

The Risk-Averse Body: How Consumers' Risk Preferences Deviate When Making Decisions About Their Body Versus Their Money

CHRISTOPH HÜLLER AND MARTIN REIMANN

ABSTRACT

Medical and cosmetic procedures can enhance the health and appearance of our bodies, yet they also bear the risk of discomfort, side effects, and other negative bodily experiences, potentially deterring consumers from making advantageous decisions. This research asks: To what extent and why are consumers hesitant to embrace the risk of such bodily experiences, and when do they become more risk-tolerant? Five experiments ($N = 2,756$) compare consumers' risk preferences for bodily prospects (e.g., choices involving varying levels of side effects) to those for equivalent monetary prospects (e.g., choices involving financial amounts equivalent to these side effects), demonstrating that when consumers face risky bodily prospects, an extremely negative bodily experience comes to mind. This causes consumers to treat available options as comparative gains and thus to exhibit risk aversion. This bodily risk aversion, which reflects a substantial deviation from consumers' monetary risk preferences, attenuates when social norms encourage risk taking.

Bodily procedures like routine checkups or immunizations are essential for protecting, curing, and enhancing the body, yet many consumers neglect them. For example, while each year half a million Americans die from cancer, half of these deaths could be prevented through rigorous body screening and treatment (American Cancer Society 2024). However, two thirds of Americans fail to follow recommendations for regular body screening, and many consumers are reluctant to consider new treatments after the onset of the disease (Kuzminski 2024). This reluctance, which was coined “America’s other drug problem” (Scott and McClure 2010), extends beyond medical contexts. For example, although almost 80% of Americans express dissatisfaction with the physical appearance of their body—a concern often linked to reduced self-esteem and mental well-being (Lemay

2018)—relatively few seriously consider noninvasive cosmetic procedures that could offer both aesthetic enhancement and therapeutic relief (Anderson 2018).

Clearly, engaging in such procedures involves the risk for negative bodily experiences. For example, although vaccines protect the body from infections, they also bring side effects such as chills, fever, and pain (Song and Katial 2004). Similarly, cancer care leads to discomfort, nausea, and hair loss, which often deters consumers (Niederdeppe and Levy 2007). Often, the procedures with the highest efficacy are also the ones with the highest risk for negative bodily experiences, causing consumers to either choose a less efficacious procedure or avoiding them altogether (McNeil et al. 1978). Consequently, understanding consumers' willingness to embrace the risk of negative bodily experiences represents a crucial

Christoph Hüller is an assistant professor of marketing at New Mexico State University, 1780 E. University Ave., Las Cruces, NM 88003, USA. Martin Reimann (corresponding author: reimann@arizona.edu) is McClelland Professor of Marketing and professor of psychology, veterinary medicine, and cognitive science at the University of Arizona, 1200 E. University Blvd., Tucson, AZ 85721, USA. The authors thank the issue editor L. J. Shrum, two anonymous reviewers, and the participants of the ACR BODI Incubator Workshop for their valuable feedback and Mike Norton, Oliver Schilke, and George Hammond for helpful comments on earlier versions of this research. This work was generously supported by the Eller Economic and Business Research Center, the Eller Center for Management Innovation in Healthcare, and the Marketing Science Institute.

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step toward improving their bodily decisions, aiding the efforts to protect, cure, and enhance their bodies, and expanding the growing literature on body-related consumption. The present research contributes to this literature by examining whether, and if so why and when, consumers' risk preferences toward bodily prospects differ from those in other domains (e.g., monetary prospects).

Prior framing research has suggested that valence offers a straightforward way to predict risk preferences. For financial decisions, for example, consumers are risk-seeking when choosing between monetary losses and risk-averse when choosing between monetary gains (Kahneman and Tversky 1979; Tversky and Kahneman 1981). This work has led researchers to suggest a similar pattern of risk preferences in the bodily domain, often referring to the so-called Asian Disease problem, in which consumers make risky decisions about the number of bodies to save or spare in a hypothetical pandemic (Tversky and Kahneman 1981; Kahneman and Tversky 1984). However, recent investigations have hinted that valence might be a less stable predictor of risk preferences than expected, especially in the medical domain (Tang and Chooi 2023). We argue that this is the case because classical attempts to assess risk preferences in this domain (e.g., the Asian Disease problem) have relied on decision outcomes that are quasi-monetary: rather than making decisions about experiences of their own body (e.g., varying levels of discomfort or side effects), consumers are tasked with making decisions about experience-poor quantities (e.g., cardinal counts on how many other bodies to spare).

Contrary to this prior work, we theorize and demonstrate that risky decisions about bodily experiences do not follow typical framing effects (Kahneman and Tversky 1979; Tversky and Kahneman 1981). Instead, decisions about negative bodily experiences are treated in risk-averse fashion, thereby being more similar to the risk preferences for monetary gains rather than losses. We argue that this deviation in risk preferences stems from a difference in reference points (Tversky and Kahneman 1973). When facing risky bodily prospects, an extremely negative experience (e.g., an extreme side effect) is likely to come to consumers' minds (Lichtenstein et al. 1978; McNeil et al. 1978), which leads them to treat future bodily experiences as comparative gains—albeit often being negative. In contrast, for monetary prospects, consumers possess a more neutral reference point and thus treat future negative monetary outcomes as comparative losses (Kahneman and Tversky 1979; Tversky and Kahneman 1981). Importantly, however, we show that social norms appear to be a powerful lever for alleviating consumers' extreme ref-

erence point, thereby causing them to become more risk-tolerant.

