

The Interaction of Framing and Decoy Effects on Risk Preferences

A thesis submitted in the partial fulfilment of the requirement for the degree of

MASTER OF ARTS IN PSYCHOLOGY

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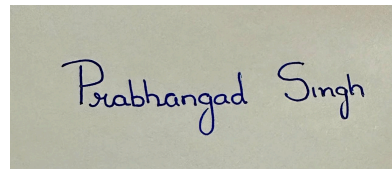
Abstract

This study investigates the interaction between the decoy effect and the framing effect in decision-making. It is aimed to understand how the presence of asymmetrically dominated alternatives influences risk preferences under different framing conditions and to find an effect on framing. Building on the recent study by Di Crosta et al. (2023), this research employs a 2 (frame: positive vs. negative) \times 3 (choice set: original, congruent decoy, incongruent decoy) within-subjects design across two experiments. This study investigated the interaction between Framing effect (FE) and Decoy effect (DE) in the case of both incongruent decoy (ID) and congruent decoy (CD) in a sample of (N=50) of the age of 18-26 years in both the experiments. In experiment 1 participants were presented with general scenarios and in experiment 2 participants were presented with medical specific scenarios and asked to choose between options that varied in risk level and contextual framing. Results confirm that positively framed scenarios led to risk-averse choices, while negatively framed ones prompted risk-seeking behavior, consistent with prospect theory. Results show that the ID option reduces the FE in positive framed conditions only in experiment 1 but in experiment 2 there's no effect shown by the ID option in both positive-negative framed conditions, while adding the CD option in both positive and negative framed condition increase the FE in both experiment 1 and experiment 2. Additionally, the inclusion of the CD option increased the decision confidence level in the both experiments, whereas there was no significant effect shown by the ID option in both experiments.

Keywords: Framing effect, Decoy effect, Congruent decoy, Incongruent decoy, Decision confidence.

CERTIFICATE

This is to certify that the thesis entitled , The interaction of framing and decoy effect on risk preference is being submitted in partial fulfilment of requirement for the award of the degree of Master of Arts in Psychology, presented in Thapar School of Liberal Arts & Sciences, Thapar Institute of Engineering and Technology, Patiala is a bonafide work carried out under the supervision of Dr. Ipshita Chowdhury, Assistant Professor , Thapar School of Liberal Arts & Sciences, Thapar Institute of Engineering and Technology, Patiala and that no part of this project has been submitted for the award of any degree.

A rectangular box containing a handwritten signature in blue ink that reads "Prabhangad Singh".

(PRABHANGAD SINGH)

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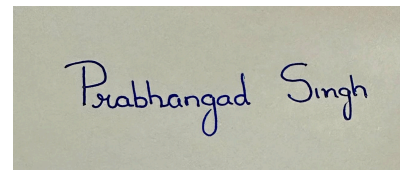
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CANDIDATE'S DECLARATION

I hereby declare that the work presented in this thesis entitled, The interaction of framing and decoy effect on risk preference submitted in partial fulfilment of requirement of the ent for the award of the degree Master of Arts in Psychology, presented in th Thapar School of Liberal Arts & Sciences, Thapar Institute of Engineering and Technology, Patiala, ia an authentic record of my work carried out under the supervision and guidance of Dr. Ipshita Chowdhury, Assistant Professor, Thapar School of Liberal Arts & Sciences, Thapar Institute of Engineering and Technology, Patiala and refers other researcher's work which are duly listed in the reference section

The matter embodied in this thesis has not formed the basis for awarding any other degree at this or any other university.

Date- June, 2025

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CHAPTER 1 - INTRODUCTION

Interaction between Decoy Effect and Framing Effect shows us how decoy effect has its effect on framing, which is also the aim of this study. This is a replication study which replicates the idea of the study done by Adolfo Di Crosta et al (2023), that is the only study which portrays the idea of how decoy affected the framing effect. Variables used in this study were Decoy Effect and Framing Effect to find an effect of interaction between both of them. This study also shows what choices were made by people when they were presented with the problematic conditions: either they made risk seeking options or risk aversive options in both positive and negative frames.

1.1 DECOY EFFECT

Decoy effect first coined by Joel Huber, John Payne and Chris Puto (Huber et al, 1982). The phenomenon whereby adding a third choice to a decision alters the distribution of preferences across options is known as the decoy effect (also known as the asymmetric dominance effect) (Huber, Payne, & Puto, 1982). In particular, even though the third alternative is of lower value (i.e., it is asymmetrically dominated by the other two options), the introduction of the third option to a decision dyad when both of the original options have similar appeal (the "decoy") will alter the choices made. The decoy option is designed to be asymmetrically dominated, meaning that it is inferior to one of the original options in all respects, but not in a way that would make it a clear, rational choice to pick. The result is that the original option it is meant to support becomes more attractive by comparison. The decoy effect plays a significant role in shaping decisions in many aspects of daily life, often without us even realizing it. Whether we're shopping, choosing a service, or making decisions about what to eat or where to go, the presence of a third "decoy" option can subtly influence our choices.

The paradigm of asymmetrically dominated alternatives is one in which the third alternative is constructed so that it is dominated by one of the options but not by the other one. The third alternative is called the decoy and since it is constructed to be inferior to one of the other alternatives, it is (almost) never chosen as the best option. However the decoy can influence the choice of other alternatives in the set; hence its name. The effect of the decoy on choice can be assessed by manipulating its

characteristics and observing changes in the choice outcome (Huber, Payne, & Puto, 1982).

Scarpi (2008) uses the following illustration to clarify the decoy effect. Option A (the contender) and Option B (target) are the two possibilities available. He proposes that there would be an equal division of customer choice if neither option A nor option B are obviously better in terms of both price and quantity. However, the preferences shown for options A and B will change if a third, less desirable option (option C), which offers inferior quality/quantity at a high price, is added to the choice set (the decoy). Therefore, even though option C wouldn't be expected to be selected

Hendricks (2018) provides an example of a decoy that can influence our political opinions as well. We might not have loved George W. Bush when he was president, he said. But we probably like Bush a little more now that Donald Trump is in power. We don't like Donald Trump in either scenario. Trump is the decoy, which is why. Our opinions of Bush may alter if Donald Trump is added to the collection, but neither Obama nor Trump will change as a result. And the CNN poll by SSRS, which revealed that 61 percent of Americans had a positive opinion of Bush and only 33 percent have a negative opinion, supports this.

When given just two options, buyers typically base their decision on their individual needs. A third strategic alternative, however, may persuade them to select the priciest of the three, demonstrating the decoy effect's subtle yet potent influence on customer behavior.

- **The decoy effect can subtly shift our choices without us realizing it**, especially when marketers, service providers, or businesses are trying to nudge us toward a certain price point or option.
- **It works by leveraging relative comparisons** rather than absolute value, meaning the presence of the decoy makes one option look significantly more attractive, even though it might not have been the best choice if considered in isolation.
- **While the decoy effect is commonly used in marketing**, it can also apply to our own personal decision-making, especially when we feel overwhelmed by choices or when we're looking for the best value.

Understanding the decoy effect can help you become more aware of how your choices

are influenced, leading you to make decisions that truly reflect your needs and preferences, rather than simply being swayed by clever marketing techniques.

It has been proposed that there are two broad types of probable mechanisms (Wedell and Pettibone, 1996). The first is value shift-based mechanisms, which demonstrate that the decoy enhances the target's perceived attractiveness regardless of the target's or competitor's objective values (Pettibone and Wedell, 2000). The second is value-added mechanisms, which claim that by increasing the target option's value in comparison to the competition, the decoy makes it appear like the safer alternative.

The decoy's position has an impact as well. The likelihood that the choice will be reversed is obviously correlated with where the decoy option is placed on the corresponding qualities. Assume for the moment that the mobile company wants to beat one of its rivals in the mobile industry. Instead of having as much memory as the competitor, the company's product (the objective) has a longer battery life. Now imagine that the firm that sells the target product launches a fake mobile brand that has less memory but the same battery as the target one. In this case, it is assumed that the two goods will look almost identical and that the decoy option will barely affect decision reversal if the decoy's memory is too close to the target one. On the other hand, because the decoy's memory is so distant from the desired option, consumers will not consider it an alternative, which also makes it ineffectual.

Wedell, D. H., & Pettibone, J. C. (1996) explained through their study how the decoy effect influences the decision of people. This is explained by them through 3 models of decoy effect in which the weight-change model is used by them, value-shift model and value-added model. In each model they showed how the decoy effect influenced the decision. The outcome of this experiment shows that in weight-change model decoy effect doesn't show his effect much but in value added model and in value shift model decoy effect shows its effect due to which decision gets influenced. This study shows how decoy effects influence decisions in different situations but in some situations the decoy effect does not appear.

