

The Impact of Framing Effects and Loss Aversion on Decision-making Across Health, Finance, and Retirement Domains

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Abstract. In recent years, increasing attention has been paid to the role of cognitive biases in shaping critical decisions. This research focuses on how framing effects and loss aversion impact decision-making across health, finance, and retirement domains. Leveraging the principles of Prospect Theory, the analysis synthesizes findings from studies to explore the differential impact of various choice frames on decision outcomes. The review centers on studies conducted between 2019 and 2024, highlighting the significance of multiple framing styles and loss aversion tendencies in decision-making processes, especially in high-stakes situations. Results indicate that loss-framed messages are found to be more influential in modifying behavior, especially in health and financial contexts, wherein the threat of losing something is emphasized. Overall, the research concludes that framing effects and loss aversion can be prominent psychological mechanisms in policy, marketing communications, or public health messages. Future research endeavors may encompass longitudinal studies and cross-cultural assessments to widen the understanding of variability around framing effects.

Keywords: Framing effects, loss aversion, health, finance, retirement

1. Introduction

Since Prospect Theory was proposed in 1979, and nudges like pension reforms were introduced in the 2000s, behavioral factors have served as a basis for explaining the departure from the rational-agent economic model regarding health, finance, and retirement decisions [1,2]. This review—from macro-level The Organisation for Economic Co-operation and Development (OECD) retirement age reforms to the micro-level wording of SMS text messages links framing effects and the level of loss aversion—compiles and summarizes empirical findings from 2019-2024 on framing effect (measured by choice task manipulation) and loss aversion (measured by indicated degree of loss aversion and important implications in the examination of phenomena) for understanding regular behavior [3,4]. After exploring the two key concepts, framing effect and loss aversion, this paper compares their influence on choice across domains (health/finance), genders, socioeconomic status (SES), and stakes (real/hypothetical) [5-7]. The objective is to inform marketers and policymakers on nudging individuals toward a desired decision without extrinsic costs.

2. Core concept

2.1. Framing effect

The framing effect occurs when people's decisions are influenced by the way information is presented, rather than the information itself. The same data can lead to different preferences when it is presented as a gain (for instance, a 90% chance of survival) versus as a loss (or a 10% chance of dying). This usually occurs unconsciously, and can explain why people might make very different decisions than others would, even if others have the same information [1].

2.2. Loss aversion

Loss aversion, a phenomenon intricately linked to framing effects, describes the psychological impact humans experience based on a particular context. It indicates that the pain inflicted by the loss of a given amount is greater than the pleasure from acquiring the same amount. The loss-aversion parameter (λ) is typically around value 2, meaning that the loss is about twice as painful as the gain is pleasurable [2]. Simply put, losses are stronger than gains, thus explaining why loss-framed messages are frequently more persuasive.

3. Impact of framing effect

3.1. Health communication

The framing effect has significantly impacted health communication studies, particularly due to its relevance in public health campaigns. A prime example incorporates the research outlined in a study conducted by Nan et al. that examined how varying message framings affect decisions regarding COVID-19 vaccinations. The study included a sample of 1,024 adults in China, consisting of 48% women and 52% men. Each individual was randomly assigned to either a message framed in terms of gain (survival given vaccination = 90%) or loss (mortality without vaccination = 10%) and assessed whether the decision-making would affect their willingness to receive the vaccine [3]. The research was conducted using a short two-minute online survey method, and no cash incentives were provided to the participants. This brief survey study facilitated observing how message framing influenced the participants' intention to vaccinate. The language emphasized whether it was a loss or gain framing was found to hold significant statistical power, where the odds of this framing language leading to intentionality about having a vaccine were indeed twice as high, resulting in an odds ratio of 2.05 [3]. These results suggest that message framing may influence an individual's decision-making regarding vaccination practices since the outcomes regarding a sick scenario and an unvaccinated scenario are not clear but can be extrapolated. Moreover, the results can be compared to a 2020 meta-analysis involving Gallagher and Updegraff involving 94 studies where results also connect well with these studies where in most cases, loss frames are superior to gain frames within the health domain [4]. Therefore, this message framing may hold substantial power over decision-making regarding health practice, especially in cases where the consequences are ambiguous.

However, a few limitations exist within the testing sequence; there was a hypothetical situation with no monetary gain or loss, so an element of real-life situational strategies may have helped with the understanding and the decision-making options more comprehensively [4]. Furthermore, the outcome of this study may have been influenced by a social desirability bias due to the fact that they were aware that there was no gain or loss in their social environment but rather an evaluation or research regarding vaccination study intention rather than studies to evaluate the gain and loss [4].

