



Print ISSN: 1738-3110 / Online ISSN 2093-7717  
 JDS website: <http://accesson.kr/jds>  
<http://doi.org/10.15722/jds.24.01.202601.85>

# Optimizing Promotional Message Distribution for Cross-Border Travel

Kyung Jin KIM<sup>1</sup>

Received: December 11, 2025. Revised: December 24, 2025. Accepted: January 05, 2026.

## Abstract

**Purpose:** This study investigates how psychological distance embedded in transportation mode, social-distance cues, and cognitive-resource availability jointly shape consumers' responses to framed promotional messages in mobile cross-border travel-booking environments. The research aims to clarify why loss-framed messages become persuasive in some travel contexts while gain-framed messages dominate in others. **Research design, data and methodology:** Three controlled experiments using mobile-booking scenarios were conducted. Study 1 (n = 193) examined how air versus ship travel interacts with framing; Study 2 (n = 268) incorporated social-distance cues between countries; Study 3 (n = 337) added cognitive-resource depletion to test whether the framing–distance match depends on effortful reasoning. Message attitudes or favorability, perceived distance, and construal levels were measured using validated procedures. The mediation analysis was conducted using multiple regression. **Results:** Air travel elicited psychological proximity, increasing the persuasiveness of loss-framed messages, whereas ship travel evoked distance, enhancing gain-framed messages. When temporal and social proximity aligned, loss framing became especially impactful, but when distance cues accumulated, gain framing consistently prevailed. Construal level mediated the effects, and cognitive depletion did not moderate them, indicating intuitive heuristic processing rather than resource-dependent reasoning. **Conclusions:** Transportation mode acts as a natural psychological-distance cue that shifts consumers' construal and alters the effectiveness of message framing. Persuasion improves when framing aligns with contextual distance, offering practical implications for designing adaptive promotional strategies in mobile travel-booking environments.

**Keywords :** Ticket Distribution, Benefit Framing, Cost Framing, Transportation Mode

**JEL Classification Code :** I18, M31, M37.

## 1. Introduction

International travel has expanded rapidly, and travelers now rely heavily on digital booking platforms to search for information and make transportation decisions. As airlines, ferry operators, and online travel services compete more intensely for consumer attention, persuasive promotional messages have become increasingly central to shaping traveler choices. However, research has yet to clarify how

individuals interpret these messages within mobile interfaces—particularly when the inherent psychological qualities of the transportation mode may subtly influence how the promotional content is perceived.

Prior work in social cognition demonstrates that judgments vary systematically depending on how psychologically near or distant a situation appears (Fujita et al., 2008; Trope & Liberman, 2010). Different forms of perceived distance—such as temporal, spatial, social, or

<sup>1</sup> First Author. Professor, School of Transportation, Korea National University of Transportation, Seoul, Korea. Email: [kimkj@ut.ac.kr](mailto:kimkj@ut.ac.kr)

© Copyright: The Author(s)  
 This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

hypothetical separation—affect the degree of abstraction people apply when interpreting events (Liviatan et al., 2008; Eyal et al., 2009; Liberman & Trope, 1998). When contexts feel proximal, individuals tend to rely on concrete, detail-focused representations, whereas distal contexts promote more generalized and meaning-oriented construals (Davis et al., 2011; Trope & Liberman, 2003). These variations in construal have been shown to shape cognitive evaluations as well as emotional responses and judgments involving risk (Lerner et al., 2015).

The manner in which information is presented also plays a crucial role in shaping consumer reactions. Prospect-theoretic work shows that individuals often make different choices when an identical outcome is portrayed as a gain versus a loss (Tversky & Kahneman, 1981; Kahneman & Tversky, 1979). Although prior studies have identified contextual elements—such as temporal focus or perceived risk—that can influence the strength and direction of framing effects (Rivers et al., 2005; Chandran & Menon, 2004), relatively little research has examined how framing dynamics operate in conjunction with psychological distance to affect persuasive impact.