CONCEPTUAL DEVELOPMENT

What Bodily Prospects Are and How They Differ from Monetary Prospects

By "bodily prospects" we mean risky choice options whose possible outcomes are bodily experiences rather than money (e.g., discomfort, side effects, or aesthetic impairments), each with some chance of occurring. In "Prospect Theory," a prospect refers to a risky choice option represented by a set of possible outcomes and their associated probabilities. For example, a consumer might face the decision to accept a riskier prospect with a 50/50 chance of losing \$80 or \$120 over a less risky prospect involving a sure loss of \$100. Classic demonstrations often use monetary gambles (Kahneman and Tversky 1979), but the concept itself is not restricted to money (Tversky and Kahneman 1981). Drawing from Prospect Theory, we adopt its vocabulary for bodily prospects to investigate consumers' risky decision making regarding the body. Just like monetary prospects, bodily prospects consist of a set of possible outcomes and their associated probabilities, but the nature of these outcomes is different. While monetary prospects include objective and quantifiable outcomes that do not elicit a physical experience in the human body, bodily prospects include outcomes with subjective and experience-rich qualities because they often involve discomfort, pain, and sometimes even irreparable experiences to the body. For example, a consumer might face the decision to choose between two anesthesia prospects: The safe prospect is expected to produce moderate discomfort; the risky prospect offers a 50/50 chance of somewhat lower or somewhat higher discomfort. In this example, the different levels of discomfort represent the outcomes, and the stated frequencies are their probabilities (i.e., "what might happen" and "how likely"). Although the nature of outcomes differs between bodily and monetary prospects, prior research demonstrates that these outcomes can be meaningfully compared. For example, health economists routinely translate bodily harms and benefits into monetary terms using willingness-to-pay and quality-adjusted life year valuations (Deal et al. 2013; Kouakou and Pöder 2022). These methods allow researchers to assess whether the benefits of medical procedures justify their costs, providing well-established benchmarks for quantifying discomfort, side effects, and other bodily experiences. We adopt this logic to examine how consumers' risk preferences diverge between bodily and monetary prospects.

How Risk Preferences for Bodily Prospects Do Not Follow Typical Framing Effects

Classic framing effects (e.g., the Asian Disease problem; Tversky and Kahneman 1981) hold outcomes and probabilities constant but vary the wording. For example, in a deadly disease scenario with an expected fatality rate of 600 people, one must choose between an intervention in which 400 people will die for sure or an intervention in which either nobody will die with a 1/3 probability, or 600 people will die with a 2/3 probability (loss frame). The same problem can also be reframed such that in the first intervention, 200 people will be saved for sure and in the second intervention either 600 people will be saved with a 1/3 probability, or nobody will be saved with a 2/3 probability (gain frame). Just like for monetary prospects, these framing effects yield risk seeking in loss frames and risk aversion in gain frames, all else being equal (Kahneman and Tversky 1979; Tversky and Kahneman 1981). Notably, however, these supposed bodily decisions involve numbers of lives—cardinal counts—as decision outcomes, making them quasi-monetary in our view: The outcome is an objective, experience-poor quantity (i.e., how many other bodies will be lost/saved), not a subjective, experience-rich quality (i.e., how one's own body will feel burdened/relieved).

Our account is not about merely reframing identical prospects. Instead, we argue that changing the outcome domain from monetary or quasi-monetary outcomes (i.e., quantitative counts) to bodily outcomes (i.e., qualitative experiences) systematically changes risk preferences. Similar to monetary prospects, bodily prospects involve outcomes that are usually either positively valenced (e.g., body-enhancing benefits) or negatively valenced (e.g., body-draining burdens). Given the established contrast between risk preferences for positive and negative monetary prospects (Kahneman and Tversky 1979; Tversky and Kahneman 1981), one could expect that consumers equate positive bodily experiences with monetary gains and negative bodily experiences with monetary losses and show corresponding patterns in risk preferences. However, we argue that this is not the case: When outcomes are bodily experiences, consumers' risk preferences deviate from those for monetary or quasi-monetary outcomes, specifically in the negative domain.

Indirect support for our prediction comes from evidence that consumers approach decisions involving affect-rich outcomes (as in bodily experiences) differently than they approach decisions involving affect-poor (as in monetary) outcomes (Hsee and Rottenstreich 2004), which can alter their risk preferences (Rottenstreich and Hsee 2001). Moreover,

making monetary decisions more experiential (e.g., via gamification) has also been shown to alter risk preferences without changing gain–loss wording (Hüller et al. 2023). In fact, an emerging research stream, known under the umbrella term “Experience Theory,” has demonstrated that risk preferences for everyday experiences evaluated on quality can deviate from those for money evaluated on quantity (Martin et al. 2016). Taken together, we suggest that studying bodily risk preferences using counts (as in the Asian Disease paradigm) yields results that are similar to consumers' monetary risk preferences. However, when consumers make decisions about bodily experiences—outcomes evaluated on quality rather than quantity—their risk preferences substantially deviate, consistent with a domain-specific (not merely verbal) shift in risk preferences. In summary, we hypothesize:

H1: Consumers are relatively more risk-averse toward negative bodily prospects compared to equivalent negative monetary prospects.