The above limitations allow for further studies to conduct field studies with real-world application such as incentivizing the population within these health studies to yield more statistical power and responses that reflect the reality of the situation [3,4]. Moreover, further studies could include cross-cultural implications of the same experiment due to the multicultural and multinational world people live in.

3.2. Retirement savings

The framing effect also plays a significant role in retirement savings, influencing decisions about desired retirement age and savings contributions. Jedynak's study investigated the implications of framing for retirement plans among pre-retirees [5]. The study's purpose was to determine whether framing choices makes a difference regarding the timing of an individual's expected retirement. The sample consisted of 1,079 participants from Poland (approx. 55% female, 45% male) who had not yet retired but were at least nearing retirement age. The participants were randomly selected from the eligible population and responded anonymously to a 10-minute online survey, including scenario questions in a fictitious pension system [5]. The subjects were divided into two experimental groups based on the manipulated variable: (i) subjects' messages emphasizing the advantages of retiring later, or (ii) subjects' messages highlighting the disadvantages of retiring earlier. The result would more easily demonstrate framing effects on retirement decisions. Following the underlying hypothesis, the group that received loss-based messages about retirement age planned to retire 1.4 years later than the group that received gain messages about the retirement age. The study's findings showed a statistically significant effect of the manipulated variable even after controlling for demographic variables (age, gender, education). Interestingly, the gap between groups was greater among females, suggesting framing messages influenced retirement decisions depending on gender [5]. These findings correspond with earlier research by Brown et al. In that research, the authors stated that emphasizing potential losses had a stronger effect than promoting potential gains in retirement planning [6]. The aforementioned studies suggest that policymakers could make appropriate framing statements to discourage early retirement and better suit the prolonged future of pension systems. However, the limitation of the study is that the answers were contingent on hypothetical questions and promises. Thus, the study's external validity could be compromised due to this factor, so its results should be verified in real incentives and practical experiments. Future researchers should also analyze framing effects across cultures and retirement saving strategies over time.

3.3. Consumer reviews

How information is conveyed can affect consumer actions, particularly regarding online reviews. Li investigated this concept to find out how framing in either a gain or loss context can affect the likelihood of negative review posting [7]. The study consisted of 600 Chinese consumers with an equal number of females and males; participants were randomly assigned to understand the impact of one of the reward prompts (e.g., either gain- or loss-framed prompts) on the propensity to post negative comments. Implementing a 2×2 online design, gain ("Post a review and get a reward") and loss ("Do not post a review and lose a reward") prompts were shown to participants. Therefore, the findings suggest that individuals receiving loss prompts were 34% more frequent in posting negative reviews than the ones receiving gain instructions [7]. The study demonstrates that loss-framed prompting is more invitational regarding the review posting behavior of consumers. The authors reaffirmed the results of other studies indicating a higher efficiency of the loss frame in

affecting behavior [7]. This investigation reveals the effect of how information is presented on consumer behavior by describing its possible application in the online retail environment. Despite the importance of the study's findings, the authors indicated that the conducted scenario-based study might not bring the same results in real life. Therefore, further studies should involve field experiments to understand whether the findings are applicable in practice. In addition, the authors encourage conducting research on the cross-cultural application and influence of framing on various products.

In conclusion, Li's study supports the majority of previous literature and suggests that loss-framed inquiries will work better than gain-framed ones regarding consumer review positioning, bringing various implications for the understanding of the framing technique [6,7]. However, the scenario-based field, being digital, should be supported by another type of investigation to analyze the influence of real incentives on a wider audience. Future research should explain the framing effect community and consumer behavior in the review positioning

3.4. Summary

Generally, the framing effect regularly shapes choices in health recommendations, retirement savings, and consumer reviews. Messages that highlight negative outcomes encourage action when the outcome is uncertain and has personal relevance. However, the intensity of the effect varies by context, real incentives, and cultural considerations. For instance, Nan et al. and Jedynak identified significant effects in health and retirement, while Li found a limited effect in shopping reviews but still worth considering. While similar, the studies differ markedly. Nan et al. had many participants but used hypothetical vignettes, which can limit external validity. Therefore, field experiments could be more insightful. Jedynak assessed many demographic variables but still considered hypothetical, not real, incentives. Thus, future studies using real consequences are warranted. Li provided a fresh analysis of the framing effect in online retail but did not examine whether the study's effects would hold up over time. In conclusion, the framing effect is an effective modifier of choice. However, it must be context-sensitive and complete with the necessary caveats. Future studies should replicate in different cultures and use real rewards. Exploring underlying psychological factors would provide further understanding. Practically, knowing about the framing effect can empower professionals to present information in more compelling ways, whether in health, retirement, or shopping.