Theoretical accounts indicate that psychological distance can transform how consumers interpret framed messages, given its influence on the level of mental abstraction applied to an event (Eyal et al., 2004). When a situation feels close in time or personally relevant, people tend to focus more strongly on the possibility of losses; in contrast, distant situations—processed in a more abstract manner—can heighten the appeal of potential gains (Trope et al., 2007). Although these processes are highly relevant for understanding travel-related judgments, their operation within mobile booking environments remains underexplored. Transportation options differ naturally in perceived immediacy—for instance, flights are often associated with shorter temporal expectations than ferry travel—and destinations vary in their sense of social closeness, yet little empirical work has examined how such distance cues interact with message framing in this setting.

Mobile users often navigate booking decisions while juggling multiple tasks or experiencing some degree of cognitive load. Prior work on limited cognitive resources suggests that when mental capacity is strained, individuals become more reliant on intuitive, shortcut-based judgments rather than deliberative analysis (Vohs & Faber, 2007; Baumeister & Vohs, 2007). Yet it is still unclear whether such cognitive demands intensify or diminish the combined influence of psychological distance cues and message framing—an issue that calls for further empirical clarification.

Addressing these unresolved issues, the present study examines how the type of transportation, country-to-country relational cues, and differences in cognitive-resource

availability jointly influence consumers' responses to gain- and loss-framed promotional messages within mobile cross-border booking environments. Drawing on insights from Construal Level Theory and the framing literature, this research explores the following question:

whether air and ship travel naturally evoke different psychological-distance perceptions that make loss- or gain-framed messages more compelling;

how cues signaling temporal and social proximity or distance jointly influence message interpretation; and

whether limitations in cognitive resources alter the effectiveness of framing in these contexts.

By tackling these issues, the current research advances theoretical perspectives on psychological distance and framing, while also providing practical guidance for crafting more effective promotional messaging in international travel platforms.

This research provides the first evidence that the type of transportation itself serves as a naturally embedded cue to psychological distance within mobile reservation settings, thereby broadening framing studies beyond differences in message phrasing. Because mode information is already integrated into booking interfaces, it can influence perceived distance without requiring any additional manipulation, offering a highly practical mechanism for enhancing the persuasive impact of promotional messages.

Travel applications rely heavily on push alerts, embedded banner messages, and dynamically generated discount prompts, yet the influence of these communications may shift depending on the transportation mode that shapes users' initial focus. Because mode information is an inherent and unalterable component of the app interface, it can be paired with framing techniques at minimal cost, allowing platforms to deliver personalized messages that naturally align with the user's situational context.

## **2. Literature Review**

### **2.1. Psychological Distance and Construal Level**

distance captures how removed or close a person feels to an event or target, and it is commonly discussed in terms of temporal, spatial, and social dimensions (Liviatan et al., 2008; Trope & Liberman, 2010). The present research centers on social distance, which reflects perceived similarity between oneself and another entity (Trope et al., 2007). Typically, people experience greater social closeness when they believe others resemble them in attributes such as age, personality, or gender, whereas reduced similarity leads to perceptions of greater social separation.

Construal level theory proposes that low levels of

psychological distance prompt people to interpret information in a concrete, detail-sensitive manner and to rely more heavily on intuitive or affective reactions (Fujita et al., 2008; Ayduk & Kross, 2010). Conversely, when distance is perceived as high, individuals tend to adopt more abstract representations of events and engage in reasoning that emphasizes broader (Eyal et al., 2008), situation-level attributes, resulting in more systematic and deliberative judgments (Eyal et al., 2009).

Psychological distance shapes how people perceive situations, experience emotions, and form judgments (Chandran & Menon, 2004). Prior studies indicate that increases in temporal, spatial, or social distance reduce the sense of personal relevance (Petty et al., 1981), which can in turn diminish perceived connectedness, threat, or the seriousness of negative outcomes (Ahn et al., 2019; Trope & Liberman, 2010). Emotional responses are also sensitive to variations in distance. Individuals typically react more intensely when imagining an event happening to themselves rather than to someone else (Lerner et al., 2015; Davis et al., 2011), and lower-level construal has been shown to heighten negative affective reactions. Moreover, emotional experiences become more detailed and concrete under low-distance conditions (Eyal et al., 2004; Lerner et al., 2015). Eyal et al. (2004) further found that people adopt more explicit pro-con attitudes toward targets that feel psychologically close.