Why Risk Preferences for Bodily Prospects Deviate from Risk Preferences for Monetary Ones

One possible explanation for our proposed effect is the extremity of consumers' reference points. A reference point is any value subjectively selected for comparing, classifying, and evaluating possible outcomes (Wang and Johnson 2012). Unlike valence, which determines whether a reference point is negative or positive, extremity refers to its degree of negativity or positivity, ranging from extreme to neutral. For monetary decisions, prior research has demonstrated that consumers' reference points are situated on the neutral level of zero (i.e., \$0). Consequently, negative outcomes in monetary prospects (e.g., losing \$5) are below the reference point and thus are treated as comparative losses. Consumers exhibit risk seeking toward monetary losses because the marginal increase in disutility becomes smaller with greater distance from the zero reference point (Kahneman and Tversky 1979; Tversky and Kahneman 1981).

In contrast, we argue that negative experiences in bodily prospects (e.g., side effects) are likely to be treated as comparative gains because reference points are at extremes (e.g., the memory of an extreme side effect), and hence we would observe risk aversion. We predict that consumers exhibit risk aversion toward negative bodily prospects because the marginal decrease in disutility becomes larger with closer distance to the extremely negative reference point (Martin et al. 2016). The notion that reference points are extreme for bodily

experiences is supported by the finding that when asked to recall experiences from the past, consumers often mention their most intense memories (Morewedge et al. 2005; Martin et al. 2016). This likely occurs because consumers tend to rely on memories that are most accessible in their minds, which often happen to be the most emotionally intense ones (Tversky and Kahneman 1973). For example, after going through bodily procedures, consumers tend to recall peak episodes (e.g., the most painful moments) more than moderate ones (e.g., less painful moments), causing them to form extreme reference points (Redelmeier and Kahneman 1996). Importantly, consumers use these extreme memories to arrive at comparative judgments and inductive inferences about future prospects, which can lead to distortions in their judgment and decision making (Tversky and Kahneman 1974; Kardes et al. 2004). For example, when imagining lethal events, consumers tend to overestimate extreme but rare causes, while underestimating less extreme but common ones, thereby inflating the perceived probabilities of extreme events happening relative to their actual probabilities (Lichtenstein et al. 1978). We therefore propose that more (vs. less) extreme reference points may underlie the divergence in risk preferences between the two decision domains. In short, we hypothesize:

H2: Consumers' heightened risk aversion toward negative bodily prospects (vs. monetary prospects) can be explained by a more extreme negative reference point stemming from past bodily experiences.

When Risk Preferences for Bodily Prospects Approach Risk Preferences for Monetary Ones

Consumers make bodily decisions after discussions with relatives (Cardoso et al. 2020), colleagues (Bennett et al. 2016), and sometimes even strangers (Zikmund-Fisher et al. 2011). Consequently, social norms, which refer to common rules and standards established and shared by a group of people (Cialdini and Trost 1998), appear to be a powerful lever for improving consumers' bodily decision making. Indeed, social norm interventions have yielded successful improvements in, for example, the reduction of alcohol consumption (Neighbors et al. 2004) or disordered eating (Mutterperl and Sanderson 2002). Certainly, the effectiveness of these interventions is greatest when the norms are shared among a social group with which a consumer identifies (Terry and Hogg 1996). Hence, we argue that friends and family—individuals who are closest to the decision maker—exert the highest

influence on consumers' bodily decisions, thereby qualifying as a promising target for physicians and policy makers to improve adherence to healthcare recommendations, such as choosing a highly effective bodily procedure even when it carries the risk of temporary negative experiences.

Previous studies suggest that providing consumers with accurate information about the norms in a social group can alter their misperceptions about risky bodily procedures (Mutterperl and Sanderson 2002; Neighbors et al. 2004). Hence, we would predict that when consumers learn about their family and friends' positive attitudes toward a risky bodily procedure that healthcare professionals recommended, they will adjust their misperception about the extremity of potential negative bodily experiences and thus will be more likely to undergo it. Hence, social norms appear to be a powerful mechanism for shifting consumers' extremely negative reference points in a positive direction, causing them to become less risk-averse. In contrast, for negative monetary prospects for which reference points are more neutral (Kahneman and Tversky 1979; Tversky and Kahneman 1981), we argue that social norms have a weaker influence on consumers' risk preferences, suggesting an interaction effect of decision domain and social norms on consumers' risky choices. In fact, social norms are suggested to be more effective in socially approved domains (e.g., healthy eating), while being less effective in socially disapproved domains (e.g., gambling; Melnyk et al. 2022). Hence, we hypothesize:

H3: Consumers' heightened risk aversion toward negative bodily prospects (vs. monetary prospects) attenuates when social norms to adhere to expert recommendations to choose the riskier prospect are present (vs. absent).

