study design was the same (between-subjects) and so was incentive-type. These seem to be the only two studies that match paradigm, incentives, and design.

Authors have also used hypothetical scenarios to elicit risky choices between self and others in gain domains rather than games or lab-simulations like the ones described so far and results have also varied. For example, when participants were asked to imagine that they (or someone else) had won the lottery and had to decide to gamble or invest those earnings participants deciding on behalf of others were more risk-averse than self (Eriksen, Kvaloy, Luzuriaga, 2020). In another study participants were asked to gauge what another person would prefer in an imagined scenario involving potential gains (Hsee & Weber, 1997). Participants reported that other people would be less risk-averse than themselves *except* if the other person was someone who they knew, in which case they thought the other person would be equally risk-averse. As will be discussed later, the identity of the decision-recipient might be an important variable. However, the limitation in both these studies is that participants were not paid. This does not necessarily mean that participants were not motivated but rather that differences could have been more pronounced if the stakes were higher. In fact, evidence suggests that in gain domains when real money is at stake people tend to be more risk-averse than hypothetical money (Etchart-Vincent & L'Harridon, 2011).

What these findings in mixed gambles and gain domains suggest is that there does not seem to be consensus on how self and others compare. Results have been conflicting when controlling for experimental paradigm, when controlling for incentive-type, and when controlling for both. The studies that match for all these variables show similar results such that those making decisions on behalf of others tend to be more risk-averse than self but the problem is that these findings are based on two studies. To what extent can conclusions be made based on two studies?

As I showed, some studies have used hypothetical money rather than real money but that does not seem to change the direction of the result but rather the magnitude. In this paper, as I will address later, participants were incentivized with raffle tickets contingent with their performance to vie for a cash prize. In addition, the identity of the person on whose behalf the decision was made varied. This might matter; making decisions for someone we know might be very different than making decisions for an unknown matter as was evidenced by the study reviewed earlier (Hsee & Weber, 1997).

There has been less research involving losses only. Incentivizing people in loss contexts poses a challenge because people generally do not volunteer to participate in an experiment where they could lose money. To address that, researchers have either used hypothetical scenarios or given participants money to use in the task and allow them to keep whatever is left. Whereas in gain domains it makes a difference whether real or hypothetical money is used in losses that does not seem to matter; participants tend to be equally risk-seeking whether real or hypothetical money is used (Etchart-Vincent & L'Harridon, 2011). Evidence suggests that in loss domains when a binary choice problem is used those deciding on behalf of others were more risk-seeking than the self (Pahlke, Strasser, & Vieider, 2015) and when using a certainty equivalence choice list there was no difference in risk-seeking between self and others (Vieider, Villegas-Palacio, Martinsson, & Mejia, 2015). Again, it is not possible to know whether these differences can be attributed to the experimental paradigm or the type of incentive as these differed as well.

To summarize, results in mixed gambles, gain, and losses might depend on the paradigm, how participants are incentivized, operationalization of the decision-recipient, or even study design. Thus, any answer as to how self compares to others when making risky choices needs to take these variables into account. I do not assume that any of these variables in my study are better than any of the authors reviewed thus far. However, I do believe that the paradigm, incentive type, and how decision-recipients were operationalized might be informative and apply to certain contexts. In addition, what makes this paper interesting are the theories. I propose three theories and unpack these in detail next in the following order: the risk-as-feelings hypothesis, the system-2-activation hypothesis, and the playing-it-safe hypothesis.

The risk-as-feelings hypothesis suggests that feelings play a role in people's risky choices (Loewenstein, Weber, Hsee, & Welch, 2001). That is, the types of decisions people make depend on how they feel about the decisions they are asked to make. For example, people show very little sensitivity to changes in probability involving negative outcomes such that they will pay seven dollars to avoid a shock that has a 1% chance of happening while paying only three dollars more to avoid a shock that is 99 times more likely (Rottenstreich & Hsee, 1999).

To describe how feelings might operate in a context in which people are asked to make decisions on behalf of others, construal level theory needs to be taken to account (Trope & Liberman, 2010). Construal level theory describes the effect of psychological distance and people's decisions (Trope & Liberman, 2010). Just like an event that is bound to happen one year from now feels more distant (abstract) than one that is bound to happen one day from now (concrete), people who make decisions for others feel more distant to the decision than people who make these decisions for themselves (Trope & Liberman, 2010). Taking this a step further, by varying the psychological distance between the decision-recipient and the person who is making these decisions the decisions that are made should vary. This assumes that when people make decisions on other people's behalf they make the decisions as they would for themselves rather than trying to think what the decision-recipient would prefer. In fact, there is evidence that supports this: people predict others who are physically present and whose identity is known as having similar risk preferences as their own but predict hypothetical others as generally less cautious (Hsee & Weber, 1997). Why? It might be that it is easier to empathize with a recipient who is close or known (concrete) than someone who is not (abstract) and thus the feelings that operate during the decision process involving a concrete-other might be as prominent as that of someone deciding for the self (Hsee & Weber, 1997; Loewenstein, Weber, Hsee, & Welch, 2001).

The risk-as-feelings hypothesis thus predicts that feelings play a role in risky choices and that people are impacted by the psychological distance between them and the decision-recipient such that in mixed gambles and loss domains there should be *no difference* in either risk-aversion or risk-seeking between those making decisions on behalf of a concrete-other and those making their own decisions. When the decision-recipient is an abstract-other people should be *less risk-averse* (less cautious) in mixed gambles, where the most common error tends to be increased risk-aversion relative to the normative standard, and *more risk-seeking* (less cautious) in loss domains, where the most common error seems to be increased risk-seeking relative to the normative standard, compared to those making their own decisions.

These differences in cautiousness should translate into differences in decision quality. This means that there should be no differences in expected value and expected loss between those making decisions on behalf of a concrete-other and those making their own decisions.

When the decision-recipient is an abstract-other, agents should yield greater expected value and greater expected loss than those making their own decisions.

The second theory that might explain differences in how people make decisions on behalf of others involves the dual systems framework. According to this framework, thinking involves two systems (Kahneman, 2003; Stanovich & West, 2000). More specifically, System 1 helps us make decisions fast and effortlessly usually through some sort of heuristic (a rule of thumb). For example, a farmer might decide whether to plant the riskless crop based on the ease with which prior droughts come to mind. If droughts happened recently the farmer might choose the riskless crop even if the forecast suggests otherwise. To the extent that this cue (i.e. recency of drought in memory) is correlated with the actual outcome then this might be a reliable cue and save the farmer time and effort. However, the cue might be a problem if there is no correlation between it and the outcome. Here is when the alternative to System 1 - System 2 - might be helpful. System 2 also helps us make decisions but requires more effort and deliberate cognitive processing but this is not to say that these systems are mutually exclusive; System 2 might monitor System 1 and inhibit it if it leads to the seemingly incorrect decision (Kahneman, 2003). In the case of the farmer, if System 2 is active it might inhibit his initial inclination to plant the riskless crop and instead make crop choices based on the actual forecast (in this case choose the risky crop given the small chance of drought).

Deciding on behalf of others could similarly trigger System 2 compared to making decisions on one's behalf. More specifically, agents assume that they might be held accountable and later might need to provide a good rationale for their choices. This implicit expectation of accountability is what underlies differences between self-others according to the System 2 activation hypothesis. In fact, accountability, which is defined as the expectation of having to justify one's decisions, has been shown to reduce loss aversion (Vieider, 2009).

Thus, according to this hypothesis people who decide on behalf of others (abstract and concrete) will make normatively better decisions than those making decisions on their own behalf. More specifically, those deciding on behalf of others will be *less risk-averse* (less cautious) and *less risk-seeking* (more cautious) than those deciding on their own behalf. This suggests that those deciding on behalf of others will yield greater expected value and lower expected loss than those deciding on their own behalf. However, if accountability underlies these differences then when agents are held accountable these differences between self and others should disappear.

While the system 2 activation hypothesis suggests that deciding for others has a debiasing effect because of the expectation of accountability, deciding on behalf of others could nevertheless introduce bias; it is plausible that deciding for others makes people more cautious overall because they do not want to feel responsible for a bad outcome. In fact, evidence suggests that individuals choosing from two lotteries are less cautious when the payoff will affect only themselves than when the payoff will also affect a passive group member (Bolton, Ockenfels, & Stauf, 2014). Here increased cautiousness means to favor the safest option even if the gamble is advised from an economical perspective. Accountability here should have no effect because whatever debiasing effect it might have is undermined by people's preference for the safe outcome. In other words, feeling responsible for someone else's fate causes people to be more cautious. Greater cautiousness on behalf of others should result in lower expected value but also lower expected loss.

Tables 2 and 3 below summarize predictions for mixed-gambles (table 2) and losses (table 3). To aid comprehension, risk-aversion and risk-seeking are labeled "cautiousness" in both tables. Comparisons are made between the self and those making decisions for an abstract or concrete-other. In addition, these comparisons are made when self and others are not held accountable and when they are held accountable. The risk-as-feelings hypothesis does not depend on accountability which explains why the predictions between self-other is the same across accountability. Predictions regarding expected value (mixed gambles) and expected loss (losses) are included on tables 6 (page 24) and 11 (page 39) but they can be inferred from the tables below by reversing the direction of the sign (e.g. greater cautiousness on behalf of self in Experiment 1 compared to abstract-other results in lower expected value on behalf of self).