Psychological distance plays an important role in how individuals categorize and make sense of social targets. In particular, social distance reflects the extent to which another person is perceived as similar to oneself (Son et al., 2014). When a target is experienced as socially close, it is more likely to be perceived as part of one's in-group, whereas greater perceived distance increases the tendency to classify others as belonging to an out-group (Trope & Liberman, 2010). As social distance increases, people tend to rely on coarse and rigid social categories—such as describing others simply as “college students in their twenties”—rather than recognizing them as individuals with distinctive characteristics (Fiske et al., 1987). This categorical processing becomes especially pronounced when psychological distance is high, leading to simplified and stereotypical interpretations of others (Rabbie & Horwitz, 1988).

By contrast, when social distance is low, judgments tend to be more differentiated and personalized. Socially proximal targets are evaluated in terms of their specific traits, shared values, or relational qualities, such as being seen as “a friend with similar interests” rather than as a generic group member (Amagai, 1996). Reduced social distance also facilitates emotional resonance and interpersonal trust, making individuals more willing to empathize with others they perceive as close (Kuwamura, 2009). Conversely,

greater psychological distance weakens these interpersonal bonds, increasing the likelihood that others are excluded from one's in-group and reinforcing symbolic boundaries between the self and socially distant targets (Fujii, 2004).

According to construal level theory, the level at which individuals construe a target or event—namely, the degree to which they mentally represent it—can influence their judgments (Liberman & Trope, 1998). Construal level is also closely related to psychological distance from the target (Trope & Liberman, 2003) as well as individuals' mindsets (Liberman et al., 2002). Psychological distance refers to the subjectively perceived distance between oneself and a target, the here, and the now (Trope & Liberman, 2003), and it encompasses not only physical and temporal distance (Todorov et al., 2007) but also probabilistic, social, and hypothetical distance (Liberman et al., 2007).

When a target is perceived as psychologically distant, individuals are more likely to think about it in abstract terms, emphasizing its core purpose, idealized meaning, or overarching goals. By contrast, when a target feels psychologically close, people tend to focus on practical details and feasibility, adopting a means-oriented mode of thinking (Liberman & Trope, 1998; Vasquez & Buehler, 2007). For instance, in considering the behavior of “locking a door,” a near-term temporal frame such as “tomorrow” encourages attention to specific actions involved in the task, such as inserting and turning a key. In comparison, when the same behavior is imagined in a more distant future—such as “next year”—individuals are more inclined to think about the broader objective of the action, such as ensuring safety or protecting one's home.

In a similar vein, people operating at a higher level of construal tend to assign greater importance to the symbolic value and desirability of a target, prioritizing why an action or outcome matters. Conversely, those engaging in lower-level construal place greater emphasis on concrete implementation issues and practical constraints, basing their evaluations on what is workable and how it can be achieved (Baskin et al., 2014).

These differences in construal level influence the aspects to which individuals direct their attention and, in turn, can systematically affect how they perceive the benefits and risks associated with a target (Raue et al., 2018). For example, one study found that participants primed with an abstract mindset adopted riskier strategies in the Balloon Analogue Risk Task in order to obtain higher rewards, because they focused more strongly on the advantages of the task (Lermer et al., 2015). Conversely, participants primed with a concrete mindset estimated both objective (e.g., the probability that someone in Germany would die from a specific cause within one year) and personal mortality risks to be higher than did participants in the abstract-mindset or control conditions (Lermer et al., 2016).

## 2.2. Framing Effect and Construal Level Theory

Prospect theory demonstrated through experimental evidence that expected utility theory—based on rationality—fails to accurately reflect real human decision-making. The theory proposed an alternative explanation showing that individuals tend to exhibit risk-averse behavior in the gain domain, choosing a certain gain even when its expected value is lower than that of a probabilistic option, while in the loss domain they tend to exhibit risk-seeking behavior, choosing a probabilistic loss even when its expected value is worse than that of a certain loss. Although the term “framing” does not explicitly appear in prospect theory, the process of constructing simple representations for evaluating and analyzing gains or losses implies the possibility that framing effects are at work (Kahneman & Tversky, 1979).