There have been a number of studies looking at the effect of decoy in multiple areas of choice and purchasing behavior, including prize selection (Muller, Schliwa, & Lehmann, 2014), assessments choice dyad paradigms (Wedell & Pettibone, 1996) and

consumer decisions in tourism(Josiam & Hobson,1995)and house purchasing (Hedgcock & Rao,2009)

1.2 Framing Effect

The Framing effect refers to the phenomenon where people's decisions and judgments are influenced by the way information is presented, rather than just the content of that information itself. The psychologists Amos Tversky and Daniel Kahneman were the first to identify this cognitive bias, demonstrating that the people are influenced by the way options are "framed" or written rather than always basing their decisions solely on objective facts or outcomes.

More simply, people's perceptions and reactions to a situation can be greatly influenced by the way it is presented, including whether the way this is presented as a possible benefit or a potential loss. When a situation is presented as a potential loss, for example, people are more inclined to take a chance than when it is presented as a potential gain For Example:

Imagine you are given two options:

- Option A: "There is a 90% chance of saving 200 lives."
- Option B: "There is a 10% chance of no one surviving, and a 90% chance of saving 200 lives."

Though both the options offers same expected outcome and the way they are framed that can lead to different choices. People are more likely to choose Option A because it emphasizes the certainty of saving lives, while the second (Option B) frame might invoke a fear of 10% chance of no one surviving, even though the outcomes are identical.

The framing effect reveals here that human decisions often are not rational, but as they can be biased by how the choices are presented, which is contrary to the assumption of fully rational decision-making in traditional economic theory.This bias is pervasive in many areas of life, from advertising to health communication, political rhetoric, and even legal decision-making, making it a crucial concept in understanding that how people make their choices under uncertainty.

The process of judging, assessing, and choosing actions or objectives is known as decision-making. The idea of the "framing effect," which states that people may become biased towards one choice while making a decision because of the way the information is presented, was first experimentally validated by Tversky and Kahneman (1981). When supplied with positive information, people are risk averse; when presented with bad information, they are risk seeking.

Framing and Risk Preference Choices

Participants are presented with a forced choice problem with two possible outcomes in risky choice framing. The two options are typically gambles that can be explained by the chances and percentages of gains or losses. Usually, one of these options is a sure outcome, whereas the other is a risky wager (very good and awful values are both given non-zero probabilities). The gamble and sure thing are described using either comparable loss outcomes and probabilities or gain outcomes and probability. Since the expected value of the two options is usually equal, the framing researcher can interpret observed patterns of choice in terms of participant risk attitudes. According to this criterion, preferences for the sure thing indicate risk aversion, whereas preferences for the gamble represent risk seeking. The "Asian Disease Problem" is the most well-known risky choice framing problem (Tversky and Kahneman 1981).

Tversky and Kahneman demonstrate that decision issues' framing, or the way options are presented, has a significant impact on people's decisions in addition to their actual content. However, when the same situation is presented in other ways (for example, as benefits or losses), people's preferences shift. For instance, even though the results are statistically equal, saving 300 lives feels far better than running the danger of killing 600. People choose risk-seeking choices for losses and risk-averse options for gains when making risky judgments. 1) Bidirectional framing effect: under positive framing, most choices are risk-averse, whereas under negative framing, most choices are risk-seeking. This is one of the two types of framing effects. The bidirectional framing effect is the term for this. 2) Unidirectional framing effect: The second type of framing influence is characterized by a shift to a more severe risk preference as opposed to a preference reversal. If the prevailing preference is unidirectionally risk adverse in both framing contexts, it is much more risk averse in a positive frame than in a negative frame. If the dominating desire is unidirectionally risk-seeking in both framing situations, it is significantly more risk-seeking in a negative frame than in a positive frame. Levin and colleagues (1998) identified three distinct categories of framing

effects—goal framing, attribute framing, and hazardous choice framing—as more research was done to better understand the ways in which framing effects may influence decision making.

Framing Effect In Medical Conditions

There is a well-known research on Asian diseases that discusses the framing effect in medical conditions (Tversky and Kahneman 1981). Subjects initially read the following synopsis of the background: Consider that the United States is getting ready for an uncommon Asian disease epidemic that is predicted to claim 600 lives. A potential initiative to fight the illness has been put forth. Assume that the following is the precise scientific evaluation of the program's effects:

Some subjects are then presented with options A and B:

A: If this program is adopted, 200 people will be saved.

B: If this program is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved.

Other subjects are presented with options C and D:

C: If this program is adopted, 400 people will die.

D: If this program is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die.

The results of the experiment show that when offered alternatives A and B, respondents choose the sure thing, but when given options C and D, they prefer the chance. However, keep in mind that alternatives A, C, B, and D are all identical. Thus, a fundamental principle of prospect theory (Kahneman and Tversky 1979) seems to be that subjects are more risk-averse for profits and risk-seeking for losses.

There is another study which is done by Theresa M. Marteau in which 3 different medical conditions are presented to the participants which were surgery; amniocentesis and termination of pregnancies due to suspected fetal abnormality. This study shows that people are more inclined to have surgery when given the option to do so at any given risk level if the risk is framed as a possible gain (surviving) rather than a possible loss (death). This demonstrates how the way information is presented affects people's decisions. It also shows that people incline towards risk averse choice in positive condition more than in negative condition and Risk seeking choice in negative

condition more than in positive condition.

1.3 Interaction Between Framing and Decoy Effect / Effect Of Decoy on Framing Effect

Cognitive biases such as the framing effect (FE) and the decoy effect (DE) have the power to influence consumer preferences and decision-making. While the decoy effect happens when a third, less appealing option is provided, it influences people to pick between the first two options. The framing effect describes how options are presented to influence choices.

No other researchers have examined the interaction between framing and decoy effects except Cheng and colleagues(2012). The findings of a research by Yin-Hui Cheng et al. examine how decoy and framing interact and impact an individual's confidence while making judgments. Their objective was to examine the ways in which the framing effect is influenced by and perhaps diminished by the decoy effect. The inclusion of an asymmetrically dominated choice reduced the framing impact, according to the study's overall findings. To improve the framing effect, however, no research has examined the usage of the decoy. Last but not least, the study has not yet examined how the interaction of the framing and decoy effects might affect participants' choice confidence. & al., Adolfo Di Croste (2023).

A research by Adolfo Di Croste et al. (2023) examined the effects of the decoy on the framing effect in order to gain a better understanding of their mutual interaction and how they affect a person's confidence while making a decision. In this study, participants were presented a series of decision-making scenarios under two contrasting framing circumstances (positive vs. negative). Furthermore, we changed the option set to compare three experimental scenarios: The decoy and the framing directed toward the opposing options in ID (incongruent decoy, as in Cheng and colleagues); the decoy and the framing pointed toward the same option in CD (congruent decoy); and (II) the original, two-option choice. In order to examine the bi-directional impact of the decoy effect on the framing effect, Adolfo Di Croste et al. used a two-frame (positive versus negative) x three-choice set (original, congruent decoy, and incongruent decoy) within-subjects design in this study. The participants were given 12 decision issues, which included six situations: Crew, Pregnancy and Cab, Fatal Disease, Money, and HomeSelling problem. These scenarios were offered to them twice at random. The results indicate that the framing impact in positive frame condition increased when the

CD (congruent decoy) option was included. On the other hand, adding the CD (congruent decoy) option did not significantly alter the negative frame condition. In contrast, the framing effect is lessened in both positive and negative scenarios when the ID (incongruent decoy) option is used.

Through these result we could perceive that how decoy shows his effect in framing also. However, our study is not only looked at how the framing effect could be diminished but also examined ways it could be enhanced. We found that introducing a Congruent Decoy option increases the framing effect, but only in the positive frame condition. Additionally, we discovered that congruent decoy options boost decision confidence in both positive and negative framing conditions, while no as such effect was observed when incongruent decoy options were used.