To test these hypotheses, two experiments were conducted in which participants were required to make decisions for themselves or on someone else's behalf who was either psychologically close or distant and participants were either held accountable or not. In addition, all participants were incentivized such that they earned lottery tickets commensurate with their performance on their own behalf or on behalf of another.

Whereas in Experiment 1 participants' goal was to maximize their income, in Experiment 2 their goal was to minimize their losses. The results of both experiments put together should inform if any of the hypotheses operate in the decision process. It could very well be the case that something other than what is proposed here is operating. For example, if the risk-as-feelings is supported in Experiment 1 this does not mean that those deciding on behalf of abstract-others are generally less cautious as it could mean that they make better decisions. If this is the case, then in Experiment 2 they would be less risk-seeking and not more risk-seeking. Thus, two experiments are necessary to test whether any of these hypotheses are explaining differences in a self-other.

Table 2

Cautiousness as a Function of Self-Other and Accountability: Mixed Gambles

	Non-accountable		Accountable	
	Self vs. Abstract	Self vs. Concrete	Self vs. Abstract	Self vs. Concrete
Risk-as-Feelings	S > A	S = C	S > A	S = C
System 2 Activation	S > A	S > C	S = A	S = C
Playing-it-Safe	S < A	S < C	S < A	S < C

Note. The “ < ” or “ > ” sign indicates whether the self is systematically less cautious or more cautious, respectively, than those making decisions on behalf of another person (abstract or concrete-other). An “ = ”sign indicates that there is no systematic difference in cautiousness.

Table 3

Cautiousness as a Function of Self-Other and Accountability: Losses

	Non-accountable		Accountable	
	Self vs. Abstract	Self vs. Concrete	Self vs. Abstract	Self vs. Concrete
Risk-as-Feelings	S > A	S = C	S > A	S = C
System 2 Activation	S < A	S < C	S = A	S = C
Playing-it-Safe	S < A	S < C	S < A	S < C

Note. The “ < ” or “ > ” sign indicates whether the self is systematically less cautious or more cautious, respectively, than those making decisions on behalf of another person (abstract or concrete-other). An “ = ”sign indicates that there is no systematic difference in cautiousness.

Method: Experiment 1

Participants

A total of 343 University of Washington psychology students (56% female) participated in return for course credit and a chance to earn $200. The mean age was 19.76 years old (*SD* = 4.53). Due to the Coronavirus pandemic, data collection had to be brought to a halt with approximately 65% of the number of participants required for 80% power based on pilot data (see Appendix A). In addition, 13 participants were omitted from the analyses because their responses to all trust or all concern questions were the same suggesting that they were not paying attention.[2] However, results reported here are the same as results that include all participants. Table 4 below shows how many participants are per condition in Experiment 1. This research was granted Human Subjects Approval (ID # 00001003).

Table 4

Number of Participants per Condition

	Self	Concrete-Other	Abstract-other	Total
Non-accountable	58	50	57	165
Accountable	52	57	56	165
Total	110	107	113	330

Note. Table shows the number of participants per condition who were included in the analyses. There were 13 participants omitted because their responses suggest that they were not paying attention.

Procedure

After giving informed consent and providing demographic information, participants read instructions on the computer while the experimenter read these aloud. Participants were required

[2] In the early stages of this Experiment participants were required to rate how much they trusted each forecast and how much they were concerned about the possibility for drought. These variables are not reported in this paper as they are not central to the question being asked but they were used as manipulation checks.

to make crop-choices based on seasonal climate predictions. In this simplified task, there were two possible crops: the risky crop cost $100 to plant and yielded $300 in non-drought conditions and $0 in drought conditions and the riskless crop cost $200 dollars but yielded $300 regardless of the conditions. In this simplified scenario, there were only two possible outcomes: drought or no drought.

Half of the participants made crop-choices on their own behalf and the other half made decisions for another participant (see Self-Other manipulation below). Each participant received a virtual budget of $1,000 from which the cost of the chosen crop was subtracted and to which the amount earned was added. The goal was to end the 46 trials with the highest possible budget. The end budget was exchanged for lottery tickets which dictated participants' odds to win a $200 cash-prize (see Lottery manipulation below). In the condition in which participants made decisions on someone else's behalf they were told that the decision-recipient was entitled to earn the cash prize. This was a deception however and these participants were entitled to those tickets. On each trial, representing a different hypothetical region, participants received a prediction and decided which of the two crops to plant. On some of these trials, which we will explain in greater detail later, they were required to provide crop choice justification *after* having chosen their crop (see "Accountability Manipulation" below). On all trials, after making crop choices participants rated how much they trusted the prediction on a drop-down menu that included six options ranging from "Not at All" to "Completely". They next rated how concerned they were about the possibility of future drought on a drop-down menu that included six options ranging from "Not at All" to "Extremely" (see Appendix B). Immediately after the concern rating participants were informed of the outcome. The budget, shown on the screen, was updated by subtracting crop costs and adding profits as soon as they occurred.

At the end, participants were asked if they wished to participate in the lottery and their email address so they could be contacted should they or the person on whose behalf decided for them win the lottery. After consenting and debriefing participants were thanked for their time.

Stimuli

Participants were given categorical drought predictions. More specifically, they were either informed that “Drought is not predicted” or “Drought is predicted” on each trial. These predictions however were not arbitrary, they were based on an underlying percent chance of drought. Unbeknownst to participants, drought likelihoods ranged from 10%-60% in 10% increments and were perfectly calibrated (e.g. drought happened in 10% of the trials in which there was a 10% chance of drought). The economically optimal strategy favors the *riskless crop* whenever the percentage chance of drought is greater than 33% and the *risky crop* otherwise. This is due to the fact that at 33% chance of drought, the profit of the riskless crop ($100) is greater than the expected value of the risky crop. The theoretical expected value of choosing the risky crop on any trial is, (1 - p[drought]) * $300[potential profit] - $100 [cost of planting].

Although participants were not given the probability of drought, the predictions they were given followed this decision rule. That is, drought was not predicted when the underlying percentage chance of drought was less than 33% (in practice 30% and less because only 10% increments were used) and drought was predicted when the probability was 40% or greater (see Appendix C). Thus, although participants were given less specific information, it was, in a sense, the optimal information because it was economically advantageous to choose the riskless, drought resistant crop whenever drought was predicted. Notice that, as with many adverse weather events, cautiousness is required here at a relatively low chance of occurrence. That is because the potential negative consequences of the event far outweigh the cost of protection (this riskless crop in this case)

Self-Other

In this experiment participants either completed the task on their own behalf (self), on behalf of a future, unknown other participant (i.e. abstract-other), or own behalf of a current, known other participant (concrete-other).[3] Experimenters ran one condition at a time and participants were assigned ID numbers upon reporting to the experimenter. In the abstract-other condition participants were required to draw subject ID numbers written on paper slips from a bag . They were informed that that number they drew represented the participant on whose behalf they would be completing this task. In addition, they were told that someone else in the past had made decisions on their behalf. In the concrete-other condition participants were also required to draw subject ID numbers from a bag but those numbers represented participant in the present session on whose behalf they would be completing the task. Furthermore, the drawer announced the ID number that was drawn and the respective person was required to stand up. This assured that participants in this condition knew on whose behalf they were deciding. While participants in the self-condition were assigned subject ID numbers upon reporting to the experimenter, they were not required to draw any numbers as that served no purpose.

The self and abstract-other conditions were carried out between one and ten participants but the concrete condition required a minimum of three participants. Running the concrete condition with two participants would have rendered the drawing manipulation pointless as it

[3] Although one could argue that there is a potential confound given that those in the concrete-other condition made decisions on behalf of a *known participant in the present session* while participants in the abstract condition made decisions for an *unknown participant in the future*, a pilot suggested that an abstract-other condition where participants made decisions for an *unknown participant in the present* was no different from *an unknown participant in the future*.

would have eliminated participants' perceived randomness of deciding on whose behalf they would decide.

Accountability

Half of all participants were required to provide a justification of their crop-choice in 50 words or less on 12 of the 46 trials (roughly one-quarter of the trials). This number allowed for an even distribution of justification trials in which drought was predicted and not predicted (six trials each). This resulted in a fixed configuration of trials in which participants were required to justify their crop-choices (see Appendix C). Participants were not informed when or how many times they needed to provide justification but just that on some of the trials they would have to justify their decisions and that either a random participant (self-condition) or the decision-recipient (abstract-other and concrete-other conditions) would have access to the justification. This however was a deception because participants did not have access to each other's responses.

Lottery

The goal of this experiment was to end it with the highest end budget which would be exchanged for lottery tickets that dictated participants' odds to win a cash prize of $200. The results of the Pilot informed how many lottery tickets participants were entitled in this experiment. More specifically, the distribution of participants' end budget was divided into roughly five percentile ranges and used to inform participants in Experiment 1 how many lottery tickets they would be entitled according to their end budget (see Table A2 in Appendix A).

Consenting participants were given lottery tickets commensurate with their performance (roughly 95% of participants consented to participate in the lottery). They were required to give their email address so they could be contacted to collect the money should they win. Participants who made decisions on someone else's behalf were reminded that their decision-recipient would be entitled to their lottery tickets and that they would be entitled to however many tickets the person who made decisions for them earned (this was a deception and they got to keep their tickets). Participant whose ID number was drawn was contacted and asked to retrieve cash prize.[4]

Design

This was a 3x2 fully crossed, between-subjects study. The independent variables were Self-Other (self, abstract-other, concrete-other) and Accountability (non-accountable or accountable).