STUDY OVERVIEW

Across five studies, we assessed consumers' risk preferences toward bodily prospects in comparison to equivalent monetary ones. We did so in several contexts concerning one's body, including those that are aimed at enhancing (i.e., cosmetic procedures; studies 1 and 3), treating (i.e., chemotherapy; studies 2 and 4), and protecting (i.e., immunization; appendix, available online) it. We further investigated consumers' reference points in both domains as an underlying psychological explanation for our focal effect (studies 2 and 3). Finally, we examined social norms and their differentiating effects on consumers' risky decision making about bodily prospects (vs. monetary ones; study 4). We preregistered

detailed data collection plans and original materials on the Open Science Framework (OSF) and conducted a power analysis (see app. A) prior to launching all our studies. Data and syntax are also available on OSF: <https://osf.io/fkjqs/overview>.

STUDY 1: BODILY RISK PREFERENCES IN THE CONTEXT OF BOTOX

The objective of study 1 was to examine participants' risk preferences toward bodily prospects (vs. equivalent monetary ones). To do so, we manipulated whether participants made a risky decision about their body or money (decision domain), in addition to manipulating whether decision outcomes were positive or negative (outcome framing). For the context of this study, we chose Botox due to its high prevalence in society, timely relevance, and varying effects on the body. Indeed, while Botox can have important cosmetic and medical benefits (e.g., lifted eyelids), it has also been shown to sometimes have the opposite effect, leading to cosmetic and medical burdens (e.g., drooping eyelids) and thus qualifying it as an interesting context to study risky decision making. A preregistered data collection plan and study materials can be accessed here: <https://osf.io/xdsn8/overview>.

Method

CloudResearch panelists ($N = 402$; $M_{\text{age}} = 39.45$; 60% female) were randomly assigned to one of four conditions in a 2 (decision domain: bodily, monetary) $\times$ 2 (outcome framing: positive, negative) between-subjects experimental design. Per our preregistration, two participants were excluded after not consenting to the usage of their responses.

Participants were instructed that the study is about Botox and were asked to answer a few questions about it. In the *positive* conditions, participants learned that one potential benefit of Botox is ascending eyelids, making the eyes look bigger and enhancing a person's vision and physical appearance. In contrast, in the *negative* conditions, participants learned that one potential burden of Botox is descending eyelids, making the eyes look smaller and diminishing a person's vision and physical appearance. After a short training session involving comprehension checks, participants in the *bodily* conditions made a risky choice regarding these bodily outcomes. In the *positive bodily* condition, participants chose between either an 80%/20% chance of having 1 or 21 months of ascending eyelid benefits (option A) or a 100% chance of having 5 months of ascending eyelid benefits (option B). Analogously, in the *negative bodily* condition, participants chose between either an 80%/20% chance of having 1 or 21 months

of descending eyelid burdens (option A) or a 100% chance of having 5 months of descending eyelid burdens (option B). These decisions were adapted forms of classic decisions used in both Prospect Theory and Experience Theory just with bodily experiences as outcomes (Kahneman and Tversky 1979; Martin et al. 2016). To calibrate the decisions in the *monetary* conditions, we asked all participants to also indicate the dollar amounts they would pay to experience 1 month of ascending eyelid benefits (*positive* conditions) or to avoid 1 month of descending eyelid burdens (*negative* conditions) on a slider scale from \$1 to \$100,000. This approach follows well-validated research practices to assess consumers' valuation of bodily outcomes by using willingness-to-pay measures (Kouakou and Pöder 2022). We carefully designed the endpoint of our slider scale (i.e., \$100,000) based on previously identified thresholds, which typically range between a few hundred dollars for minor bodily outcomes (e.g., experiencing side effects) to about \$100,000 for major bodily outcomes (e.g., losing an entire life year; Deal et al. 2013; Kouakou and Pöder 2022). We used the responses of the slider scale to create monetary decisions equivalent to those made in the bodily conditions. In the *positive monetary* condition, participants chose between either an 80%/20% chance of having 1 or 21 months of their specified dollar amount worth in gains (option A) or a 100% chance of having 5 months of their specified dollar amount worth in gains (option B). Analogously in the *negative monetary* condition, participants chose between either an 80%/20% chance of having 1 or 21 months of their specified dollar amount worth in losses (option A) or a 100% chance of having 5 months of their specified dollar amount worth in losses (option B). Note that the choice options in all four conditions were expected value-matched: The expected value of option A was 5 months (=80% times 1 month plus 20% times 21 months) equal to the certain 5 months in option B. In addition to the binary choice between option A (1 = *riskier prospect*) and option B (0 = *less risky prospect*), we also assessed participants' risk preferences using a continuous measure (1 = *definitely option A*, 7 = *definitely option B*), reverse-coded so that higher values indicate a stronger preference for the riskier option A.