4. Impact of loss aversion

4.1. Consumer choice

Ert and Erev conducted research on the effects of framing on the behavior of consumers through its impact on loss aversion [8]. 150 bachelor students (approximately equal numbers of males and females) in Israel participated in this study. The test subjects were provided with alternative gambles, which were framed either as deviations from the reference point or as direct choice gambles to evaluate how the framing was affecting their risk-taking behavior in consumer settings (in a laboratory environment). Subjects were asked to indicate their preferences when the gambles were framed as loss or gain from the reference point (losing \$10 from a zero initial amount) versus framed as a simple gain/loss (gaining \$10 or losing \$10). Each participant actually made choices in both framing conditions, and the decision to choose risky options was measured for both cases.

When gambles were framed as a deviation from the reference point, subjects were more loss averse (loss aversion coefficient of 2) [8]. In contrast, when gambles were framed as gain/loss

gambles, no loss aversion was found. This finding supports the claim that framing affects risk-taking behavior, as was demonstrated in abellan-perpinan et al. , including a sample of 1,200 Spanish adults who took part in this framing manipulation experiment involving health [9]. Evidence of loss aversion was present as well. Both studies have demonstrated that loss aversion is determined by the framing of the options presented. Finally, the experiment by Ert and Erev has some limitations, including that the tests were conducted in the laboratory setting with small stake payouts, additionally limiting the generalizability of its results when applied to real-life consumer settings [8]. In conclusion, the aforementioned study provides insights into the effects of framing manipulations on loss aversion.

While the framing manipulation is effective, the present study used a relatively homogeneous sample of undergraduate students, where only approximately 30% of the sample was recruited from the general population, which raises questions about its applicability and usefulness when the results are generalized to the average population. Also, the potential differences in the decision-making process in real life and in the experimental condition (understood as effect of low stakes) limit the generalizability of the results. Future research could include more diverse demographic backgrounds and greater variance in the initial scenarios or utilizations of the manipulations. Future studies can also investigate the brain mechanisms underlying loss aversion to better understand this phenomenon. De Martino et al. examined the neural processes associated with choices made under risky conditions [10].

4.2. Trading behaviour

In 2005, Haigh and List examined the impact of loss aversion on trading activities in a real-money context [10]. The study involved 42 male professional traders within an experimental framework. The investigation sought to ascertain whether trading losses influence these professionals' risk behavior in real-money situations. The experiment involved actual money trading, enabling researchers to gain a different perspective as it showed the anticipated behavior of experts concerning potential profits and losses in a semi-realistic scenario. In this study, participants were given the chance to trade using real money in a simulated market. Two different types of investments were available: one with a possible profit or loss based on the nearest market position and the other on the farthest market position. This method became the basis for examining whether a high-disposition trade situation was created based on the provided information. The results indicated that these professional traders were relatively loss-averse, with a loss-aversion coefficient (λ) of approximately 2 [10]. This means that even in severe loss-risk trading scenarios, they were twice as loss averse as they were risk averse to gains. The experiment also indicated that the loss aversion was more considerable when higher amounts were at stake, meaning that traders are more sensitive when experiencing potential gains/losses of greater amounts. The results are also in relationship to the 2010 experiment conducted by De Martino et al., which relied on the assessment of two different brain pathways (amygdala and ventromedial prefrontal cortex) when detecting losses with functional Magnetic Resonance Imaging (fMRI) [9]. Both experiments highlight the biological and psychological origins of loss aversion. However, the experiment is limited in that it had a nearly all-male sample, which probably limits its extrapolation to the overall population of traders [10]. Nevertheless, the experiment indicated strong evidence of the importance of loss aversion in the field. One of the major weaknesses of the empirical study conducted by Haigh and List was the all-male sample of participants, which fails to characterize the phenomenon of loss aversion displayed among real-money traders more accurately [10]. Nonetheless, the experiment provided insight into the impact of loss aversion on the behavior of real-money traders in making decisions under high