Operational Hypotheses

Experiment 1 is a mixed-gamble in which the most common error is being too risk-averse (overcautious). Risk-aversion is operationalized as the proportion of riskless crop participants planted and is labeled cautiousness. The risk-as-feelings hypothesis predicts that those in the self and concrete-other conditions will be equally cautious but those in the self-condition will be more cautious than those in the abstract-other condition. As a result, there should be no differences in expected value between those in the self and concrete-other conditions but those in the self-condition should yield lower expected value than those in the abstract-other condition.

The system 2 activation hypothesis predicts that when participants are not held accountable, those in the self-condition will be more cautious than those who decide on behalf of others but equally cautious when held accountable. As a result, when participants are not held accountable those in the self-condition should yield lower expected value than those who decide on behalf of others but equal expected value when participants are held accountable.

[4] This manipulation was granted Human Subjects Approval (ID # 00001003).

The playing-it-safe hypothesis predicts that those in the self-condition will be less cautious than those deciding on behalf of others. As a result, those in the self-condition should yield greater expected value than those deciding on behalf of others regardless of accountability. These hypotheses are summarized in tables 5 and 6 below.

Table 5

Operational Hypotheses for Cautiousness

	Non-accountable		Accountable	
Hypotheses	Self vs. Abstract	Self vs. Concrete	Self vs. Abstract	Self vs. Concrete
Risk-as-Feelings	S > A	S = C	S > A	S = C
System 2 Activation	S > A	S > C	S = A	S = C
Playing-it-Safe	S < A	S < C	S < A	S < C

Note. The “ < ” or “ > ” sign indicates whether participants deciding for themselves will choose the riskless crop less often or more often, respectively, than those deciding on behalf of another participant (abstract or concrete-other) at a *p*-value of .05. An “ = ” sign indicates that differences failed to reach statistical significance.

Table 6

Operational Hypotheses for EV

	Non-accountable		Accountable	
Hypotheses	Self vs. Abstract	Self vs. Concrete	Self vs. Abstract	Self vs. Concrete
Risk-as-Feelings	S < A	S = C	S < A	S = C
System 2 Activation	S < A	A < C	S = A	S = C
Playing-it-Safe	S > A	S > C	S > A	S > C

Note. The “ < ” or “ > ” sign indicates whether participants deciding on their own behalf will yield a lower or greater expected value, respectively, than those deciding on behalf of another participant (abstract or concrete-other) at a *p*-value of .05. An “ = ” sign indicates that differences failed to reach statistical significance. Notice that these hypotheses reflect the differences in cautiousness outlined in table 4.

Results: **Experiment 1**

For the analyses reported in this paper, I used the conventional alpha level of .05. I report main effects and interactions alongside their effect sizes (eta-squared). I also report simple effects, both planned and post-hoc contrasts alongside their effect sizes (Cohen's D). Planned contrasts are those predetermined by the hypotheses outlined in this paper which have been registered in the Open Science Foundation (Risky Choices on Behalf of Others) and involve comparisons between participants in the self-condition versus those making decisions on behalf of an abstract-other or a concrete-other on all trials. Correction methods to contrasts were not applied as doing so would increase the chances of a false-negative which is costlier than a false-positive given the sheer number of participants, resources, and time needed to conduct this study.

First, I examine cautiousness (the degree to which participants chose the riskless crop) to determine whether there is an effect as a function of self-other and accountability. Second, I examine decision quality (the average expected value) to determine if participants' cautiousness translated into differences in expected value. The summary of the results involving cautiousness and expected value have been included in tables 7 and 8 on page 30.

Cautiousness

The risk-as-feelings hypothesis and the playing-it-safe hypothesis were both about cautiousness such that in the former cautiousness would decrease when deciding on behalf of an abstract-other and in the latter cautiousness would increase when deciding on behalf of others. Therefore, cautiousness was the first variable examined. In this experiment I operationalized cautiousness as the proportion of trials participants chose the riskless crop. I divided the number of trials in which a participant chose the riskless by the overall number of trials. In this task, participants tend to choose the riskless crop more often than is warranted (see Demnitz & Joslyn,

2020) because a sure gain is involved and the alternative crop could yield a loss (Tversky& Kahneman, 1979). In fact, whereas the norm dictates that participants should choose the riskless crop on .35 of the trials (on .35 of trials the chance of drought was 33% or greater) participants in this task chose the riskless crop on average on .42 of the trials (*SD* = .14). More specifically, they chose the riskless crop on average on .20 of the trials (*SD* = .20) in which drought was *not economically optimal* (i.e. when drought was not predicted).

To test whether self-other and accountability effected the proportion of trials in which participants chose the riskless crop I ran a between-subjects ANOVA in which the proportion of times participants chose the riskless crop was the dependent variable and self-other and accountability were the independent variables. Results suggested that self-other, F (2, 324) = .68, p = .51 (eta^2 = .00), accountability, F (1, 324) = .36, p = .55 (eta^2 = .00), and the interaction, F (1, 324) = .36, p = .55 (eta^2 = .00), failed to reach statistical significance. Figure 1 below shows the effects self-other and accountability on cautiousness.

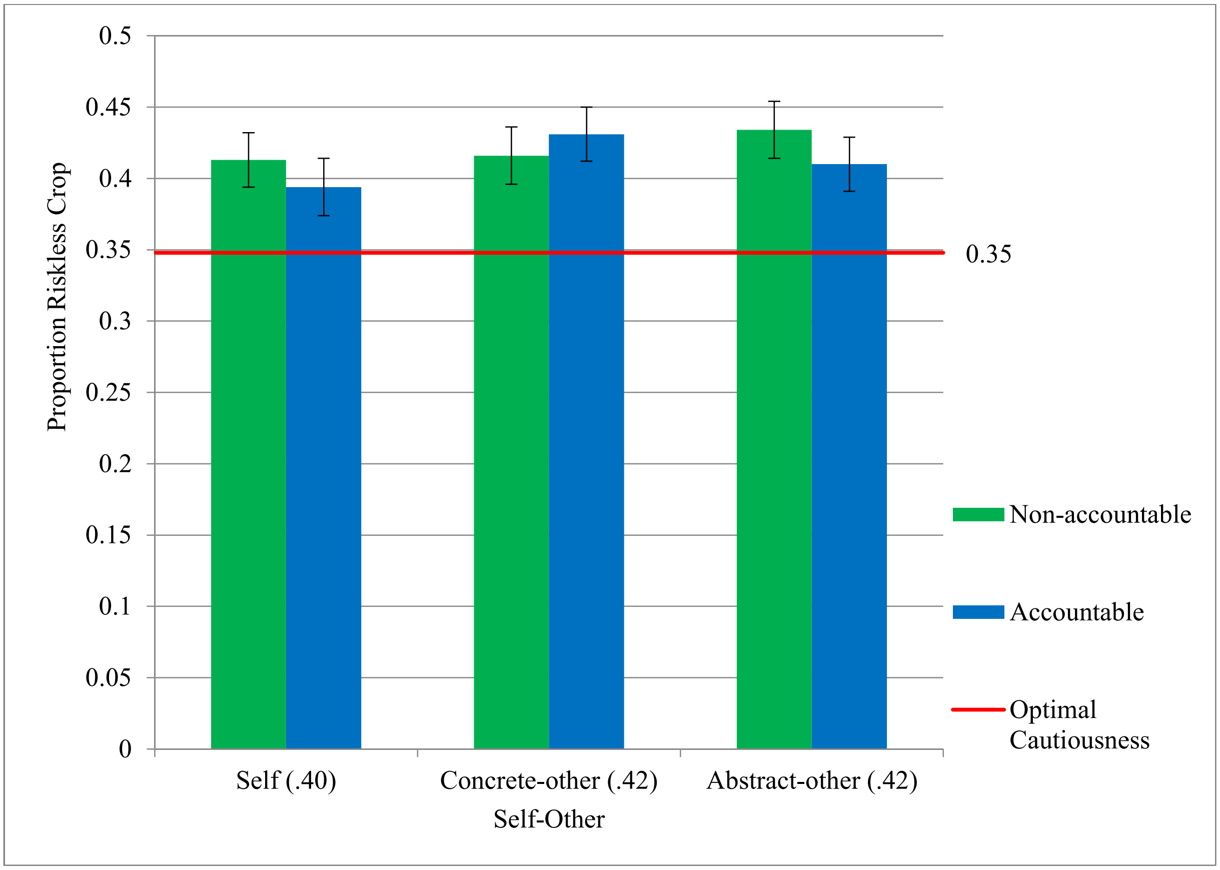

Figure 1. Proportion of the riskless crop chosen as a function of self-other and accountability. Although there were no statistical significant effects, participants in all conditions were significantly more cautious than optimal.

There had been a simple effect in the pilot study such that participants in the self-condition chose the riskless crop significantly less often than participants in the concrete-other condition when not held accountable, indicating less cautiousness when making decisions for oneself. Although here in Experiment 1 participants in the self-condition were less cautious (M = .41, SD = .11) than participants in the abstract-other (M = .43, SD = .16) and concrete-other (M = .42, SD = .17) conditions when they were not held accountable, these differences were negligible as were the effects when participants were held accountable (summary of results in tables 7 and 8) and the differences did not reach significance. Thus, contrary to both risk-as-feelings and the playing-it-safe hypotheses, there were no detectible overall differences in cautiousness.