Results

A binary logistic regression revealed an interaction effect of decision domain and outcome framing on risky choice ($b = .86$, $SE = .45$, $p = .054$, $OR = 2.36$). As predicted, participants were less likely to choose the riskier prospect in the negative bodily (prob. = 49%) versus monetary condition (prob. = 65%; $p = .020$). In contrast, participants were

equally likely to choose the riskier prospect in the positive bodily (prob. = 24%) versus monetary condition (prob. = 21%; $p = .586$), demonstrating that participants deviated from their monetary risk preferences primarily when making negative (but not positive) decisions about their body. Although the interaction effect in the logistic regression was marginally significant, a two-way ANOVA with the continuous measure as dependent variable yielded a fully significant interaction ($F(1, 396) = 5.97$, $p = .015$, $\eta_p^2 = .01$). Again, participants indicated a lower preference for the riskier prospect in the negative bodily ($M = 3.85$) versus monetary condition ($M = 4.52$; $p = .007$), while there was no significant difference in risk preferences between the positive bodily ($M = 2.89$) versus monetary conditions ($M = 2.70$; $p = .454$; fig. 1).

Discussion

Study 1 demonstrated that while participants exhibited similar risk preferences toward positive bodily prospects (vs. equivalent monetary ones), their risk preferences substantially deviated from each other for negative decisions. Specifically, participants were more risk-averse toward negative bodily prospects (vs. equivalent monetary ones), supporting hypothesis 1. However, while Botox is primarily used for cosmetic purposes, it is unclear whether our theorizing generalizes to bodily contexts in which the stakes for the body might be higher. Thus, study 2 aimed to test our theorizing in the context of chemotherapy, a medical procedure often employed as the gold standard and last resort in cancer care.

STUDY 2: BODILY RISK PREFERENCES IN THE CONTEXT OF CHEMOTHERAPY

The objective of study 2 was to provide converging support for hypothesis 1 in the context of chemotherapy. To ensure the comparability of our experimental conditions, we asked participants to name three negative bodily experiences associated with chemotherapy themselves (e.g., certain side effects), and to indicate the negative monetary outcomes that they consider equivalent to these experiences (e.g., the monetary amount they would pay to avoid the side effects). Unlike in study 1 in which we used a slider scale to gauge monetary outcomes, this time we utilized an open-entry question to ensure that monetary amounts are not capped by a maximum number. A preregistered data collection plan and study materials can be accessed here: <https://osf.io/c6txf/overview>.

Method

CloudResearch panelists ($N = 603$; $M_{\text{age}} = 41.93$, 58% female) were randomly assigned to one of two conditions in a one-factorial (decision domain: negative bodily, negative monetary) between-subjects experimental design. Per our preregistration, one participant was excluded after not responding to the dependent variable.

Using text-entry boxes, participants in both conditions were asked to write about three of the most negative bodily experiences of chemotherapy (e.g., certain side effects) that they can think of and to indicate the monetary amounts that they would pay to avoid each of these experiences. We utilized this approach to carefully calibrate the risky decisions

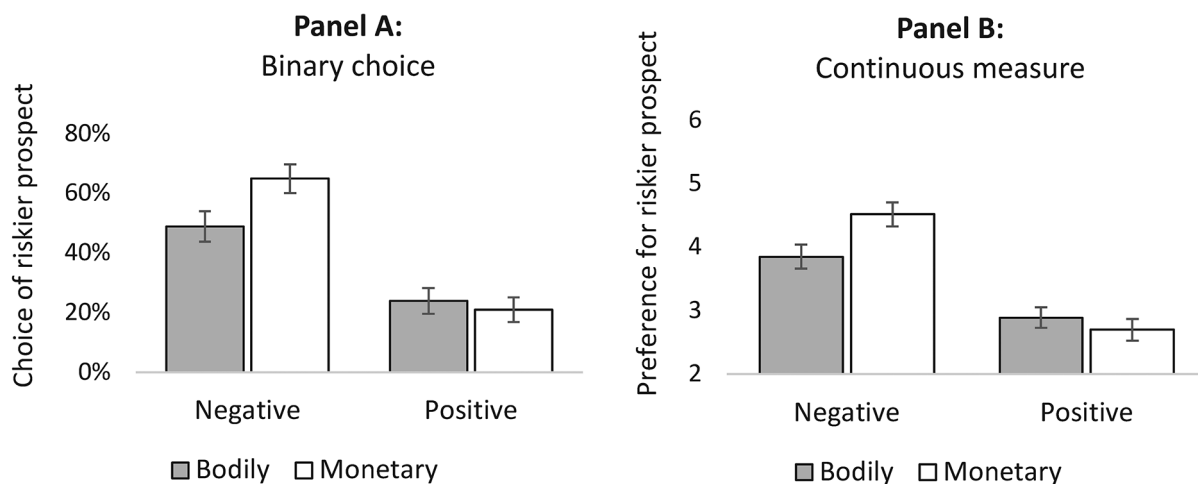


Figure 1. Participants were more risk-averse toward bodily (vs. monetary) prospects only for negative (but not positive) decision outcomes.

that participants made in the two conditions. In the *negative bodily* condition, participants were asked whether they preferred a 50%/50% chance of either their *most negative bodily experience* or *third most negative bodily experience* (riskier prospect) or a 100% chance of their *second most negative bodily experience* (less risky prospect). In the *negative monetary* condition, they were asked whether they preferred a 50%/50% chance of either their *most negative monetary outcome* or *third most negative monetary outcome* (riskier prospect) or a 100% chance of their *second most negative monetary outcome* (less risky prospect; Martin et al. 2016).