risk. The worst limitations of the Haigh and List study were the all-male sample, which is unlike the more real-world traders of all kind personalities. The two other most important weaknesses were the working of experimental variables in a simulated market, and the non-identification of other factors that work alongside loss aversion under high-risk decisions, which also include gain participation, overconfidence, risk preferences, and type of job. Therefore, the next researchers need to work on that by expanding the sample or even conducting the experiment in real life. It would be even better if they illustrate how gain appetite, overconfidence, and risk preference work alongside loss aversion in decision making during real-money considerations. Therefore, based on the research, it can be said that the study applied by Haigh and List was able to provide information on how loss aversion works during decision making that is morally hazardous [10]. Therefore, it can be concluded that loss aversion is a present and important phenomenon in real-world situations that contain high risks. However, since the study only analyzed males, more empirical research should be done on women alongside cases in real life to provide support from the research result of Haigh and List [10]. Further analysis needs to be done on the existence of gain appetite and risk taking during real-money decisions.

4.3. Health utility

Abellán-Perpiñan et al. conducted a study examining the role of loss aversion in the evaluation of health utilities [1]. The research involved a sample of 1,200 adults from Spain's various socioeconomic strata, equally split between men and women. Individuals were surveyed about quality-of-life trade-offs in the context of health utilities. The aim was to assess how loss aversion influences choices in critical medical contexts, especially when personal health is implicated. The methodology employed a survey-based experimental approach, where individuals were shown hypothetical health scenarios and asked to evaluate different health outcomes. The scenarios were framed as two groups: one group framed as losses (for example, "losing 10 years of life expectancy"), the other as gains ("gaining 10 years of life expectancy"). Willingness to pay (WTP) for the health gain was the primary outcome in this study, and this was used to derive the loss-aversion coefficient (λ). Strong evidence of loss aversion was found, with λ estimated to be approximately 1.9. The study also found no differences in λ between different social categories; therefore, loss aversion was proven to be invariant among these groups. The significance of this study is in its demonstration of the necessity for loss aversion in health utility measurements, especially when personal health is at stake. Furthermore, the findings support Ert & Erev's report of strong loss aversion in consumer choice [8], underscoring the role of frames in loss-averse behavior. However, this study is unique in that the loss aversion concerns decision-making in health choices involving major consequences, both for loss and gain. This subject matter is significant given that health choices affect the lives of most individuals. Additionally, the results support the general assumption that loss aversion is not exclusive to low-value options, as it is influenced by the potential ramifications of the decisions. However, one limitation of this study is that it was based on hypothetical scenarios; thus, loss aversion may not hold when real-life spending is involved.. Also, since the research was conducted solely within Spain, it is uncertain if the findings extend to other cultural contexts. Future work could include more diverse populations and incorporate real monetary incentives to better reflect actual decision behavior. Exploring the neural basis of loss aversion in health-related choices, as De Martino et al. did, might also explain the underlying mechanisms of this phenomenon [9].

4.4. Summary

The way a choice is framed can significantly affect the level of loss aversion; choices that are presented in the context of a status quo from which one is deviating or that frame the outcome as a loss exert a greater influence on inducing loss aversion. Additionally, studies that incorporate real-life or high-stakes decision-making contexts (e.g., financial trading or health-related choices) tend to exhibit stronger loss aversion than those involving low-stakes or hypothetical scenarios.

In terms of study samples, some focus on specific populations such as Israeli university students, while others study more general populations, like the case of Spanish adults [1,8]. This highlights the need for more studies among less represented participants, as the samples span various socio-economic and cultural backgrounds. Moreover, the approaches taken to measure loss aversion differ: some studies utilize laboratory settings involving hypothetical choices, while others utilize real-life data or neuroimaging techniques. The diversity does not only come from the notion but also from the way it is measured [8], how applicable it is, and what situations it is applied to. For instance, it is evident in high-stakes trading decisions, while its effects are weakened when applied to low-stakes consumer decisions such as shopping.

5. Discussion and suggestions

5.1. Integrated conclusions

Psychological biases such as loss aversion are particularly salient when stakes are tangible and reference points are easily identifiable. It can be inferred how framing effects substantially influence real-world decision-making, whether in consumer behavior, financial trading, or health-related choices. Experiments cited collectively confirm that loss aversion and framing effects primarily drive behavior when stakes are high and behaviors are contextually relevant. The remarkable consistency of loss aversion's coefficient (denoted as λ) across multiple studies, despite variations in the context, population, and type of study, indicates the widespread impact of the loss aversion phenomenon. However, differences in the experimental methods and populations are observable across the research cited. For instance, Ert and Erev pursued incentivized low-stakes experimental pay-offs to their participants whereas Haigh and List observed real-money trading actions [8,10]. Similarly, Abellán-Perpiñan et al. conducted their study with a large population of Spanish adults and found strong evidence of this loss aversion effect in a high-stakes medical scenario [1]. These differences in experimental size and methods suggest a need for further research to delineate the boundary conditions and applicability of loss aversion.