Expected Value

The System 2 hypothesis was that participants would be less cautious and therefore yield a greater expected value when deciding on someone else's behalf because System 2 would be activated but accountability would neutralize the effect increasing expected value in the self-condition. Therefore, we next calculated the expected value of participants decisions. The earning of the riskless crop ($100) was guaranteed because it did not depend on drought and therefore its value was always $100 on any single trial it was chosen. The earning of the risky crop ($200) did depend on the drought. Thus, to calculate the expected value of a risky crop on any single trial I multiplied the total return ($300) by the percent chance of a favorable outcome (i.e. no drought) and subtracted the cost of the chosen crop ($100) from the product. Following the norm on every single trial would yield $126 average expected value but instead participants yielded $117.74 (*SD* = 6.86) average expected value.

I next calculated the average expected value for each participant among all trials and ran a between-subjects ANOVA with expected value as the dependent variable and self-other and accountability as the independent variables. Results suggested that the effects of self-other, F (2, 324) = 1.82, p = .16 (eta^2 = .01), accountability, F (1, 324) = .03, p = .87 (eta^2 = .00), or the interaction, F (2, 324) = 1.5, p = .23 (eta^2 = .00), failed to reach statistical significance. Figure 2 below shows the effects of self-other and accountability on expected value.

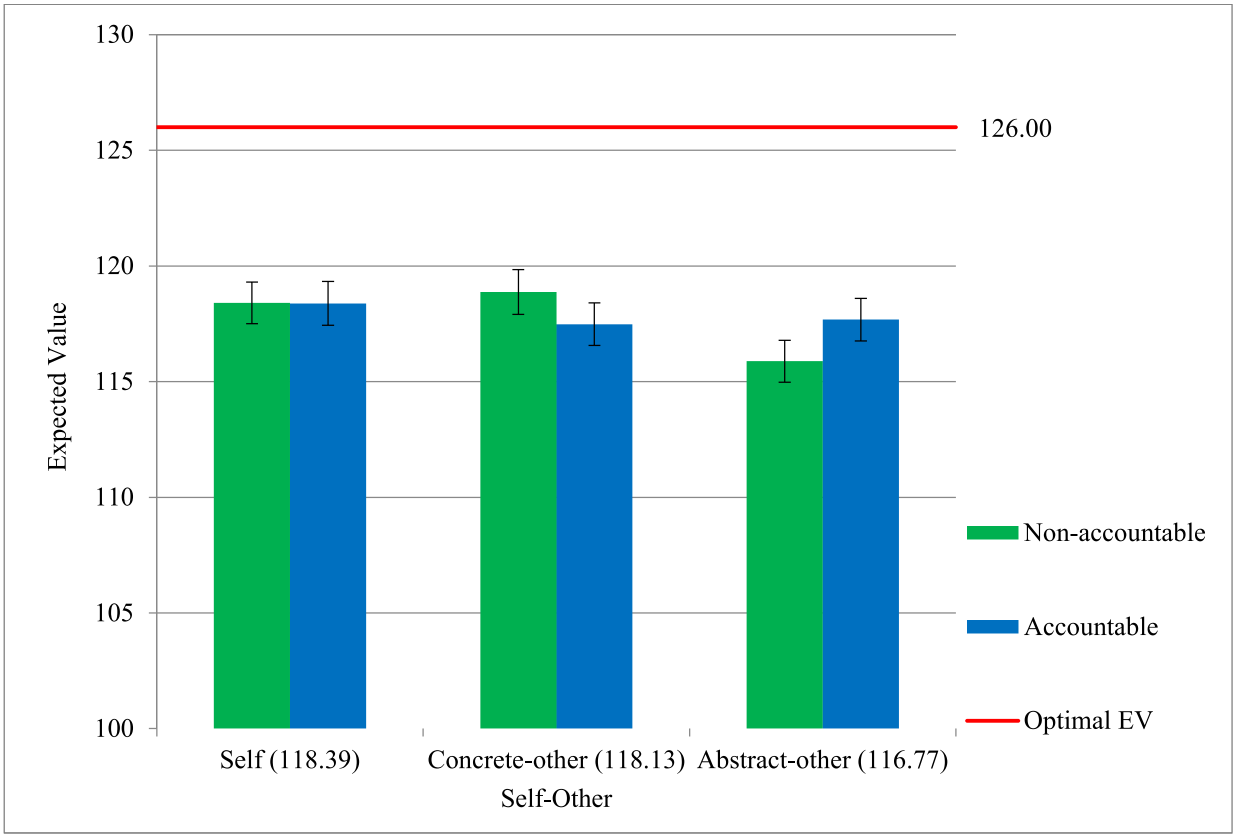

Figure 2. Expected value by self-other and accountability based on drought-prediction type. Participants in all conditions did worse than optimal.

However, following the pattern suggested in the cautiousness analyses, those in the self-condition tended to have higher expected value than those in the abstract condition and this difference reached significance in the non-accountable condition: those in the self-condition had a greater expected value (M = 118.40, SD = 5.21) than those in the abstract-other condition (M = 115.88, SD = 8.28), t (113) = 1.97, p = .05 (Cohen's d = .37), but no different than those in the concrete-other condition (M = 118.87, SD = 5.84). In addition, in the non-accountable condition, those in the concrete-other condition (M = 118.87, SD = 5.84) also had a greater expected value expected value than those in the abstract-other condition (M = 115.88, SD = 8.28), t (105) = 2.25, p = .03 (Cohen's d = .44). There were no significant differences when participants were held accountable. Summary of these results can be found in tables 7 and 8 below.

Table 7

Summary of Results of Experiment 1: Effect of Self-Other as a Function of Accountability

	Non accountable	Power	Accountable	Power
Riskless crop	Self < Abstract (.15)	.12	Self < Abstract (.11)	.09
	Self < Concrete (.01)	.05	Self < Concrete (.27)	.29
	Concrete < Abstract (.13)	.10	Concrete > Abstract (.35)	.12
EV	Self > Abstract (.37) *	.50	Self > Abstract (.1)	.08
	Self < Concrete (.07)	.06	Self > Concrete (.13)	.10
	Concrete > Abstract (.44) *	.61	Concrete < Abstract (.03)	.05

Note: Number in parentheses indicates effect size (Cohen's *d*).
EV: Expected Value.
* Statistical difference at a p-value of .05 or less.
φ Marginal statistical difference.

Table 8

Summary of Results of Experiment 1: Effect of Accountability as a Function of Self-Other

	Self-Other	Accountability	Cohen's *d*	Power
Riskless crop	Self	No > Acc	.14	.11
	Concrete	No < Acc	.11	.09
	Abstract	No > Acc	.17	.15
EV	Self	No > Acc	.00	.05
	Concrete	No > Acc	.20	.18
	Abstract	No < Acc	.26	.28

EV: Expected Value

Discussion: Experiment 1

In this decision task, involving gains, results suggested that participants chose the riskless crop on a greater proportion of trials than is economically warranted as predicted by prospect theory (Tversky & Kahneman, 1979). This suggests that participants deciding on behalf of others show the same biases that individual decision-makers show. However, the main goal of this paper was to test how people decide on behalf of others compared to the self. To that end, I entertained three hypotheses.

The risk-as-feelings hypotheses predicted that participants deciding on their own behalf would be no different than those deciding on behalf of a concrete-other but more cautious than those deciding on behalf of an abstract-other. As a result, there would be no differences in expected value between those in the self and concrete-other conditions but those in the self-condition would do worse than those in the abstract-other condition.

While differences in cautiousness between self and others failed to reach statistical significance, there was a statistically significant effect on expected value when participants were not held accountable: deciding for the self resulted in better decisions than deciding on behalf of an abstract-other while it was no different than those in the concrete-other condition. These results, at least here in Experiment 1, suggest that psychological distance matters but not in the way the risk-as-feelings hypothesis suggests: while there was no difference when psychological distance was low (self versus concrete-other), when psychological distance was high participants in the abstract-other did not do better than self but worse. It should be noted though that these differences were observed in the non-accountable condition only. In the accountable condition differences disappeared because accountability seemed to have a sizeable though statistically non-significant effect reducing cautiousness and increasing decision quality among participants in the abstract-other condition.

The playing-it-safe hypothesis predicted that those who decide on behalf of others, concrete or abstract, would be more cautious overall than those deciding on behalf of themselves which would result in lower expected value. In fact, when participants decided for an abstract-other they did worse, tending to support this hypothesis, at least in the abstract-other condition. Again, this was only true in the non-accountable condition. Moreover, when participants decided on behalf of a concrete-other they were no different than the self.

The System 2 activation hypothesis predicted that those who decide on behalf of others, concrete or abstract, would do better, i.e. be less cautious in this task where over-cautiousness is the primary error as compared to those who decide for themselves. As a result, participants deciding on behalf of others would yield greater expected value than those deciding on their own behalf. However, these differences would disappear when participants were to be held accountable, because performance would improve in all accountable conditions. The results in this experiment also partially support the System 2 hypothesis, but not in a way that the System-2-activation hypothesis predicted: participants making decisions on behalf of themselves did better (not worse), perhaps because they were more motivated to engage System 2, than those making decisions on behalf of abstract-others when not held accountable. The same may have been true of those making decisions on behalf of concrete-others, who also did better.