CHAPTER 2: LITERATURE REVIEW

2.1 Effect of Decoy

Through Research it is found that presence of a third option (decoy option) influences the decision of people and makes them choose the targeting option. For example, a study conducted by Monk and colleagues (2016) which intend to look at how alcohol's decoy effect affects consumers' purchase decisions. In particular, look at how participants' choices change when two other, more favorable options are added to an objectively unfavorable option (the decoy). Participants were shown a picture of the product, its price, and its quantity for sale. They were given three options, one of which was the decoy option, and the other two were target and competitor options. The decoy option was very less appealing and it influenced the decision of the participant to choose the best cost effective option which was the targeting option. Through this study we could assess how decoy influences our choices. There is another study which is done by Huei-Chen Hsu and colleagues(2011) in which they find the effect of decoy on online brand choices. When participants in this study were shown the option in which the A was the advertised option or target option C was the competitive brand and B option was decoy, from these presented options participants chose the target option which shows us through results that the participant's decision got influenced with presence of the decoy option.

Ariely (2008) popularized the concept in work of his *Predictably Irrational*, illustrating how consumers can be manipulated through pricing structures, such as the famous *Economist* subscription study, where the addition of a decoy increased preference for a more expensive bundle. Ariely's research emphasized that even individuals who are highly educated are prone to such biases, underscoring the robustness of the decoy effect across contexts.

Further research expanded the application of the decoy effect beyond consumer goods. Pettibone and Wedell (2000) found similar effects in multi-attribute choice tasks, showing that decision-makers often rely on comparative heuristics rather than absolute evaluations. Trueblood, Brown, and Heathcote (2013) proposed a dynamic model for the decoy effect based on decision field theory, highlighting that decision processes unfold over time and can be influenced by the salience and structure of available

options.

The Decoy effect has also been explored in healthcare and public policy. For instance, Cheng et al. (2012) demonstrated that vaccine uptake could be increased by adding a decoy option that made the desired behavior (vaccination) appear more favorable. This shows the potential for nudging behavior through subtle changes in choice architecture.

However, the effectiveness of the decoy effect is not universal. Simonson (1989) found that expertise and cognitive effort can reduce susceptibility, suggesting that more deliberate thinkers may override such biases. Similarly, Cui (2022) argues that awareness and pre-commitment strategies can mitigate the effect, although complete immunity is rare.

Despite its predictability and replicability, the decoy effect raises important ethical concerns about manipulating consumer or voter behavior. Researchers such as Bhatia (2013) have asked for more transparency and regulation in how such choice architecture is deployed in real-world contexts.

Noguchi and Stewart's (2014) study offers strong proof of how the decoy effect affects visual attention when making decisions. They used eye-tracking technology to find that when a decoy option was added to a multi-alternative, multi-attribute choice task, participants focused more of their visual attention on the dominant option. Increased fixations on the traits where the target choice performed better than the decoy were indicative of this attentional shift, indicating that the presence of the decoy makes the target's superior features more salient. As a result, the individual's preference for the dominating alternative is strengthened since this increased concentration on the target's advantages allows for more thorough cognitive processing. The effect is further influenced by time constraints and cognitive load. Under high cognitive load, individuals are more inclined towards fall prey to the decoy effect, suggesting reliance on heuristics (Pettibone & Wedell, 2007). These findings align with previous research showing that visual attention actively influences choice outcomes rather than just reflecting preferences passively. The importance of attention in the decision-making process is shown by the fact that studies have demonstrated that the quantity and pattern of eye fixations can predict choice behavior.

While the decoy effect has been widely recognized as a robust phenomenon in consumer choice behavior, a growing body of literature has identified specific contexts

where its influence diminishes or disappears. One such area is expert decision-making, where individuals with domain-specific knowledge are less likely to rely on heuristic shortcuts and more inclined to participate in analytical evaluation of options (Frederick, Lee, & Ariely, 2009). Similarly, the decoy effect tends to weaken in high-stakes or risk-laden scenarios, such as medical or financial decisions, where the potential consequences of poor choices lead to more deliberate reasoning processes (Trueblood & Pettibone, 2017).

Furthermore, when choice architecture is transparent, and consumers are provided with clear, structured, and comparable information, the asymmetrical dominance of the decoy option becomes less persuasive (Huber, Payne, & Puto, 2014). Cultural factors also play a role; in collectivist societies, individuals often engage in holistic and contextual thinking, making them less susceptible to manipulative choice designs typical of individualistic cultures (Usunier & Lee, 2013). Lastly, studies have shown that the decoy effect is most effective under cognitive load or time pressure; when participants have adequate time and mental resources, they are more favourable to detect the irrelevance of the decoy option (Yang & Lynn, 2014). These findings underscore the conditional nature of the decoy effect and highlight the significance of context, expertise, and culture in moderating consumer behavior.

The Weight Change Model, Value Shift Model, and Value Added Model are three main models which have been put out to describe the mechanisms underlying it. By modifying the weight given to the features of the competing options, the decoy may make one appear more appealing by changing the relative relevance of certain attributes in the decision-making process, accordingly to the Weight Change Model (Huber, Payne, & Puto, 1982). Additionally, according to the value Shift Model, the decoy modifies the alternatives' overall perceived worth, changing the way they are assessed and causing a preference shift in favor of one of the options which is original (Tversky & Simonson, 1993). By making one of the options appear better than the others, the decoy raises its perceived worth, according to the value Added Model (Simonson & Tversky, 1992). The Weight Change Model stresses changes in attribute relevance, the Value Shift Model focuses changes in perceived value, and the Value Added Model suggests that the decoy makes one option more attractive. These models offer different reasons for how the decoy effect preferences.

2.2 Effect of Framing

Tversky and Kahneman (1981) first explicitly proposed the idea of framing, showing that how outcomes are framed, especially in risky situations, might influence people's judgments. The "framing effect," which states that people may become biased towards one alternative while making a decision because of how the information is presented, was validated by Tversky and Kahneman (1981). When supplied with positive information, people are risk averse; when presented with negative information, they are risk seeking. According to their findings, people are more risk-averse when choices are presented in a favorable light and more risk-seeking when they are presented in a negative light.

Levin et al. (1998) further explored the framing effect and its effects on how consumers behave, demonstrating how even subtle changes in wording could significantly influence choices. Subsequent research has expanded and refined the understanding of framing effects. provided a typology that divided framing into three primary categories: goal framing, attribute framing, and risky-choice framing.

Additional research has examined framing in practical contexts. Advertising framing effects can affect attitudes and purchase intentions, particularly when consumers are driven to digest information, as demonstrated by Maheswaran and Meyers-Levy (1990). In a similar vein, Rothman and Salovey (1997) illustrated the significance of goal framing in health communications by discovering that gain-framed messages are more successful in encouraging preventative activities and loss-framed messages are more successful in encouraging detection behaviors (such as cancer screening).

In the consumer decision-making context, framing plays a important role in product evaluations, pricing strategies, and promotional messaging. Research by Chandran and Menon (2004) showed that emotional framing (focusing on the emotional impact of a message) can enhance the effectiveness of health advertisements. More recently, Kühberger (1998) conducted a meta-analysis confirming that framing effects are robust across domains but vary in strength depending on how information is framed and the decision context.

Framing effect shows us that Positive framing and negative framing significantly influence decision-making by altering how individuals perceive risk, value outcomes, and evaluate choices, even when the actual content is logically equivalent. These

framing effects are rooted in cognitive biases and are extensively documented in psychology, behavioral economics, and communication studies. Framing in Terms of Gains vs. Losses (Tversky & Kahneman, 1981) In their classic work on prospect theory, Tversky and Kahneman demonstrated that: Positive framing (gains) leads to risk-averse decisions.

Negative framing (losses) leads to risk-seeking decisions. As in their study of “Asian Disease Problem,” when options were framed positively (lives saved), most people preferred a sure outcome. When the same options were framed negatively (lives lost), most preferred a risky option. Emotional and Motivational Impact (Fagley & Miller, 1997) Negative frames tend to evoke strong emotional responses, such as fear or anxiety, which can heighten attention and cognitive effort, leading to different choices compared to positively framed messages.

Levin .et. al. (1998) shows us how not only cognition but also emotions are impacted by the framing effect . Study shows how framing affects the emotional valence (positivity or negativity) of a message, which directly influences mood. Positive frames (e.g., “90% survival rate”) tend to produce uplifting emotions such as hope, confidence, or relief.

Negative frames (e.g., “10% mortality rate”) evoke negative emotions such as anxiety, fear, or worry, even though the two messages are logically equivalent. In health psychology, Rothman & Salovey (1997) showed that When it comes to healthy diet and sunscreen use, gain-framed messages work better. Loss-framed messages work better for detection behaviors such as cancer screening—because they induce fear, which motivates action. This suggests that negative framing, though emotionally aversive, can lead to more adaptive decisions in certain contexts.