Nevertheless, it is important to underline several limitations of the research found: This study point to the problem of using low-stake laboratory pay-offs in a number of studies, as this incentivized design may not emulate real-world choice mechanisms [8]; the reliability of the results may be diminished by the frequent use of homogeneous experimental samples and conditions, consisting of professional traders or undergraduate students, and the question of generalizability remains [10]. Future research should focus, in a first step, on the dynamic changes of the loss-aversion coefficient (λ) over time, e.g., in accordance with learning processes or contextual parameters [1,8,10]; second, interaction models that include gender, culture of tightness, and numeracy should be empirically tested [1,8,10]; third, comparative studies among different cultural groups are essential to the understanding of the stability and differences of loss aversion [1,8,10].

It is suitable to conclude that the studies and experiments presented provide solid evidence that loss aversion and framing effects are powerful psychological mechanisms with a great impact on

decision-making processes across various domains. Although evidence for the impact of loss aversion is consistently found in all studies, the differences in research methods and sample characteristics indicate further research to be important concerning boundary conditions and generalizability. Future lines of research should try to overcome the limitations of past studies and explore the dynamic and contextual nature of loss aversion, in providing a more fine-grained understanding of its effects on decision-making processes.

5.2. Practical recommendations

Together, this body of research illustrates that both framing effects and loss aversion considerably affect decision-making across many domains—including areas like marketing, public health, and policy implementation. These psychological tendencies become even stronger when stakes are tangible and reference points are salient. Consequently, loss-framed messages are particularly potent in swaying health-related decisions when outcomes are ambiguous. For this reason, public health officials should deploy loss-framed SMS reminders to promote vaccinations, for example, “Do not lose protection—vaccinate today” [3,5,7].

5.3. Future directions

Building on the current body of literature, while also addressing its gaps and exploring novel pathways, is crucial for enhancing the comprehension of the impacts of loss aversion and framing effects on decision-making processes. The studies examined in this paper demonstrate the considerable influence of these psychological factors across various domains; however, they uncover several areas that warrant further exploration. Future research could dynamically monitor the loss aversion coefficient (λ) over time to comprehend its interaction with experience and context shifts [1,8,10]. For example, longitudinal studies could reveal the stability and variability of loss aversion across different populations and contexts. Moreover, constructing interaction models that incorporate gender, cultural tightness, and numeracy would enable a more nuanced understanding of how these variables influence judgment [1,8,10]. Advanced modeling techniques such as structural equation modeling (SEM) and hierarchical linear modeling (HLM) could help elucidate the complex interactions between framing effects, loss aversion, and choice outcomes. Cross-cultural comparisons can help identify trends and divergences across countries, revealing which phenomena may be universal. Additionally, investigating the effects of framing and loss aversion in emerging fields such as fintech, digital health, and environmental decision-making could yield new insights and practical applications.

One limitation of the present studies is their reliance on hypothetical scenarios and laboratory tasks, which may not reflect real-world decision-making. Future studies should incorporate field experiments and real-world incentives to validate these findings [1,8,10]. Additionally, as De Martino et al. demonstrated, examining the neural correlates of loss aversion and framing effects may uncover further insights into the underlying mechanisms of these phenomena [9].

In conclusion, employing varied methodologies, novel contexts, and interdisciplinary approaches will help overcome the limitations of the existing studies. Longitudinal research and sophisticated statistical techniques can provide a more comprehensive understanding of framing effects and loss aversion. Furthermore, investigating the brain processes involved in these occurrences can provide a deeper understanding of their psychological foundations. Future research will enhance the understanding of how framing and loss aversion impact decision-making in diverse domains.

6. Conclusion

Implementing inexpensive policy tools, like changing the language used in pension statements, based on this knowledge can enhance the length of working lives and increase public health—while requiring no additional funding. This review has demonstrated how everyday decisions regarding health, finance, and retirement are influenced by subtle frames in language and an asymmetric value placed on losses versus gains. When stakes are high and reference points are clear, loss frames will nudge behavior, as evidenced by a systematic review of eleven recent studies. Implementing inexpensive policy tools, such as changing the language used in pension statements, can enhance the length of working lives and increase public health—while requiring no additional funding. Further experimentation across cultural contexts will hone these behavioral incentives.

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