To summarize, while there were no differences in cautiousness there were differences in expected value such that those deciding on behalf of an abstract-other did worse than those deciding on their own behalf. These results are not in line with any of the hypotheses. Instead they suggest, at least in mixed gambles, that when psychological distance increases decision quality tends to decrease in the absence of accountability.

Method: Experiment 2

Results of Experiment 1 did not support any of the three hypotheses entertained here. However, it did reveal that those deciding on behalf of the self (and concrete-other) did better than those in the abstract-other condition. In addition, accountability reduced cautiousness among participants in the abstract-other condition. These results do not necessarily mean that participants who were less cautious here generally make better decisions, it ma. The results of Experiment 2 will reveal whether lower cautiousness in Experiment 1 means better decisions or generally less cautious decisions. Most importantly, it will allow for another test of the three hypotheses that I originally.

Participants

A total of 503 University of Washington psychology students (60% female) participated in return for course credit and a chance to earn $200. The mean age was 19.2 years old (*SD* = 3.93). Due to the Coronavirus pandemic data collection had to be brought to a halt with approximately 92% of the number of participants but more powered than Experiment 1. A total of six participants were omitted from the analyses either because all their responses to the trust questions were the same or because their forecast estimates were at least three standard deviations from the mean error.[5] However, results reported here tend to be no different when all participants are included. Table 9 below shows how many participants are per condition in Experiment 2. This research was granted Human Subjects Approval (ID # 00007536).

[5] After having been given temperature predictions participants were required to provide their own estimates. However, this variable is not reported in this paper as it is not central to the question being asked but was used as manipulation check.

Table 9

Number of Participants per Condition

	Self	Concrete-Other	Abstract-other	Total
Non-accountable	81	95	89	265
Accountable	60	82	90	232
Total	141	177	179	497

Note. Number of participants per condition who were included in the analyses.
There were four participants omitted because their responses suggest that they were not paying attention.

Procedure

After giving informed consent and providing demographic information, participants read instructions on the computer while the experimenter read these aloud. In this task, participants were required to decide whether to apply salt to roads based on the predicted nighttime low temperature for the following night on 60 trials, each trial representing one night and each group of 30 trials representing one month. Each participant received a monthly budget of $36,000 ($72,000 total) to be used towards salting the roads. The goal here as with Experiment 1 to end the task with the highest possible budget. In this task, because no gains were possible, this was accomplished by minimizing losses. As in Experiment 1, half of the participants made these decisions on their own behalf and the other half made decisions on behalf of another participant. The end budget was exchanged for lottery tickets which dictated participants' odds to win a $200 cash-prize. The decision-recipient was entitled to earn the cash prize in the condition in which participants made decisions on someone else's behalf. As in Experiment 1, this was a deception and these participants were entitled to those tickets.

On each trial, the predicted nighttime low temperature for the next night appeared on the screen. After reading the forecast, participants indicated their salting decision by clicking on a "salt" or "no salt" button. On some of these trials, which we will explain in greater detail later, they were required to provide justification *after* having chosen whether to salt (see Accountability manipulation below). Following their decisions participants were asked to rate their trust in the forecast on a scale ranging from 1 ("Very Little") to 5 ("Very Much"). Finally, participants indicated what they thought the nighttime low temperature would be, entering a numeric value in a text box. The forecast was visible to participants at all times during a given trial, along with their current budget. At the end of the trial, the observed nighttime low temperature and any balance adjustments appeared on the screen. The salt costs and penalty amounts were shown in red below the balance when they occurred but then disappeared. After the first block, a break screen was shown and participants clicked "Next" to continue to the second month's trials, and $36,000 was added to the remaining balance.

At the end, participants were asked if they wished to participate in the lottery and to provide their email address so they could be contacted should they win the lottery or should the person who decided on their behalf should win. After consenting and debriefing participants were thanked for their time.

Stimuli

Participants were shown a sequence of 60 forecasts and observations. These were based on archived data from Spokane and Yakima, Washington State, and followed natural weather patterns (M_{Forecast} = 34.33º F, Range$_{\text{Forecast}}$ = 32º F - 37º F; $M_{\text{Observation}}$ = 34.57º F, Range$_{\text{Observation}}$ = 26º F - 42º F). Half of all observed temperatures were above their respective nighttime low temperature forecasts and half were below. The probability of freezing forecast was reliable: the percentage of observed temperatures at or below freezing was within the range of forecasted probabilities in six probability of freezing (PoF) bins (10-16%, 17-23%, 24-33%, 31-37%, 38-44%, and 45-

51%). For example, in the 10-16% bin, freezing temperatures were observed on 2 of 18 days, or 11.1%. Because the cost-loss ratio was the same for all trials, the optimal strategy, based on expected loss, favored salting whenever the probability of freezing was 17% or greater (1000/6000 = .17). However, participants were simply instructed to attempt to maximize profits by minimizing salting expenses and avoiding penalties. Appendix D shows the stimuli for this experiment.

Self-Other

The self-other manipulation was identical to that of Experiment 1.

Accountability

In Experiment 1 participants in the accountability condition were required to provide justification on one-quarter of trials. To match that, in the current study half of all participants were required to provide justification on 16 out of the 60 trial such that there were six justification trials in which the underlying percent chance of freezing was less than 17% (10%-16%; low chance) and 17% or more on ten trials (22%-51%; high chance). Because predicted freezing temperatures were a relatively rare forecast, participants were required to provide justification on fewer trials when percent chance of freezing was low. Furthermore, for six of these trials freezing temperature was experienced in the preceding and for ten of these trials freezing temperatures were not experienced. However, as in Experiment 1 participants did not know on how many trials or when they would be required to justify.

Lottery

The lottery manipulation was identical to Experiment 1.

Design

This was a 3x2 fully crossed, between-subjects study. The independent variables were Self-Other (self, abstract-other, concrete-other) and Accountability (non-accountable or accountable).

Operational Hypotheses

Experiment 2 is a loss domain in which the most common error is being too risk-seeking (under-cautious). Risk-seeking is operationalized as the proportion of trials participants opted to salt the roads and for consistency with Experiment 1 is labeled cautiousness. The risk-as-feelings hypothesis predicts that those making decision on behalf of an abstract-other will make riskier decisions, resulting in lower cautiousness, than those in the self-condition and those in the self-condition will be equally cautious as those in the concrete-other condition. As a result, there should be no differences in expected loss between those in the self and concrete-other conditions but those in the self-condition should yield lower expected loss (better decisions) than those in the abstract-other condition.

The system 2 activation hypothesis predicts that people make better decisions on behalf of others than for themselves (lower expected loss) but when people are held accountable this difference should disappear. This means that those deciding on behalf of others will be more cautious than those deciding on their own but equally cautious when people are held accountable.

The playing-it-safe hypothesis predicts that those making decisions on behalf of other will be more cautious than those in the self-condition. As a result, those in the self-condition should yield greater expected loss (worse decisions) than those deciding on behalf of others regardless of accountability. These hypotheses are summarized in tables 10 and 11 below.

Table 10

Operational Hypotheses for Cautiousness

	Non-accountable		Accountable	
Hypotheses	Self vs. Abstract	Self vs. Concrete	Self vs. Abstract	Self vs. Concrete
Risk-as-Feelings	S > A	S = C	S > A	S = C
System 2 Activation	S < A	S < C	S = A	S = C
Playing-it-Safe	S < A	S < C	S < A	S < C

Note. The " < " or " > " sign indicates whether participants deciding for themselves will opt to salt less often or more often, respectively, than those deciding on behalf of another participant (abstract or concrete-other) at a *p*-value of .05. An " = " sign indicates that differences failed to reach statistical significance.

Table 11

Operational Hypotheses for Expected Loss

	Non-accountable		Accountable	
Hypotheses	Self vs. Abstract	Self vs. Concrete	Self vs. Abstract	Self vs. Concrete
Risk-as-Feelings	S < A	S = C	S < A	S = C
System 2 Activation	S > A	S > C	S = A	S = C
Playing-it-Safe	S > A	S > C	S > A	S > C

Note. The " < " or " > " sign indicates whether participants deciding on their own behalf will yield a lower or greater expected loss, respectively, than those deciding on behalf of another participant (abstract or concrete-other) at a *p*-value of .05. An " = " sign indicates that differences failed to reach statistical significance. Notice that these hypotheses reflect the differences in cautiousness outlined in table 5.

Results: Experiment 2

The same analyses methods as in Experiment 1 were used here. The analyses and planned contrasts predetermined by the hypotheses have been registered alongside Experiment 1 on the Open Science Foundation (Risky Choices on Behalf of Others). The order of analyses also follows that of Experiment 1: cautiousness and expected loss. Note that because Experiment 2 is a loss domain expected loss is used rather than expected value, to remind the reader that in this case, less loss indicates better quality decisions. Finally, whereas cautiousness was operationalized as the proportion of trials participants chose the riskless crop in Experiment 1 here cautiousness is operationalized as the proportion of trials participants opted to salt. As in Experiment 1, a summary of results is included in tables 12 and 13 on page 46.

Cautiousness

In order to determine whether there were any differences due to self-other or accountability in cautiousness, in this experiment, I operationalized cautiousness as the proportion of trials in which participants chose to salt. I divided the number of trials in which participants chose to salt by the total number of trials. In this task, participants tend to salt less often than is warranted (i.e. they are more risk-seeking than is economically optimal; see Grounds & Joslyn, 2018), because it involves only losses (Tversky & Kahneman, 1979). In fact, whereas participants should have salted on 70% of the trials according to this standard (meaning they should not salt on 30% of the trials), participants salted on 50% of the trials (*SD* = 19) here. Figure 3 below shows the effects of self-other and accountability on cautiousness.