One of the core strengths of the framing effect is that it challenges classical economic theories that assume humans make rational, utility-maximizing decisions. Tversky and Kahneman’s (1981) seminal work showed that people systematically make different choices based on whether outcomes are framed as gains or losses—even when the underlying facts are identical. This gave prospect theory empirical backing. introducing key concepts like loss aversion and reference dependence.

Robust Empirical Support Across Domains is another strength in which Framing effects

have been consistently observed in multiple areas of research:(Rothman, A. J., & Salovey, P. (1997)) Health Communication: Messages that are gain-framed are more convincing for preventive behaviors (e.g., exercise), while message that are loss-framed are more effective for detection behaviors (e.g., cancer screenings), Marketing and Consumer Behavior: Attribute framing (e.g., “90% fat-free” vs. “10% fat”) influences product evaluations and purchase intentions(Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998), Political Communication: Emphasis framing (e.g., highlighting security vs. civil liberties) affects public opinion and policy preferences (Druckman, J. N. (2001). Thaler, R. H., & Sunstein, C. R. (2008) shows that framing has high practical utility because of its predictability and impact, framing is often used as a behavioral intervention tool to influence attitudes and decisions in a non-coercive way.

However, scholars such as Druckman (2001) have criticized the literature for conceptual ambiguity, particularly the conflation of equivalency and emphasis frames, leading to inconsistencies in findings across political and social domains. Moreover, Kühberger’s (1998) meta-analysis revealed that factors can moderate the impact of framing such as task familiarity and cognitive reflection, raising questions about their generalizability. Despite its empirical robustness and practical relevance in fields like policy, marketing, and media, the framing effect literature requires greater theoretical integration, especially with regard to the role of emotion, individual differences, and social context, which remain underexplored in current models.

The integrating framing theory with neuroscience and affective computing could clarify how emotional and cognitive pathways interact in real-time decision-making (e.g., Camerer et al., 2005). Another promising direction is investigating cultural variability and cross-linguistic framing effects, which remain underexplored in global communication contexts (Levin et al., 1998).

Finally, framing can be used more ethically and transparently in policy design to support prosocial behavior without manipulation, aligning with the principles of libertarian paternalism (Thaler & Sunstein, 2008).

2.3 Interplay Role Between Decoy And Framing Effect

Tversky and Kahneman (1981) first proposed the framing effect, which explains how people's risk choices change based on whether options are presented as wins or losses,

even when the results are factually equal. It has its roots in prospect theory, which holds that because of reference dependency and loss aversion, people are often risk-seeking in loss frames and risk-averse in gain frames. On the other hand, Huber, Payne, and Puto (1982) defined the decoy effect as a change in choice brought about by the introduction of an asymmetrically dominating alternative (the decoy), which, despite the decoy's rarity, makes one of the original options more appealing in contrast.

Two significant phenomena in behavioral decision-making that highlight how presentation and context can skew rational choice are the framing effect and the decoy effect. Although these two effects have traditionally been examined independently, new research has started to examine how they combine, demonstrating how the addition of a decoy can change or intensify framing effects by altering choice weightings, preference structure, and value perception.

Recent studies suggest that decoys can influence how framed options are perceived and processed, thereby modulating the framing effect. For example, Cheng, Hsee, and Zhang (2012) found that when a decoy is introduced in a set of framed options (e.g., two health interventions framed in gain or loss terms), it can shift the decision-maker's focus toward specific attributes (such as effectiveness or cost), which interacts with the emotional response triggered by the frame. In this way, the decoy can amplify the framing effect by reinforcing the cognitive bias toward one frame (gain or loss), or dampen it by diluting attention to the frame itself.

In their 2023 study, Di Crosta et al. explored the interaction in the decoy and framing effects in decision-making, aiming to determine how the presence of decoy options influences choices framed as gains or losses. The researchers manipulated both the framing (positive vs. negative) and the type of decoy presented—congruent decoys (which support the typical framing preference) and incongruent decoys (which oppose it). The results displayed that congruent decoys enhanced the framing effect, particularly in positively framed conditions, while incongruent decoys significantly reduced it, promoting more balanced decision-making. These findings demonstrate that decoy options can modulate the strength of the framing effect, suggesting a complex interaction between contextual cues and cognitive biases in shaping preferences. The study contributes to the growing literature on how multiple heuristics jointly influence decisions and emphasizes the significance of choice architecture in behavioral science.

Recent work has investigated how the existence of a decoy can influence the strength or direction of the framing effect. For instance, Levin et al. (1998) suggested that decoys could interact with attribute framing by modifying the salience of specific features, thus reinforcing or undermining the intended frame. Similarly, Druckman (2001) emphasized that framing functions through the selective activation of evaluative dimensions (e.g., values or risks), a process that could be changed by the presence of a decoy that redirects attention to different attributes of the decision.

Di Crosta et al. (2023) talks about strengths that include Novel integration of two well-studied biases provide empirical support for the co-occurrence and interaction of framing and decoy effects, enriching the field's understanding of compound biases. Relevance to real-world choices: Many real-life decisions involve both attribute comparisons and valence-based framing.

There are criticisms that are Frame-specific interaction which shows that interaction was stronger in gain frames than in loss frames, suggesting that emotional valence and motivational asymmetries may moderate these effects. This indicates a lack of symmetry, limiting generalizability. Limited scope of decision contexts: Most existing studies, including Di Crosta et al.(2023), focus on hypothetical choices. Real-world behaviors involving stakes, time pressure, or social influence may behave differently. Individual differences not accounted for: Traits like need for cognition, numeracy, or emotional intelligence may moderate susceptibility to both effects but were not thoroughly explored.

The interaction between the decoy and the framing effects underscores the complex and context-sensitive nature of human decision-making. When aligned, these biases can amplify each other, significantly shaping preference and confidence; when misaligned, they can mitigate biased decision patterns, offering a potential tool for debiasing. While studies like Di Crosta et al. (2023) represent a promising step toward understanding multi-bias interactions, the field would benefit from broader, real-world, and theoretically integrated research that accounts for affective, cognitive, and contextual variables.

CHAPTER 3: RESEARCH GAP, OBJECTIVES AND HYPOTHESIS

3.1 Research Gap

Although a great deal of independent study has looked at the framing effect (Tversky & Kahneman, 1981) and the decoy effect (Huber et al., 1982), very few studies have explored how these two cognitive biases interact to shape decision-making. The only notable prior work on this interaction is by Cheng et al. (2012), who suggested that incongruent decoys could reduce the framing effect, and Di Crosta et al. (2023), who extended this by examining congruent and incongruent decoys' impact on framing and decision confidence. This research investigates whether this concept works properly or not because only single research has been conducted with this theoretical framework on this topic by Di Crosta et al. 2023, and to check whether this theoretical framework works with other new scenarios or not. Additionally, the major novelty of this study is to check whether this concept works in a specific domain as the medical field has been investigated in this study to determine the effect of decoy on framing because there is not a study present with this theoretical framework to conduct study in a specific domain.

3.2 Objectives

1. To find an effect of decoy on framing.
2. To find an effect of decoy on framing in the medical domain.

3.3 Hypothesis (hypothesis would be same for both experiments)

H0: In original set participants will prefer the risk-averse option in the positive frame and the risk-seeking option in the negative frame.

H1: A congruent decoy effect could increase the choice of the expected option in both framing conditions.

H2: The effect of an incongruent decoy effect could decrease the choice of the expected options, both in positive framing and negative framing.

CHAPTER 4: METHODOLOGY

Experiment 1

Aim: To find the effect of decoy on framing.

4.1 Sample

A random sample size of 50 participants aged 18-26 years , with the mean age of 20.84 years (SD 1.55). consisting of both male and female students, was chosen for the experiment.

4.2 Sample Characteristics

The research sample comprised a total of 50 Participants, from which 32 participants were from the Thapar University , Patiala and another 18 were from out of the university from Ludhiana,Punjab. The sample size is consisted of 15 male and 35 female participants . Regarding educational background, most of the participants were postgraduate students 76 % other participants were working.

4.3 Research Design

It is a repeated measures design. In this study , the independent variables are the Framing and Decoy and the dependent variable is the choice of the participants.. In this study we used 2 (frame : Positive vs Negative) x 3 (choice set : Original set , Congruent decoy set , Incongruent decoy set) within- subject design to investigate the bi-directional influence of the decoy effect on the framing effect. To conduct this study we created 4 different scenarios and in each scenario there were a total 6 conditions from which 1 and 2 conditions came under the Original set, 3 and 4 conditions came under Congruent decoy set and 5,6 conditions came under Incongruent decoy set. These conditions also came under positive and negative frames in which 1,3,5 conditions came under Positive framing and 2,4,6 conditions came under Negative framing. The participants were presented with conditions and from each condition the participants have to choose 1 option from the presented option.