Results

A binary logistic regression again revealed that participants were less likely to choose the riskier prospect in negative bodily (prob. = 29%) versus monetary condition (prob. = 37%; $b = -.36$, $SE = .17$, $p = .040$, $OR = .70$).

Next, to explore whether the extremity of the bodily experience that first came to participants' minds yielded differences in participants' risky choices, we conducted a standard moderation analysis (PROCESS model 1; Hayes 2017). To code extremity, we had two research assistants, unfamiliar with the study, rate how extreme they perceived participants' most negative bodily experience (2 = *extremely negative*, 1 = *slightly negative*, 0 = *not negative at all*; inter-rater reliability: Cronbach's $\alpha = .91$). Results revealed that extremity intensified the effect of decision domain on risky choice (interaction: $b = -.84$, $SE = .34$, $p = .014$, 95% $CI = [-1.51, -.17]$). Accordingly, participants were less likely to choose the riskier prospect in the negative bodily (prob. = 15%) versus monetary condition (prob. = 35%) only when the first bodily experience that came to mind was extremely negative ($b = -.90$, $SE = .28$, $p = .001$, 95% $CI = [-1.45, -.35]$). Conversely, for slightly negative bodily experiences, there was no significant difference in risky choice between the negative bodily (prob. = 39%) versus monetary condition (prob. = 40%; $b = -.06$, $SE = .22$, $p = .780$, 95% $CI = [-.50, .37]$). This suggests that the heightened risk aversion toward negative bodily prospects (vs. monetary ones) is driven by an extreme reference point, and that it can be overcome by shifting it in a positive direction.

Discussion

Study 2 provides convergent evidence for hypothesis 1 in the context of chemotherapy, showing that participants were more risk-averse toward negative bodily (vs. equivalent monetary) prospects. In another study (reported in

app. B), we replicated these findings in yet another context (i.e., immunization). Next, we focus our attention on the underlying mechanism of our focal effect. While study 2 provided preliminary evidence that consumers are more risk-averse toward negative bodily prospects (vs. monetary ones) solely when an extreme bodily experience comes to mind, likely serving as their reference point (hypothesis 2), study 3 measured participants' reference points directly.

STUDY 3: EXTREME REFERENCE POINTS UNIQUE TO BODILY PROSPECTS

The objective of study 3 was to further test hypothesis 2, stating that consumers' heightened risk aversion toward negative bodily (vs. equivalent monetary) prospects can be explained by a more extreme negative reference point (e.g., an extreme embodied experience) held in consumers' minds. To examine this possibility, we directly measured participants' reference points in both domains. A pre-registered data collection plan and study materials can be accessed here: <https://osf.io/vu6x3/overview>.

Method

CloudResearch panelists ($N = 623$; $M_{age} = 39.40$; 61% female) were randomly assigned to one of two conditions in a one-factorial (decision domain: negative bodily, negative monetary) between-subjects experimental design. Per our pre-registration, four participants were excluded after not consenting to the usage of their responses.

The experimental design was similar to that of study 1, with the exceptions that we (1) focused on comparing participants' risk preferences toward negative bodily (vs. monetary) prospects (i.e., omitting the positive conditions) and (2) added additional measures to examine participants' reference points in both domains in line with previously established procedures (Martin et al. 2016). Specifically, after indicating their risk preferences using the same binary choice as in study 1, we asked participants to write about the first thing that came to their mind when thinking about Botox (*negative bodily* condition) or money (*negative monetary* condition). They were further instructed that this could be something that they experienced themselves or saw someone else experiencing. Participants then rated the extremity of this experience on six dimensions using a 7-point bipolar scale (e.g., subtle-extreme, undramatic-dramatic, minor-life-changing; Cronbach's $\alpha = .90$), which served as the measure for reference point extremity.

Results

A standard mediation analysis (PROCESS model 4; Hayes 2017) revealed that participants recalled a more extreme experience in the bodily ($M = 4.98$) versus monetary domain ($M = 4.51$; $b = .47$, $SE = .11$, $p < .001$, 95% CI = [.26, .68]), likely serving as their reference point when making their risky choice. Indeed, a more extreme reference point was associated with a lower likelihood of selecting the riskier prospect albeit only marginally ($b = -.11$, $SE = .06$, $p = .087$, 95% CI = [-.23, .02]). Accordingly, participants were again less likely to choose the riskier prospect in the negative bodily (prob. = 48%) versus monetary condition (prob. = 66%; $b = -.70$, $SE = .17$, $p < .001$, 95% CI = [-1.03, -.37]).

Discussion

Study 3 provides additional support for our theorizing that consumers are relatively more risk-averse toward negative bodily (vs. monetary) prospects (hypothesis 1). Mediation evidence further indicates that this shift likely arises from a more extreme negative reference point—specifically, the recalled memory of an adverse bodily experience—which participants appear to use when evaluating options (hypothesis 2). A more extreme reference point reframes many available outcomes as comparative gains, thereby eliciting risk aversion. In contrast, negative monetary contexts elicit a more neutral reference point, framing negative outcomes as comparative losses and thus promoting risk seeking. In our next study, we examined whether social norms could shift consumers' extremely negative reference points in a positive direction, causing them to become less risk-averse toward negative bodily prospects.