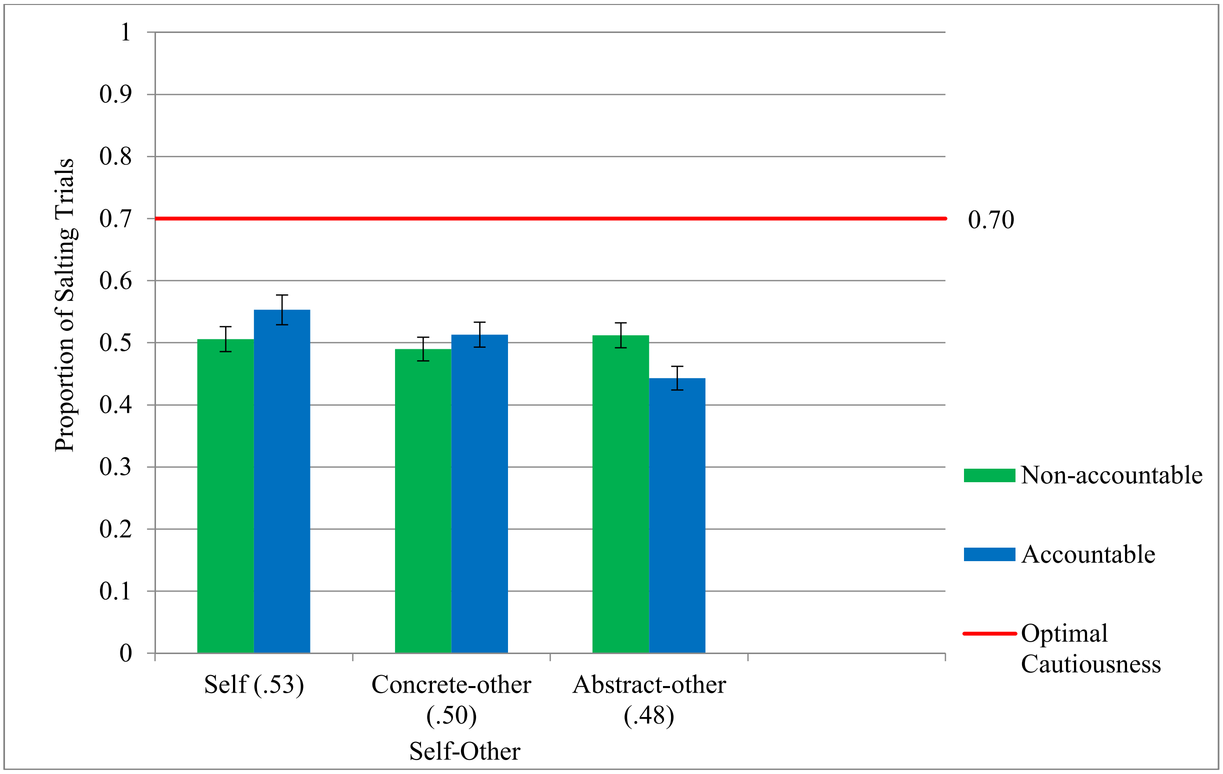

Figure 3. Proportion of salting trials as a function of self-other and accountability. All participants salted less than optimal.

To test whether cautiousness differed depending on whether participants were making the decision on behalf of themselves or someone else, or whether they had to account for their decisions, I ran a between-subjects ANOVA on proportion of salt decisions using self-other (self, abstract-other, and concrete-other) and accountability (accountable, non-accountable) as the independent variables. While the main effect of accountability failed to reach statistical significance, F (1, 491) = .00, p = .98 (eta^2 = .00), the main effect of self-other on the proportion of salting decisions was significant, F (2, 491) = 3.16, p = .05 (eta^2 = .01). More specifically, those in the self-condition decided to salt on a greater proportion of trials (M = .53, SD = .2), indicating greater cautiousness, than those in the abstract-other condition (M = .48, SD = .18), t (318) = 2.48, p = .01 (Cohen's d = .28), but no different than those in the concrete-other condition (M = .50, SD = .17). Notice that this is in the opposite direction of the non-significant trend observed in the Experiment 1 where people making decisions for themselves tended to be less cautious especially in the non-accountable condition.

There was also a significant interaction between self-other and accountability, F (2, 491) = 4.59, p = .01 (eta^2 = .02). When participants were held accountable, the difference between self and abstract-other was much larger, enhancing the greater cautiousness when making decisions on behalf on oneself (M = .55, SD = .20) compared to the abstract-other condition (M = .45, SD = .19), t (148) = 3.55, p < .01 (Cohen's d = .59), but not significantly different from those in the concrete-other condition (M = .51, SD = .19). In addition, those in the concrete-other condition (M = .51, SD = .19) salted significantly more often than those in the abstract-other condition as well (M = .45, SD = .19), t (170) = 2.54, p = .01 (Cohen's d = .39), when participants were held accountable. There were no significant differences in the no accountability condition. These results are summarized in tables 12 and 13.

To better understand the impact of accountability, post hoc comparisons were conducted comparing accountable to non-accountable in each self-other condition. Results suggested that the effect of accountability was mainly to reduce salting among participants in the abstract-other condition. They salted significantly *less* when they were held accountable (M = .45, SD = .19) than when they were not held accountable (M = .51, SD = .17), t (177) = 2.46, p = .02 (Cohen's d = .37). Although those in the self and concrete conditions salted slightly more in the accountable condition (self: M = .55, SD = .20; concrete-other: M = .51, SD = .19) than the non-accountable condition (self: M = .51, SD = .20; concrete-other: M = .49, SD = .15) these differences did not reach significance.

To summarize, unlike Experiment 1, the trend in Experiment 2 was for those making decisions on behalf of themselves to be more cautious, salting more often, than those in the abstract-other condition but equally cautious as those in the concrete-other condition. This pattern supports the risk-as-feelings hypothesis, less cautious on behalf of abstract-others others. As in Experiment 1 where this same difference was observed in the accountable condition between self and abstract-others, it seemed to be driven by a sizeable decrease in cautiousness among participants in the abstract-other condition (this time making decisions worse) compared to when they were not held accountable.

Expected Loss

In order to compare self-other in terms of decision quality, I next examined expected loss. Participants made road-salting decisions on 60 trials. Salting the roads cost $1,000 on any single trial and while not salting did not incur any costs, $6,000 was deducted from the budget in the event of freezing. To calculate the expected loss of not salting on any single trial I multiplied -$6,000 by the percent chance of freezing if participants choose not to salt and assigned the cost of salting otherwise. Then I calculated the mean across trials for each participant. I ran a between-subjects ANOVA with self-other and accountability as the independent variables to test whether there were differences in mean expected loss between groups. Figure 4 below shows the effects self-other and accountability on expected loss.

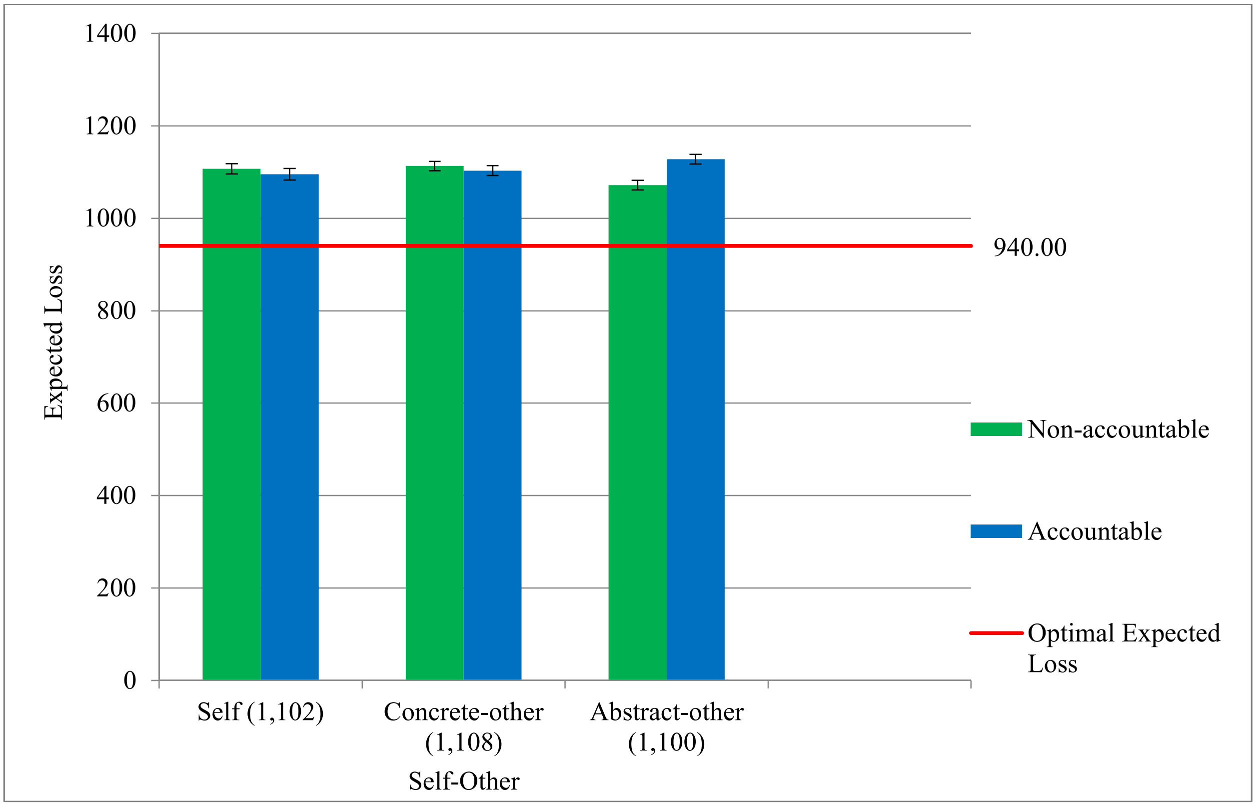

Figure 4. Expected loss by self-other and accountability. Note that higher means suggests greater loss, doing worse and all conditions did worse than optimal.