4.4 Procedure

In this experiment a total of 4 scenarios were built and that scenario was of 1) Exporting goods 2) Leading a battalion of 1000 soilers 3) Reaching office by choosing the best route and 4) Investing money in stocks. The study was conducted through the

google form and the consent was taken through form only. After the consent was taken the participants were given the instructions that “ There are a total **4 Scenarios**, each scenario containing **6** specific **conditions**. For each condition, there are multiple options available, and you'll need to select **one option** from each condition”. Participants were informed that there is no time limit but they have to choose as soon as possible. Table1. An example of a different set of options for the exporting scenario that is displayed under experimental conditions (choice set x frame).

You have to export 1200 high quality electronic gadgets to America through DHL exporting company. But there's a risk of losing a few during transit due to potential mishaps. Company offering you choices on how you want to handle any potential issues.

Storyline There are two suggested alternatives (or "three" under the decoy conditions). Choose your preferred choice, assuming the following are the estimated outcomes.

Choose Between

	Positive	Negative
Original	A. 400 Items will safely reach.	A.800 Items will lost for sure.
	B. There is a 1/3 chance that 1200 items will reach and a 2/3 chance that no item may reach.	B. There is a 1/3 chance that no item will lost and 2/3 chance That 1200 items will lost
	A.400 Items will safely reach.	A. 800 Items will lost for sure.
CD	A'.300 Items will safely reach.	B' . There is a 1/3 chance that 300 items will lost and a 2/3 chance that 1200 will lost
	B. There is a 1/3 chance that 1200 items will reach and a 2/3 chance that no item may reach.	B' . There is a 1/3 chance that no item will lost and 2/3 chance That 1200 item will lost
	A.400 Items will safely reach.	A. 800 Items will lost for sure.
ID	B'. There is 1/3 chance that 900 items will safely	A'.900 Items will lost for sure.

reach and a 2/3 chance that no item will be reached.

B. There is a 1/3 chance that 1200 items will reach and a 2/3 chance that no item may reach. **B.** There is a 1/3 chance that no item will be reached and a 2/3 chance that 1200 items will be lost.

4.5 Tools Used

- Scenario was used which was selfmade
- Google Form
- SPSS 29

4.6 Precautions

- 1) Participants were asked to complete the form at once.
- 2) Participants were encouraged to ask questions in case of any doubt.

EXPERIMENT 2

Aim: To find the effect of decoy on framing in the medical domain.

4.7 Sample

A random sample size of 50 participants aged 18-26 years, consisting of both male and female participants, was chosen for the experiment. The diverse sample ensured the generalizability of the results, and the random selection eliminated biases.

4.8 Sample Characteristics

The research sample comprised a total of 50 Participants, from which 29 participants were from the Thapar University, Patiala and other 21 were from out of the university. The sample size consisted of 21 male and 29 female participants. The age range of students range between 18-26 years, with the mean age of 22.6 years (SD= 1.12). In terms of educational background, the most of the participants were postgraduate students 70 %.

4.9 Research Design

It is repeated measures design. In this study, the independent variables are the Framing and Decoy and the dependent variable is the choice of the participants. In this study we used 2 (frame : Positive vs Negative) x 3 (choice set : Original set ,

Congruent decoy set , Incongruent decoy set) within- subject design to investigate the bi-directional influence of the decoy effect on the framing effect. To conduct this part of the study we created 3 different scenarios and in each scenario there were a total 6 conditions from which 1 and 2 conditions came under the Original set, 3 and 4 conditions came under Congruent decoy set and 5,6 conditions came under Incongruent decoy set. These conditions also came under positive and negative frames in which 1,3,5 conditions came under Positive framing and 2,4,6 conditions came under Negative framing.. The participants were shown conditions and from each condition the participants have to choose 1 option from the presented option.

4.10 Procedure

In this experiment a total of 4 scenarios were built and in this part of the experiment all scenarios were related to the medical domain. The scenarios were 1) Use of anesthesia during surgery 2) Pregnancy 3) Liver Transplant. These scenarios were standardized through conducting pilot study first. The study was conducted through the google form and the consent was taken through form only. After the consent was taken the participants were given the instructions that “ There are a total **3 Scenarios**, each scenario containing **6 specific conditions**. For each condition, there are multiple options available, and you'll need to select **one option** from each condition”. Participants were informed that there is no time limit but they have to choose as soon as possible. Table 1. An example of a different set of options for the exporting scenario that is displayed under experimental conditions (choice set x frame).

You are lying on a hospital bed in the preoperative room , dressed in a light blue surgical gown, preparing for a complex dental surgery that will last for 4 hours. Dr. Reynold walks in and present you with different anaesthesia options, each varying in duration and cost. Dr. asked you to choose the most suitable option based on your preference and needs.

Storyline There are two suggested alternatives (or "three" under the decoy conditions). Choose your preferred choice, assuming the following are the estimated outcomes.

Choose Between

Positive

Negative

Original A. It will work for 2 hours - (200\$) A. It will not work for last 2 hours (200\$)
B. There is 1/3 chance that it will work for 4 hours, but 2/3 chance that it will not work for more than 30 minutes (400\$). B. There is 1/3 chance that it will work for full duration but 2/3 chance that it will not work for more than 30 minutes (400\$).

A. It will work for 2 hours - (200\$) A. It will not work for last 2 hours (200\$)
CD A' It will work for 1.5 hours (300\$) B'. There is 1/3 chance that it will work for 3 hours, but there is 2/3 chance that it will not work for more than 20 minutes. (300\$)
B. There is 1/3 chance that it will work for 4 hours, but 2/3 chance that it will not work for more than 30 minutes (400\$) B. There is 1/3 chance that it will work for full duration but 2/3 chance that it will not work for more than 30 minutes. (400\$)

A. It will work for 2 hours - (200\$) A. It will not work for last 2 hours (200\$)
ID B'. There is 1/3 chance that it will work for 3 hours, but there is 2/3 chance that it will not work for more than 20 minutes. (300\$)
A'. It will not work for 2.5 hours (300\$)
B. There is 1/3 chance that it will work for 4 hours, but 2/3 chance that it will not work for more than 30 minutes (400\$) B. There is 1/3 chance that it will work for full duration but 2/3 chance that it will not work for more than 30 minutes. (400\$)

4.11 Tools Used

- Scenarios were used which was selfmade
- Google Form
- SPSS 29

4.12 Precautions

- 1) Participants were asked to complete the form at once.
- 2) Participants were encouraged to ask questions in case of any doubt.

CHAPTER 5: RESULTS

EXPERIMENT -1

Aim-To find an effect of decoy on framing effect.

Under this experiment the Chi-square is used for results analysis and there would be Three tables will be presented and each table for each SET, as previously said, there are three choice sets- First ORIGINAL SET , Second CONGRUENT DECOY SET and Third INCONGRUENT DECOY SET.

HYPOTHESIS

H₀: In original set participants will prefer the risk-averse option in the positive frame and the risk-seeking option in the negative frame

H₁: A congruent decoy effect could increase the choice of the expected option in both frame condition

H₂: The effect of an incongruent decoy effect could decrease the choice of the expected options, both in positive and negative framing.