STUDY 4: THE ROLE OF SOCIAL NORMS IN ATTENUATING BODILY RISK AVERSION

One objective of study 4 was to test hypothesis 3, stating that consumers' heightened risk aversion toward negative bodily (vs. monetary) prospects attenuates when social norms to adhere to expert recommendations are present (vs. absent). Another objective was to generalize our results to yet another type of risk, namely the risk of having to undergo the uncomfortable bodily experience of chemotherapy multiple times. A preregistered data collection plan and study materials can be accessed here: <https://osf.io/cz74r/overview>.

Method

CloudResearch panelists ($N = 809$; $M_{\text{age}} = 39.04$; 55% female) were randomly assigned to one of four conditions in a 2 (decision domain: negative bodily, negative monetary) $\times$ 2 (social norms: present, absent) between-subjects experimental design. Per our preregistration, six participants were excluded after not responding to the dependent variable.

Participants were instructed to make a choice between two options. In the *negative bodily* condition, participants chose between two different chemotherapy options. Option A meant a 50%/50% chance of undergoing the negative bodily chemotherapy experience either one time or five times (riskier prospect), whereas option B meant a 100% chance of undergoing the experience three times (less risky prospect). Analogously, in the *negative monetary* condition, participants chose between two different monetary options. Option A meant a 50%/50% chance of losing either \$1 or \$5 (riskier prospect), whereas option B meant a 100% chance of losing \$3 (less risky prospect; Martin et al. 2016). Participants were further instructed that healthcare professionals (bodily condition)/financial professionals (monetary condition) recommend choosing option A (i.e., the riskier prospect). Participants in all four conditions were exposed to these additional instructions. To manipulate social norms, we then either did (*present* condition) or did not (*absent* condition) include a sentence that instructed participants to further suppose that their family and friends expected them to listen to the professionals' recommendations.

Results

A binary logistic regression again revealed a significant main effect of decision domain on risky choice ($b = -.81$, $SE = .18$, $p < .001$, OR = .45). However, as predicted, the regression also revealed a significant interaction of decision domain and social norms on risky choice ($b = .70$, $SE = .36$, $p = .049$, OR = 2.01), indicating that social norms, when they were present, attenuated participants' relative risk aversion toward negative bodily (vs. monetary) prospects. When social norms were absent, participants were substantially less likely to choose the riskier prospect in the negative bodily (prob. = 68%) versus monetary condition (prob. = 87%; $p < .001$). In contrast, when social norms were present, this difference in risky choice between the negative bodily (prob. = 73%) versus monetary condition (prob. = 81%; $p = .049$) diminished.

Discussion

Study 4 demonstrated that when social norms are present (i.e., when one's family and friends expect one to listen to the recommendations of healthcare professionals about choosing a riskier procedure), consumers actually become more risk-tolerant toward negative bodily prospects, thereby gradually approaching their risk preference for negative monetary ones. This finding suggests that family and friends are a promising channel for healthcare professionals to reach out to consumers who are hesitant to engage in necessary bodily procedures due to the potential discomfort, side effects, and other negative bodily experiences they might cause.

GENERAL DISCUSSION

Theoretical Contributions

Five studies (four in the main article and one in the appendix) consistently showed that consumers are more risk-averse toward negative bodily prospects than equivalent monetary ones, demonstrating that their risk preferences substantially deviate across the two domains. This puts research around the Asian Disease problem to the test, which argued that both monetary and bodily decisions should be tied to risk seeking for negative decision outcomes (Tversky and Kahneman 1981; Kahneman and Tversky 1984). However, while this prior research has not compared the two domains directly, our attempt to do so revealed that risk preferences deviate, which is further warranted by recent findings that valence might be a less stable predictor of risk preferences than previously assumed (Tang and Chooi 2023). We argue that this is the case because classical attempts to assess bodily risk preferences (e.g., the Asian Disease problem) have relied on decision outcomes that are quasi-monetary counts (i.e., number of other bodies to spare) rather than actual bodily experiences (e.g., side effects felt by the own body). For the latter type of decision outcomes, we show that risk preferences do not follow typical framing effects, which can be explained by a difference in consumers' reference points between the two domains.

Indeed, we demonstrate that when consumers face risky decisions regarding negative bodily prospects, an extremely negative experience from the past is likely to come to their mind (Lichtenstein et al. 1978; McNeil et al. 1978), causing them to treat available options as comparative gains—albeit being negative. This extreme reference point is different from the neutral reference point that has been extensively documented for monetary or quasi-monetary decisions (Kahneman and Tversky 1979; Tversky and Kahneman 1981),

thereby constituting a mind-body connection that is unique to consumers' decisions about their body.

Another difference in consumers' decisions between the two domains is the role that social norms play in the process. Recent meta-analytical evidence suggests that the effect of social norms might be context-dependent (Melnyk et al. 2022), which underlines the importance of our research to compare the effect of social norms between the bodily (vs. monetary) domains. We find that when social norms are strong, consumers are more willing to listen to healthcare professionals and embrace the risk of negative bodily experiences associated with bodily procedures. This challenges prior work showing that healthcare professionals (rather than family and friends) have the strongest influence on consumers' bodily decisions (Song et al. 2024). In fact, we find that family and friends have a more favorable influence on consumers' decisions about their body than on their decisions about money, thereby identifying an important interaction effect of social norms and decision domain.