While the results of self-other, F (2, 491) = .36, p = .7 (eta^2 = .00), and accountability, F (1, 491) = 1.69, p = .19 (eta^2 = .00), failed to reach statistical significance, the interaction between self-other and accountability was significant, F (2, 491) = 6.77, p < .01 (eta^2 = .03). Among participants held accountable, those in the self-condition had a lower expected loss (M = 1,095.16, SD = 93.25) than those in the abstract-other condition (M = 1,128.05, SD = 112.99), t (148) = 2.03, p = .04 (Cohen's d = .34), but no different than those in the concrete-other condition (M = 1,103.28, SD = 90.56). In addition, those in the concrete-other condition also had a (marginal) lower expected loss (M = 1,103.28, SD = 90.56) than that of those in the abstract-other condition (M = 1,128.05, SD = 112.99), (p = .1; Cohen's D = .26), when participants were held accountable.

The pattern reversed in the non-accountable condition. Those in the self-condition had a greater expected loss (*M* = 1,107.19, *SD* = 111.27) than those in the abstract-other condition (*M* = 1,071.89, *SD* = 75.42), *t* (168) = 2.37, *p* = .02 (Cohen's *D* = .36), while they were no different than those in the concrete-other condition (*M* = 1,113.06, *SD* = 93.73). In addition, expected loss for those in the concrete-other condition was also greater (*M* = 1,113.06, *SD* = 93.73) than those in the abstract-other condition (*M* = 1,071.89, *SD* = 75.42), *t* (182) = 2.87, *p* < .01 (Cohen's *D* = .42), in the non-accountable condition.

Accountability had an effect once again on participants in the abstract-other condition such that they had a greater expected loss when they were held accountable (*M* = 1,128.05, *SD* = 112.99) compared to when they were not held accountable (*M* = 1,071.89, *SD* = 75.42), *t* (177) = 3.87, *p* < .01 (Cohen's *d* = .57). For those in the self and concrete-other conditions, accountability resulted in slightly better decisions but the effects failed to reach statistical significance.

To summarize, mirroring the differences in cautiousness, when participants were held accountable those making decisions on behalf of themselves or concrete-others did better than those making decisions on behalf of abstract others. However, this pattern reversed when participants were not held accountable even though there had not been any differences in cautiousness. While the increase in decision quality (i.e. lower expected loss) due to accountability failed to reach statistical significance among participants in the self or concrete-other conditions, among participants in the abstract-other condition accountability caused worse decisions than no accountability. This effect also mirrored differences in cautiousness.

Table 12

Summary of Results of Experiment 2: Self-Other as a Function of Accountability

	Non accountable	Power	Accountable	Power
Salting	Self < Abstract (.03)	.05	Self > Abstract (.59) *	.94
	Self > Concrete (.09)	.09	Self > Concrete (.21)	.23
	Concrete < Abstract (.12)	.13	Concrete > Abstract (.39) *	.71
EL	Self > Abstract (.36) *	.64	Self < Abstract (.34) *	.53
	Self < Concrete (.06)	.07	Self < Concrete (.08)	.08
	Concrete > Abstract (.42) *	.81	Concrete < Abstract (.26) φ	.40

Note: Number in parentheses indicates effect size (Cohen's *d*).
* Statistical difference at a p-value of .05 or less.
φ Marginal statistical difference.

Table 13

Summary of Results of Experiment 2: Accountability as a Function of Self-Other

	Self-Other	Accountability	Cohen's *d*	Power
Salting	Self	Non < Acc	.26	.33
	Concrete	Non < Acc	.12	.12
	Abstract	Non > Acc *	.37	.69
EL	Self	Non > Acc	.12	.11
	Concrete	Non > Acc	.10	.10
	Abstract	Non < Acc *	.57	.97

EL: Expected Loss
* Statistical difference at a p-value of .05 or less.

Discussion: Experiment 2

In Experiment 2 I operationalized cautiousness as the proportion of trials in which participants salted the roads. The results were such that participants in the self-condition salted proportionally more (were more cautious, did better) than participants in the abstract-other condition while no differently than participants in the concrete-other condition.

These results suggest that psychological distance plays a role. However, unlike Experiment 1 where psychological distance was inconsistent with the risk-as-feelings hypothesis since those in the abstract-other condition were slightly more cautious, yielding worse decisions, in this experiment the effect of psychological distance is consistent with the risk-as-feelings hypothesis, participants were *less* cautious on behalf of the abstract other. This suggests that as psychological distance increases, cautiousness tends to decrease. This will be discussed in greater detail in the General Discussion.

As was the case in Experiment 1, accountability had a sizeable effect reducing cautiousness among participants in the abstract-other condition (they were less cautious) which might explain why the difference in cautiousness between self and abstract-other was only seen in the accountable condition alone. In combination with Experiment 1, this suggests that accountability generally reduces cautiousness when psychological distance is high.

To summarize, of the three hypotheses that were proposed the results of Experiment 2 support to the risk-as-feelings hypothesis. In addition, an effect not predicted by any of the three original hypotheses was observed here: accountability tended to generally reduce cautiousness when psychological distance is high.

General Discussion

The goal of this dissertation was to compare risky choices made on behalf of others to those made on behalf of oneself. To that end, I entertained three hypotheses. I entertained the risk-as-feelings hypothesis: feelings make one fear risk and thus result in more cautious, risk-averse decisions. As feelings diminish with psychological distance, decision-making becomes riskier. Thus, as psychological distance increases cautiousness would decrease independent of accountability. I also entertained System-2-activation hypothesis: deciding on behalf of others would lead to better decisions but that would be dependent of accountability such that when participants were to be held accountable differences would disappear (System-2-activation). Finally, I entertained the playing-it-safe hypothesis: deciding on behalf of others would lead to more cautious decisions independent of accountability and psychological distance (playing-it-safe).

To test whether there are differences in risky choices between self and others and whether any of these hypotheses explain differences, two experiments were conducted; one in mixed gambles and one in losses. Participants in both experiments made decisions either on their own behalf or own behalf of someone else whose identity was known or unknown and they were either held accountable or not accountable. In addition, participants were given lottery tickets commensurate with their performance to motivate them to take the task seriously. Participants who made decisions on behalf of someone else were told that their decision-recipient would be entitled to their tickets although they got to keep them.

In these tasks and according to prospect theory participants tend to be more risk-averse (mixed gambles) and more risk-seeking (losses) than what is economically optimal. In both experiments these patterns were observed among participants making decisions on behalf of someone else as well as the self. That is, the results in this paper suggest that people who make decisions on behalf of others show the same biases that individual decision-makers show.

As for the main goal of this paper whether any of the proposed hypotheses help explain differences between self and others, the results of Experiment 1 are inconclusive. While participants deciding on behalf of abstract-others made worse decisions from an economically rational perspective than those deciding on behalf of the self when not held accountable, this result is not in line with any of the three hypotheses proposed here. However, the results suggested that accountability had its biggest effect when psychological distance was high such that it reduced cautiousness.

In Experiment 2 there was a main effect of self-other on cautiousness: those in the self-condition were more cautious, did better, than those in the abstract-other condition and no differently than those in the concrete-other condition. This effect is in line with the risk-as-feelings hypothesis because it suggests that as psychological distance increases, cautiousness tends to decrease. Again, accountability reduced cautiousness among participants in the abstract-other condition resulting in greater expected loss.

What to make of these results? First, the risk-as-feelings hypothesis seems to be the most likely candidate of the three theories to explain risky choices between self and others. Why are decisions riskier as psychological distance increases? In the introduction I suggested that feelings play a role in people's decision process and these feelings bias people to be cautious. When people are tasked with making decisions on behalf of others psychological distance plays a role such that when the recipient is somebody abstract the feelings that are involved in the decision process are reduced if not muted because they cannot empathize with the recipient. This causes agents to make riskier choices on behalf of other who are more distant. Interestingly, all it took for participants in this study to be equally cautious as the self was to know on whose behalf they were making decisions by having the respective participant stand up from their chair.

These results suggest that people who make decisions on behalf of abstract-others incur more risks because recipients are impersonal. If cautiousness is desirable, cautious decisions might be induced by showing agents the photograph of the person on whose behalf they are making decisions if meeting them in person is not possible. Would this work among trained professionals? It remains to be seen if, for instance, an investment manager for a bank or a treasury secretary for a country would be more cautious in their investments or budget allocation when the market demands fiscal restraint if they are given a picture of their clients or constituents.