ORIGINAL SET RESULT

TABLE 1

ORIGINAL SET TABLE

SOURCE	<u>POSITIVE</u>		<u>NEGATIVE</u>		X ² (1)
	n	%	n	%	
RISK AVERSE	33	66.00%	7	14.00%	28.167**
RISK SEEKING	17	34.00%	43	86.00%	

** $p < .001$

The findings from Table 1 demonstrate a significant association between risk preference and framing effects (positive vs. negative). The statistical analysis reveals that the p-value is .001, indicating a highly significant result. This suggests that the way a scenario is framed (either positively or negatively) has a notable impact on

individuals' risk-taking behavior. As this table indicates that in Positive framing 66% of participants preferred Risk Aversive choice when the options are shown to them whereas 34% participants opted for Risk Seeking choices as they are presented with the choices. In Negative framing 86% of participants went for Risk Seeking option whereas 14% participants opted Risk Aversive option in negative framing in Original Set. The statistical significance of these findings ($p = .001$) reinforces the framing effect's influence on decision-making. Since the results align with the expected theoretical framework, the null hypothesis (H_0) which was "In original set participants will prefer the risk-averse option in the positive frame and the risk-seeking option in the negative frame" is accepted, confirming that risk preference is indeed affected by framing

CONGRUENT DECOY SET

TABLE 2: CONGRUENT DECOY SET TABLE

SOURCE	POSITIVE		NEGATIVE		X ² (1)
	n	%	n	%	
RISK AVERSE	23	46.00%	7	14.00%	12.248**
RISK SEEKING	22	44.00%	34	68.00%	
DECOY	5	10.00%	9	18.00%	

** $p < .002$

According to Table 2 it is demonstrated that the congruent decoy effect increased the choice of expected option in both Frames. The p value is .002 which suggests that results have significant outcomes. As this table indicates that in Positive framing 46% of participants preferred Risk Aversive choice when they are exposed with the choices whereas 44% participants opted for Risk Seeking choices as they are exposed with the choices and 10% participants opted Decoy option. In Negative framing 68% of participants went for Risk Seeking option whereas 14% participants opted Risk Aversive option and 18% went for Decoy option in negative framing in Original Set. The statistical significance of these findings ($p = .002$) reinforces the presence of a decoy option can alter decision-making processes and lead participants to gravitate

towards the expected option. Since the results align with the expected theoretical framework, the alternate hypothesis (H1) which was “A congruent decoy effect could increase the choice of the expected option in both frame conditions.” is accepted.

INCONGRUENT DECOY SET

TABLE-3

INCONGRUENT DECOY TABLE

SOURCE	POSITIVE		NEGATIVE		X ² (1)
	n	%	n	%	
RISK AVERSE	13	26.00%	9	18.00%	4.313**
RISK SEEKING	36	72.00%	35	70.00%	
DECOY	1	2.00%	6	12.00%	

$p < .116$

According to Table 3 it is demonstrated that incongruent decoy effect decreases the choice of expected option but only in a positive frame. The *p value is $p < .116$* which shows that our results have insignificant outcome.

As this table indicates that in Positive framing 26% of participants preferred Risk Aversive choice when they are presented with the choices whereas 72% participants opted for Risk Seeking choices as they are shown the choices and 2% participants opted Decoy option. In Negative framing 18% of participants went for Risk Seeking option whereas 70% participants opted Risk Aversive option and 12% went for Decoy option in negative framing in Original Set.

The statistical significance of these findings ($p = .116$) reinforces that the incongruent decoy effect does not have a strong impact on participant’s choices in this study, particularly in the negative frame, the alternate hypothesis (H2) which was “The effect of an incongruent decoy effect could decrease the choice of the expected options, both in positive and negative framing” is rejected.

EXPERIMENT-2

Aim-To find an effect of decoy on framing effect but in the medical domain.

Under this experiment Chi-square is used to analysis the results and there would be total 9 tables will be presented and first three tables would come under the ORIGINAL CHOICE SET, other three tables would come under CONGRUENT DECOY CHOICE SET and last three tables would come under the INCONGRUENT DECOY CHOICE SET.

HYPOTHESES

H₀- In the original set participants will prefer the risk-averse option in the positive frame and the risk-seeking option in the negative frame.

H₁- A congruent decoy effect could increase the choice of the expected option in both frame conditions.

H₂: The effect of an incongruent decoy effect could decrease the choice of the expected options, both in positive and negative framing.

ORIGINAL SET RESULTS

TABLE 1 :ORIGINAL SET RESULT TABLE [Scenario 1 (Surgery)]

SOURCE	POSITIVE		NEGATIVE		X ² (1)
	n	%	n	%	
RISK AVERSE	41	82.00%	13	26.00%	31.562**
RISK SEEKING	9	18.00%	37	74.00%	

p < .001

The findings from Table 1 demonstrate a significant association between risk preference and framing effects (positive vs. negative). The statistical analysis reveals that the p-value is .001, indicating a highly significant result. This suggests that the way

a scenario is framed (either positively or negatively) has a notable impact on individuals' risk-taking behavior.

As this table indicates that in Positive framing 82% of participants preferred Risk Aversive choice when they are shown with the choices whereas 18% participants opted for Risk Seeking choices as they are shown the choices. In Negative framing 74% of participants went for Risk Seeking option whereas 26% participants opted Risk Aversive option in negative framing in Original Set for scenario 1(treatment).

The statistical significance of these findings ($p = .001$) reinforces the framing effect's influence on decision-making. Since the results align with the expected theoretical framework, the null hypothesis (H_0) which was "In original set participants will prefer the risk-averse option in the positive frame and the risk-seeking option in the negative frame" is accepted for the scenario1 (treatment) confirming that risk preference is indeed affected by framing.

TABLE 2

ORIGINAL SET RESULT TABLE [Scenario (Pregnancy)]

SOURCE	POSITIVE		NEGATIVE		$X^2 (1)$
	n	%	n	%	
RISK AVERSE	35	70.00%	1	34.00%	12.981**
RISK SEEKING	15	30.00%	33	66.00%	

$p < .001$

The findings from Table 2 demonstrate a significant association between risk preference and framing effects (positive vs. negative). The statistical analysis reveals that the p-value is .001, indicating a highly significant result. This suggests that the way a scenario is framed (either positively or negatively) has a notable impact on individuals' risk-taking behavior.

This table shows us that in Positive framing 70% of participants preferred Risk Aversive choice whereas 30% participants made a choice of Risk Seeking as they are

given the options.. In Negative framing 66% of participants went for Risk Seeking option whereas 34% participants opted Risk Aversive option in negative framing in Original Set for scenario 2 (treatment).

The statistical significance of these findings ($p = .001$) shows the framing effect's influence on decision-making. Since the results align with the expected theoretical framework, the null hypothesis (H_0) which was "In original set participants will prefer the risk-averse option in the positive frame and the risk-seeking option in the negative frame" is accepted for the scenario 2 (treatment) confirming that risk preference is indeed affected by framing.

TABLE 3

ORIGINAL SET RESULT TABLE [Scenario-3 (Liver Transplant)]

SOURCE	POSITIVE		NEGATIVE		X ² (1)
	n	%	n	%	
RISK AVERSE	44	88.00%	12	24.00%	41.558**
RISK SEEKING	6	12.00%	38	76.00%	

$p < .001$

The findings from Table 3 demonstrate a significant relation between risk preference and framing effects (positive vs. negative). The statistical analysis reveals that the p-value is .001, indicating a highly significant result. This suggests that the way a scenario is framed (either positively or negatively) has a notable impact on individuals' risk-taking behavior.

As this table indicates that in Positive framing 88% of participants preferred Risk Aversive choice when they are given the options whereas 12% participants opted for Risk Seeking choices as they are given the options.. In Negative framing 76% of participants went for Risk Seeking option whereas 24% participants opted Risk Aversive option in negative framing in Original Set for scenario 3(Liver Transplant).

The statistical significance of these findings ($p = .001$) reinforces the framing effect's

influence on decision-making. Since the results align with the expected theoretical framework, the null hypothesis (H_0) which was “In original set participants will prefer the risk-averse option in the positive frame and the risk-seeking option in the negative frame” is accepted for the scenario3 (treatment) confirming that risk preference is indeed affected by framing.

Conclusion of Original set results

From the result of the Original result set it could be concluded that participants exhibited more risk-averse choices than risk-seeking ones in positive framing, and more risk-seeking choices than risk-aversive ones in negative framing, according to the three tables of various scenarios. A significant p-value of .001 was found in each of the three tables for each of the three scenarios, indicating that our H_0 is accepted in each of them.

CONGRUENT DECOY SET

TABLE 1 CONGRUENT DECOY SET [Scenario 1 (Surgery)]

SOURCE	POSITIVE		NEGATIVE		$X^2 (1)$
	n	%	n	%	
RISK AVERSE	38	76.00%	12	24.00%	27.101**
RISK SEEKING	8	16.00%	27	54.00%	
DECOY	4	8.00%	11	22.00%	

$p < .001$

According to Table 3 it is demonstrated that the incongruent decoy effect decreases the choice of expected option but only in a positive frame The p value is $p < .001$ which shows that our results have significant outcome.

As this table indicates that in Positive framing 76% of participants preferred Risk Aversive choice when they are given the choices whereas 16% participants opted for Risk Seeking choices as they are given the choices and 8% participants opted Decoy

option. In Negative framing 54% of participants went for Risk Seeking option whereas 24% participants opted Risk Aversive option and 22% went for Decoy option in negative framing in Congruent Decoy Set.