The Bigger Picture of Experience Theory

Our research fits into a broader theoretical framework that Martin, Reimann, and Norton coined "Experience Theory." This theory proposes that consumers' risk preferences deviate when making decisions about everyday experiences than when making decisions about money largely because they compare available options to extreme instances rather than more neutral reference points (Martin et al. 2016). Experience Theory has since been validated and further developed in several different research contexts. For example, one article applied Experience Theory to gamified financial platforms and illustrated that when financial decisions resemble gamelike experiences by employing leaderboards and levels, consumers become substantially more risk-seeking (Hüller et al. 2023). Another article studied Experience Theory from a functional neuroimaging perspective, identifying a neurophysiological mechanism unique to decisions about everyday experiences (e.g., choosing a song). Accordingly, such experiential decisions are best predicted by hippocampal activity linked to autobiographical memory, while monetary decisions rely more on the ventral striatum and related areas of the reward circuitry (Basavaraj et al. 2025), further supporting the assumptions brought forward by Experience Theory. The present research broadens this body of work by applying Experience Theory to bodily decisions, demonstrating that its assumptions extend beyond the lower-stakes everyday experiences studied previously (e.g., songs, small

investment amounts; Hüller et al. 2023; Basavaraj et al. 2025) and instead even generalize to high-stakes decisions regarding the human body.

Looking ahead, Experience Theory invites further work that bridges different levels of analysis like testing how interventions that change reference points or norms (as in the present work) interact with gamified choice environments (Hüller et al. 2023) or with memory- and reward-related neural systems (Basavaraj et al. 2025). Such research could map when and how marketers, policymakers, or platform designers should make choices more experiential to motivate engagement and beneficial risk taking, and when they should dampen experiential focus to prevent excessive risk aversion or harmful risk seeking.

Practical Implications

Our research has implications for consumers, who must choose between different bodily procedures that vary in perceived riskiness, as well as healthcare professionals and policy makers, who want to stress the efficacy of certain procedures and promote adherence to them, even if these procedures might expose consumers to negligible side effects or discomfort in the short run. The finding that consumers are relatively more risk-averse toward negative bodily prospects than toward equivalent monetary ones does not necessarily represent a problem. However, being overly risk-averse toward inevitable discomfort, side effects, and other temporary bodily experiences can create problems when it hinders consumers from undergoing procedures necessary for their body. This is particularly important because often the procedures with the highest efficacy are also the ones with the highest risk for negative bodily experiences, causing consumers to either choose a less efficacious procedure or avoiding them altogether (McNeil et al. 1978).

Consequently, healthcare professionals and policy makers are challenged to carefully design interventions that increase consumers' risk tolerance for temporary negative experiences associated with bodily procedures. Because consumers already have an extremely negative reference point when thinking about bodily procedures, we recommend exercising caution when using fear appeals or shock advertisements, like those that are widely applied in health communications (Fumagalli and Shrum 2024). Instead, our research suggests that healthcare professionals and policy makers should design social norm interventions to target their recommendations to a broader audience so that they reach not only consumers but also their social environments. Consum-

ers tend to make bodily decisions in consultation with close others, and this shared decision making is likely to increase their adherence to healthcare recommendations—much more than the adherence to expert recommendations in other domains, as our findings illustrate.

Future Research

Our research has limitations that provide directions for future research. Creating a study in which the two decision domains are perfectly identical turned out to be challenging. However, to mitigate this concern, we triangulated data across different contexts and experimental designs and carefully calibrated decisions across the two domains by using well-established willingness-to-pay valuations (Kouakou and Poder 2022). One attempt to make the decisions comparable was to ensure that they involved solely negative outcomes (i.e., negative bodily experiences vs. monetary losses). We acknowledge that this might limit the ecological validity of our results and encourage further research to study more ambivalent bodily decisions that involve both positive and negative experiences similar to when monetary decisions involve both gains and losses.

Another deliberate design choice was to ask participants to make bodily and monetary decisions solely by providing information about outcomes and their associated probabilities. While this attempt was necessary to ensure that the expected value is constant across prospects and domains thereby testing our account in a tightly controlled design, we acknowledge that it leaves out other variables that consumers might consider when making their decisions. Thus, future research should investigate how individual difference variables like, for example, affective dispositions (e.g., hopeful optimism; Reimann et al. 2014), identities (e.g., political ideology; van Esch et al. 2021), or moral values (e.g., the naturalness of bodily procedures; Scott et al. 2020) moderate our documented effects. In a similar vein, future research could examine the moderating roles of situational variables other than social norms like, for example, cultural differences or varying social meanings of risk. Given that our studies were exclusively conducted in the United States, an investigation into whether our documented effects replicate across different cultures with varying health norms and institutions seems warranted. Finally, future research could validate and further expand our research by analyzing de-identified hospital data or other secondary data sources.

In conclusion, we hope that our research represents an important step toward aiding consumers' efforts to protect,

cure, and enhance their bodies and that it sparks further interest into the unique psychology behind consumers' risky decisions concerning their body.

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