It should be noted that differences between self and abstract-others were observed in Experiment 2 in the accountability condition because accountability significantly reduced cautiousness among participants deciding on behalf of an abstract-other. This tendency was also observed in Experiment 1 though it was statistically non-significant. However, these reductions in cautiousness might explain why these participants did as well as participants in the self and concrete-other condition in Experiment 1 and worse in Experiment 2. In other words, because being less cautious is better in mixed gambles accountability helped participants in the abstract-other condition in Experiment 1 but because being less cautious is worse in losses accountability hindered them in Experiment 2.

Why would accountability on behalf of abstract-others reduce cautiousness? In other words, why were participants less willing to pay for the riskless crop or to salt the roads less often when they were held accountable? In addition, why did accountability not have the same or any appreciable impact when psychological distance was small? The literature does not suggest an answer to these questions. To my knowledge, this seems to be a novel finding at least with respect to how self-other and accountability were operationalized. Perhaps when people are deciding on behalf of abstract-others and held accountable they are willing to take more risks because they are reminded that the recipient is a stranger they have never seen. I don't mean to imply that agents forget on whose behalf they are deciding but accountability might bring that back into conscious awareness while they are justifying their decisions, enhancing the psychological distance.

If this theory is true, why would accountability not increase cautiousness among participants in the self or the concrete-other condition? If accountability reminds participants on whose behalf they are deciding, doesn't that mean that they would be more cautious if they knew on whose behalf they are deciding because they are reminded that they can be blamed for a bad outcome? A possible answer is that accountability might do very little when psychological distance is small because the concreteness of the decision-recipient looms large in participants' conscious awareness and accountability is not able to change that.

In the introduction I asked you to imagine how you would make financial decisions on behalf of a friend compared to the self. The results of this paper suggest that you would make similar decisions as you would for yourself. If, however, instead of a friend you were asked to decide on behalf of a stranger you would be less cautious.

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Appendix A: Pilot Study

Prior to running the experiment, I ran a pilot to test whether an effect could be obtained and, if so, what the required sample size should be to detect the effect at approximately 80% power.

Participants

373 Psychology students and 63 % were female (*Mean age* = 18.93, *SD* = .99).

Procedure

The procedure was identical to that of the main study.

Stimuli

The stimuli were identical to the main study.

Self-Other

In the pilot there were four groups. In addition to the groups described in the main study, there was a fourth group: participants who made decisions on behalf of someone in the same session but whose identity was not known to the person making the decision.

Lottery

This manipulation was identical to that of the main study. However, to establish the number of tickets participants could earn in this Pilot the results from a prior, published paper was used (see Demnitz & Joslyn, 2020).

Design

This was a single-factor design consisting of four levels: self (identical to main study), abstract-other (identical to main study), abstract-other (recipient is in the same session but unknown), and concrete-other (identical to main study).

Results

The result on the proportion of trials in which the riskless crop was chosen on all trials was used to determine the number of participants needed for 80% power, which we report below. The results suggest that there was a main effect on the proportion of trials in which the riskless crop was chosen, F (3, 383) = 2.67, p = .05 (eta^2 = .03). Contrasts suggested that participants in the self-condition chose the riskless crop proportionally less (M = .39, SD = .11) than participants in the concrete-other condition (M = .45, SD = .17), t (118) = 2.27, p = .02 (Cohen's D = .42). See table 8 below for results. However, participants in the self-condition were statistically no different than either abstract-other conditions and both were statistically no different from one another suggesting that either manipulation had the same effect.

The results also suggested that participants in the self-condition had a slightly greater mean expected value (M = 118.00, SD = 5.66) than participants in the concrete-other condition (M = 115.96, SD = 7.39), t (118) = 1.68, p = .09 (Cohen's D = .31) but no different from either abstract-other conditions. In addition, the latter two groups were no different from one another.

These preliminary findings slightly favored the playing-it-safe hypothesis; participants in the self-condition were less risk-averse than participants in the concrete-other condition but were not any different from any of the abstract-other conditions.

Based on these findings, Experiment 1 was planned without the abstract-other condition in which participants made decisions on behalf of a participant in the same session whose identity was not known. In addition, an accountability condition was added such that half of the participants were in the accountable condition and the other half in the non-accountable condition and participants either made decisions on their own behalf or on behalf of an abstract-other or concrete-other (3x2 between-subjects, fully-crossed).

The means, standard error, and sample size for each of the dependent variables in this pilot are shown in table A1 below. Based on the statistical significant difference between the self and the concrete-other along with its effect size a power analysis suggested that 90 participants (540 participants overall) per cell would be necessary to detect that same difference with an 80% chance.

The distribution of participants' end budget was divided into roughly five percentile ranges and used to inform participants in Experiment 1 of how many lottery tickets they would be entitled according to their end budget (see Table A2).

Table A1

Descriptive Results of Pilot Study

	Sample size	Mean proportion riskless crop (standard error)	Mean expected value (standard error)
Self	68	.39 (.02)	118.00 (.79)
Abstract-other (same session, identity unknown)	86	.38 (.02)	117.41 (.71)
Abstract-other (future session, identity unknown	81	.39 (.02)	118.25 (.73)
Concrete-other	52	.45 (.02)	115.96 (.91)

Note. The statistical difference between the self-condition and the concrete-other condition with respect to the proportion of trials in which the riskless crop was chosen (Cohen's D = .42) was used for the power analysis to determine sample size for 80% power.

Table A2

Lottery Tickets

End Budget	Tickets
$6,800 and above	5
$6,600 - $6,799	4
$6,400 - $6,599	3
$6,100 - $6,399	2
$1 - $6,099	1

Appendix B

Trust:

"How much do you trust this prediction?"

Not at all
A little
Somewhat
Quite a bit
Very much
Completely

Concern:

"How concerned are you about drought in this region?"

Not at all
A little
Somewhat
Quite a bit
Very much
Extremely

Appendix C

Table C1

Experimental Stimuli

Region	Drought Prob	Prediction	Provide Reason	Observation
1	30	is not	0	0
2	10	is not	0	0
3	60	is	0	1
4	30	is not	1	0
5	50	is	0	1
6	10	is not	1	0
7	50	is	0	0
8	30	is not	0	0
9	20	is not	0	0
10	40	is	1	1
11	30	is not	0	1
12	10	is not	0	0
13	20	is not	0	0
14	20	is not	0	0
15	40	is	0	0
16	10	is not	0	1
17	50	is	1	1
18	20	is not	0	0
19	30	is not	0	0
20	40	is	0	0
21	20	is not	0	1
22	10	is not	0	0
23	60	is	1	0
24	40	is	0	1
25	50	is	0	1
26	10	is not	0	0
27	30	is not	0	0
28	50	is	0	0
29	30	is not	0	1
30	10	is not	1	0
31	60	is	0	1
32	20	is not	1	0
33	30	is not	0	0
34	20	is not	0	0
35	50	is	1	0
36	60	is	0	0
37	30	is not	0	0
38	40	is	1	0
39	60	is	1	1
40	30	is not	1	1
41	10	is not	0	0
42	20	is not	0	0
43	10	is not	0	0

44	20	is not	1	1
45	20	is not	0	0
46	10	is not	0	0

*Note: "*Prediction" refers to whether drought was predicted or not. Participants in the accountable condition were required to provide justification after their crop choice on 12 trials, coded as 1 if justification is required and 0 if not under "Provide Reason". A non-drought outcome is coded as a 0 (1 if drought) under "Observation".

Appendix D

Table D1

Experimental Stimuli

Trial	Forecast	Freeze Prob	Participant's Forecast	Provide Reason	Observation
1	35	20	32	0	38
2	34	20	35	0	37
3	34	23	35	1	30
4	35	24	32	0	33
5	33	32	31	0	39
6	33	34	31	1	32
7	34	26	30	0	36
8	35	22	33	0	37
9	34	20	36	0	33
10	35	18	31	0	34
11	35	17	31	0	36
12	36	14	34	1	40
13	35	13	36	0	34
14	36	10	32	0	35
15	37	11	40	0	31
16	35	15	35	1	38
17	35	21	35	0	33
18	34	27	31	0	41
19	33	36	35	0	31
20	32	39	33	1	26
21	32	41	30	1	34
22	32	48	32	0	28
23	33	37	32	0	35
24	34	29	35	0	42
25	34	21	31	0	35
26	34	17	32	0	36
27	36	10	32	1	40
28	36	13	35	0	34
29	36	15	35	0	37
30	37	11	32	0	39
31	35	15	35	1	34
32	35	16	34	0	30
33	35	19	30	1	34
34	34	25	30	0	38
35	33	33	35	0	39
36	32	51	34	1	30
37	32	50	32	0	32
38	32	44	32	0	37
39	34	30	32	0	32
40	34	35	30	0	39
41	33	43	35	1	30

42	35	23	34	0	37
43	35	18	34	0	32
44	34	19	33	0	31
45	36	22	35	1	35
46	34	16	30	0	36
47	36	13	34	0	39
48	36	12	36	0	33
49	37	14	37	1	36
50	35	17	35	0	36
51	36	12	36	1	35
52	35	18	35	0	33
53	34	28	34	0	31
54	32	47	30	0	36
55	33	38	33	1	37
56	32	49	32	0	27
57	32	45	32	1	34
58	34	16	34	0	34
59	36	14	34	0	33
60	35	19	34	0	30