The statistical significance of these findings ($p = .001$) reinforces the presence of a decoy option that can alter decision-making processes and lead participants to make a choice towards the expected option. Since the results align with the expected theoretical framework, the alternate hypothesis (H1) which was “A congruent decoy effect could increase the choice of the expected option in both frame conditions.” is accepted in Scenario1 (Surgery).

TABLE 2 CONGRUENT DECOY SET RESULT [Scenario 2 (Pregnancy)]

SOURCE	POSITIVE		NEGATIVE		X ² (1)
	n	%	n	%	
RISK AVERSE	30	60.00%	13	26.00%	12.124**
RISK SEEKING	17	34.00%	29	58.00%	
DECOY	3	6.00%	8	16.00%	

$p < .002$

According to Table 3 we can say that incongruent decoy effect decreases the choice of expected option but only in a positive frame. The p value is $p < .002$ which shows that our results have significant outcome.

As this table indicates that in Positive framing 60% of participants preferred Risk Aversive choice when they are given the choices whereas 34% participants opted for Risk Seeking choices as they are given the choices and 6% participants opted Decoy option. In Negative framing 58% of participants went for Risk Seeking option whereas 26% participants opted Risk Aversive option and 16% went for Decoy option in negative framing in Congruent Decoy Set.

The statistical significance of these findings ($p = .002$) reinforces the presence of a decoy option that can alter decision-making processes and lead participants to make a choice towards the expected option. Since the results align with the expected theoretical framework, the alternate hypothesis (H1) which was “A congruent decoy effect could increase the choice of the expected option in both frame conditions.” is accepted in Scenario2 (Pregnancy).

TABLE 3 CONGRUENT DECOY SET RESULT [Scenario 3 (Liver Transplant)]

SOURCE	POSITIVE		NEGATIVE		X ² (1)
	n	%	n	%	
RISK AVERSE	43	86.00%	11	22.00%	41.252**
RISK SEEKING	6	12.00%	32	64.00%	
DECOY	1	2.00%	7	14.00%	

$p < .001$

According to Table 3 we can say that the incongruent decoy effect decreases the choice of expected option but only in a positive frame. The p value is $p < .001$ which shows that our results have significant outcome.

As this table indicates that in Positive framing 86% of participants preferred Risk Aversive choice when they are given the choices whereas 12% participants opted for Risk Seeking choices as they are given the choices and 2% participants opted Decoy option. In Negative framing 64% of participants went for Risk Seeking option whereas 22% participants opted Risk Aversive option and 14% went for Decoy option in negative framing in Congruent Decoy Set.

The statistical significance of these findings ($p = .001$) reinforces the presence of a decoy option that can alter decision-making processes and lead participants to make a choice towards the expected option. Since the results align with the expected theoretical framework, the alternate hypothesis (H1) which was “A congruent decoy effect could increase the choice of the expected option in both frame conditions.” is accepted in

Scenario3 (Liver Transplant).

CONCLUSION OF CONGRUENT DECOY SET RESULTS

From the result of the Congruent decoy result set could be concluded that the Congruent decoy option had shown his effect due to which participants had gone for the expected option in both Positive and Negative framing in all 3 tables of the various scenarios. A significant p-value of .001 was found in table 1 and table 3 and in table 2 the p-value is .002 which is significant and indicates that our H1 is accepted in each table.

INCONGRUENT DECOY SET

TABLE 1 INCONGRUENT DECOY SET [Scenario 1 (Surgery)]

SOURCE	POSITIVE		NEGATIVE		X ² (1)
	n	%	n	%	
RISK AVERSE	32	64.00%	12	24.00%	16.883**
RISK SEEKING	14	28.00%	33	66.00%	
DECOY	4	8.00%	5	10.00%	

p < .001

According to Table 1 it is demonstrated that incongruent decoy effect do not decrease the choice of expected option in both positive and negative framing. The p value is p < .001 which shows that our results have significant outcome.

As this table indicates that in Positive framing 64% of participants preferred Risk Aversive choice when they are presented with the choices whereas 28% participants opted for Risk Seeking choices as they are presented with the choices and 8% participants opted Decoy option. In Negative framing 66% of participants went for Risk Seeking option whereas 24% participants opted Risk Aversive option and 10% went for Decoy option in negative framing in Congruent Decoy Set.

The statistical significance of these findings (*p* = .001) reinforces that the incongruent decoy effect does not have any impact on participant's choices in this study, both in

positive and negative framing , the alternate hypothesis (H2) which was “The effect of an incongruent decoy effect could decrease the choice of the expected options, both in positive and negative framing” is rejected in Scenario 1 (surgery).

TABLE 2

INCONGRUENT DECOY SET RESULT [Scenario 2 (Pregnancy)]

SOURCE	POSITIVE		NEGATIVE		X ² (1)
	n	%	n	%	
RISK AVERSE	31	62.00%	6	12.00%	26.855**
RISK SEEKING	16	32.00%	38	76.00%	
DECOY	3	6.00%	6	12.00%	

p < .001

According to Table 2it is demonstrated that incongruent decoy effect do not decrease the choice of expected option in both positive and negative framing. The *p value is p<.001* which shows that our results have significant outcome.

As this table indicates that in Positive framing 62% of participants preferred Risk Aversive choice when they are presented with the choices whereas 32% participants opted for Risk Seeking choices as they are presented with the choices and 6% participants opted Decoy option. In Negative framing 76% of participants went for Risk Seeking option whereas 12% participants opted Risk Aversive option and 12% went for Decoy option in negative framing in Congruent Decoy Set.

The statistical significance of these findings (*p* = .001) reinforces that the incongruent decoy effect does not have any impact on participant’s choices in this study, both in positive and negative framing , the alternate hypothesis (H2) which was “The effect of an incongruent decoy effect could decrease the choice of the expected options, both in positive and negative framing” is rejected in Scenario 2 (Pregnancy)

TABLE 3

INCONGRUENT DECOY SET RESULT [Scenario 3 (Liver Transplant)]

SOURCE	POSITIVE		NEGATIVE		X ² (1)
	n	%	n	%	
RISK AVERSE	26	52.00%	7	14.00%	17.749**
RISK SEEKING	20	40.00%	40	80.00%	
DECOY	4	8.00%	3	6.00%	

$p < .001$

According to Table 3 it is demonstrated that incongruent decoy effects do not decrease the choice of expected option in both positive and negative framing. The *p value is $p < .001$* which shows that our results have significant outcomes.

As this table indicates that in Positive framing 52% of participants preferred Risk Aversive choice when they are presented with the choices whereas 40% participants opted for Risk Seeking choices as they are presented with the choices and 8% participants opted Decoy option. In Negative framing 80% of participants went for Risk Seeking option whereas 14% participants opted Risk Aversive option and 6% went for Decoy option in negative framing in Congruent Decoy Set.

The statistical significance of these findings ($p = .001$) reinforces that the incongruent decoy effect does not have any impact on participant's choices in this study, both in positive and negative framing, the alternate hypothesis (H2) which was "The effect of an incongruent decoy effect could decrease the choice of the expected options, both in positive and negative framing" is rejected in Scenario 3(Liver Transplant)

CHAPTER-6 DISCUSSION

This study examined the interplay between two widely known cognitive biases—framing effect and decoy effect. Specifically, this study examined the influence of an asymmetric dominated option (decoy) on framing effect. Another aim was to examine the effect of decoy on framing in the medical domain. The aim for experiment 1 is to find the effect of decoy on framing and the aim for experiment 2 is to find the effect of decoy on framing but in the medical domain.

The framing effect, as predicted by prospect theory (Tversky & Kahneman, 1981), was clearly demonstrated in the original choice sets of this study. Participants displayed a consistent tendency to choose the risk-averse option when presented with positively framed scenarios (i.e., outcomes described in terms of gains) and a risk-seeking preference when options were framed negatively (i.e., in terms of losses), in both the experiments which lead to accept the Hypothesis 1 in both the experiment. The p value for the original choices sets in the first experiment was $p < .001$ which is significant and in experiment 2 the p value was also $p < .001$ in all three scenarios which shows that the results are significant. This pattern supports the foundational assertion that individuals do not evaluate outcomes solely based on their final states but rather on perceived gains or losses relative to a reference point. These results are consistent with earlier research. (Levin et al., 1998; Rothman & Salovey, 1997), reinforcing that the framing effect is a robust, generalizable phenomenon across decision-making contexts.

The study advanced existing literature by examining how the presence of decoys modifies the strength and direction of framing effects. The inclusion of congruent decoys—those that supported the choice most favored by the framing condition—led to a noticeable intensification of the framing effect. In positively framed scenarios, for instance, the presence of a decoy option similar but slightly inferior to the risk-averse option made the preferred choice even more attractive, increasing the proportion of participants selecting it. The Hypothesis 2 is accepted in both the experiments because the CD shown its effect in both positive framed conditions and in negative framed conditions by increasing the choice of expected option in both conditions. The p value for CD choice sets in experiment 1 is $p < .002$ which is significant value whereas in experiment 2 the p value for 1 and 3 scenarios is $p < .001$ and for 2 scenario is $p < .002$.

which is significant value, which shows that the outcome of the results was significant in CD choice sets. This result can be interpreted through the lens of the decoy effect (Huber, Payne, & Puto, 1982), which posits that adding a less attractive, asymmetrically dominated option can shift preferences toward the dominating option. This amplification effect points to a synergistic interaction: the decoy provides a contrast that emphasizes the benefits of the previously preferred option, reinforcing the initial directional preference primed by the frame. Increased prominence of positive qualities and decreased cognitive conflict when one choice is obviously superior to the decoy are probably the cognitive mechanisms underlying this. These findings are similar to those of Di Crosta et al. (2023), who discovered that congruent decoys greatly improved decision confidence and framing-consistent choices.

In contrast, the presence of incongruent decoys—designed to support the non-preferred option in a given frame—had a moderating effect. The data revealed that in experiment 1 ID shows its effect only in positive framed conditions and not in negative framed conditions, incongruent decoys reduced the proportion of framing-consistent choices, suggesting a weakening of the framing effect. In experiment 2 there was no significant effect present in both positive framed conditions and negative framed conditions, due to which we could say that our Hypothesis 3 (The effect of an incongruent decoy effect could decrease the choice of the expected options, both in positive and negative framing) is rejected. The p value for the ID choice set is $p < .116$ in experiment 1 which is an insignificant value whereas in experiment 2 the p value is $p < .001$ in all three scenarios.

The findings also indicated that decision confidence was higher when congruent decoys were present, regardless of framing. This supports the idea that when choice architecture aligns with existing cognitive biases, individuals experience reduced decision conflict and greater certainty. This is consistent with the findings of Di Crosta et al. (2023), who observed increased decision confidence in the presence of congruent decoys, suggesting a reinforcing effect on the subjective assurance of choice quality. However, incongruent decoys did not significantly affect confidence levels, suggesting that while they influence choices, they may not fundamentally change the subjective ease or assurance with which those decisions are made. Our experimental methodology was not designed to explore this idea, although we acknowledge that different circumstances may generate partially different kinds of decisions. Multiple scenarios were primarily selected to avoid boredom and repetition bias (Di Crosta et al. 2023).

CHAPTER 7 : CONCLUSIONS AND FUTURE DIRECTIONS

7.1 Conclusion

This work investigates the decoy's bi-directional role in the framing effect. This study offers significant contributions to the growing literature on cognitive biases by systematically investigating the interaction between the Framing Effect (FE) and the Decoy Effect (DE) through two controlled experiments—one involving general decision-making contexts and the other within the medical domain. Drawing upon foundational theories of prospect theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1981), the study reinforces the robustness of the framing effect: individuals consistently showed risk-averse tendencies under positive framing and risk-seeking tendencies under negative framing, supporting the assertion that people evaluate options relative to a reference point, rather than based on final outcomes.

More importantly, this study extends prior research by exploring how decoy options—either congruent or incongruent—can modulate the strength of the framing effect, aligning with the theoretical mechanisms proposed in Huber, Payne, & Puto's (1982) decoy model. By implementing a within-subject design, we found results revealed that the congruent decoy (CD) enhanced the framing effect in both experiments, notably increasing participants' preference for the expected option consistent with the frame (risk-averse in positive frames, risk-seeking in negative frames). This finding corroborates recent work by Di Crosta et al. (2023), who found that congruent decoys not only influenced decision direction but also increased decision confidence, suggesting an effective reinforcement mechanism at play.

Conversely, the incongruent decoy (ID) produced mixed results. While it showed a slight diminishing effect on the framing bias in general decision-making (experiment 1), this effect did not reach statistical significance across all conditions. In the medical scenarios of experiment 2, the ID had no significant moderating impact on risk preferences, implying that domain specificity and perceived stakes may reduce the decoy's influence—a finding that aligns with studies suggesting that the DE is less effective in high-stakes or emotionally charged decisions (Trueblood & Pettibone, 2017; Simonson, 1989). Finally from this study we could concluded that how decoy

shown his effect in framing and how it could change the choice of participants.

7.2 Limitations and Future Directions.

There are some limitations to this study, first, imbalanced gender ratio that may affect the results since it may differ between the genders. Second, the study is the replication of the idea of another study which could lack the novelty factor from this study. Third, the scenarios which were created are not standardized properly and this could also be the implication in the future so that to fulfill the standardized criteria. One of the primary limitations is the use of hypothetical decision-making tasks rather than real-world choices with tangible consequences. While hypothetical vignettes are widely used in cognitive psychology for their experimental control, they may not evoke the same level of emotional engagement, stress, or motivation as real-life decisions (Kühberger, 1998). Consequently, participants may exhibit biases differently in laboratory-style settings than in high-stakes environments like medical treatment, financial investment, or legal judgments.

Although the study attempted to diversify contexts by including both general and medical scenarios, the medical domain scenarios may not fully capture the emotional intensity and complexity of real-life clinical decisions. For instance, participants might process the scenario of undergoing surgery differently if they were actually facing the procedure themselves or considering it for a family member. Emotional salience plays a critical role in framing and risk processing (Fagley & Miller, 1997), and without inducing real emotional stakes, the observed decision patterns may not fully reflect real-world behavior.

Future research on how different scenarios may produce partially distinct sorts of choices might be conducted directly by altering the setting, for as when comparing financial and social decisions (Fagley et al., 1997). By adding attention checks to the experimental design, future research might additionally examine whether participants focused enough on looking at the probabilistic possibilities.

In future study the longitudinal studies could assess whether the interaction between these two biases remains stable over time or changes with repeated exposure. Given that cognitive biases can be moderated by learning, familiarity, or reflection (Kahneman, 2011), future research should examine whether repeated exposure to

framed decisions with decoy options reduces susceptibility through cognitive adaptation or fatigue

Another future study could give promising direction involving the study of individual differences in susceptibility to these effects. Variables such as need for cognition, numeracy, emotional intelligence, or decision-making style may moderate how individuals respond to framing and decoy manipulations. For example, Simonson (1989) and Frederick et al. (2009) found that individuals with higher cognitive abilities or reflective thinking are less prone to decision biases. Including such personality and cognitive measures could clarify who is most or least affected by framing-debiasing interventions.

Furthermore, cross-cultural studies are essential to determine the generalizability of these findings. Cultural orientations—particularly individualism vs. collectivism—may influence susceptibility to both FE and DE. In collectivist cultures, for example, holistic reasoning may reduce reliance on heuristics such as asymmetric dominance, whereas in individualistic cultures, where analytic thinking is prioritized, biases might operate differently (Usunier & Lee, 2013; Choi et al., 2007). Thus, replication in diverse socio-cultural contexts is needed to develop culturally sensitive models of decision-making.

Another important line of future research lies in real-world applications and high-stakes environments. Most existing studies, including the present one, utilize hypothetical scenarios. Future work could investigate these effects in financial decision-making, legal judgments, or emergency medicine, where the stakes are high and emotional pressure may exacerbate or suppress bias. Field experiments or simulation studies could help test whether the effects observed in controlled environments persist under real-world conditions (Druckman, 2001). There is a need to study these future connection with decoy and framing effect which could contribute much in this field.

7.3 Implications.

There are some implications which could be implicated in future as the scenarios should be standardized in future studies. These studies should be implicated in different domain like behavioral science, public policy, consumer behavior, and applied decision-making domains by using the same theoretical framework as such this study has implicated. As in marketing and e-commerce, understanding these effects can lead

to more ethically optimized product presentations, enhancing consumer satisfaction without manipulation (Ariely, 2008).

From a theoretical standpoint, the study contributes to the growing understanding of compound cognitive biases, supporting dual-process models of reasoning (Evans & Stanovich, 2013) and suggesting avenues for exploring individual differences in susceptibility to these effects. As artificial intelligence systems increasingly shape digital decision environments, incorporating knowledge of framing and decoy effects will be essential to creating bias-aware, human-centered technologies (Rahwan et al., 2019), reinforcing the broader relevance of this work in both academic and applied domains.

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