Prior work has shown that the way a decision problem is framed can lead individuals to choose very different options (Tversky & Kahneman, 1981). In the classic Asian disease scenario, participants shifted their preferences depending on whether the outcomes were described in positive terms (lives saved) or negative terms (lives lost), demonstrating a robust reversal in choice patterns.

However, directly applying prospect-theoretic principles to experimental framing research presents practical challenges. Prospect theory explains departures from rational choice using mathematically specified probabilities and quantified outcomes, but in studies examining differences in message effectiveness between gain- and loss-framed communications, it is difficult to manipulate framing intensity in a probabilistic or numerically precise manner. As a result, developing more refined and systematically controllable framing manipulations remains an important methodological task for future research.

In the study, the fact that the positive/negative framing manipulation does not achieve logical equivalence—because the direction differs though the intended strength is similar—indicates that the framing used corresponds to emphasis framing. When framing is broadly categorized into two types, equivalence framing refers to the use of logically equivalent yet linguistically distinct expressions, whereas highlighting particular salient elements, core features, or selected attributes belongs to emphasis framing. Although emphasis framing has been criticized for conceptual ambiguity and for encroaching upon the distinct domain of framing effects (Scheufele & Iyengar, 2016), some argue that because equivalence framing is difficult to implement in real-world contexts, researchers should instead focus on refining emphasis framing as a pragmatic solution (Leeper & Slothuus, 2018).

Kahneman and Tversky (1984), in the course of developing prospect theory, used the description of

outcomes or events interchangeably with framing, arguing that “a change of wording” produces framing effects. Although they suggested that prospect theory could be applied to policy decisions such as presidential choices, their starting point was a quantitative approach showing that people’s choices do not rely on probabilities. As prospect theory evolved into cumulative prospect theory, additional theoretical advancements were made to allow the model to apply to outcomes involving a larger number of possibilities (Tversky & Kahneman, 1992). Cumulative prospect theory posits that even in the gain domain, risk-seeking tendencies may emerge depending on the probability level of losses. This opens the possibility that the effects of framing may reverse depending on the level of potential loss or risk embedded in a policy. This development in prospect theory served as the starting point for the present study’s attempt to examine the differential effects of positive and negative framing in the context of nuclear energy issues, which inherently involve potential risks.

A substantial body of prior research supports the hypothesis that the relative effectiveness of positive versus negative framing varies depending on the nature of the advocated target, the level or type of risk associated with the recommended behavior, or the probability of loss. In an experiment on cervical cancer screening—an inherently diagnostic behavior—messages manipulating the perceived severity of risks associated with failing to detect cancer early showed that loss-framed messages were more persuasive when the perceived risk was high, whereas gain-framed messages were more persuasive when the risk was manipulated to be lower (Rivers et al., 2005). Similarly, research comparing messages encouraging condom use versus messages urging individuals to negotiate condom use with a partner found that gain framing was more persuasive for the lower-risk behavior (condom use), whereas loss framing was more effective for the higher-risk behavior (negotiating with a partner) (Kiene et al., 2005).

Furthermore, a meta-analysis of 136 experiments concluded that the relative advantage of positive versus negative framing cannot be explained solely by the valence emphasized in the message. Instead, it depends on factors such as whether the recommended behaviors vary qualitatively or quantitatively in risk, and whether multiple risky events are involved (Kühberger, 1998).

As reviewed above, most studies on message framing have focused either on identifying the superior effects of one framing direction over the other or on examining the moderating variables that influence framing effects. In other words, although many studies have investigated how positive versus negative message framing and consumers’ perceptual states or characteristics regarding the framed target influence framing effects, relatively few studies have examined factors—other than the positivity or negativity of

the frame—that shape consumers’ perceptions of the framed target. In this regard, the study by Chandran and Menon (2004), which employed psychological distance as a factor influencing perceptions of the framed target, demonstrated that the effects of framing differ depending on the temporal dimension of psychological distance.

Research on psychological distance has expanded significantly since the seminal work of Liberman and Trope (1998) on temporal distance. Various dimensions of psychological distance (e.g., temporal, spatial, social distance) influence mental construal, which in turn guides individuals’ predictions, evaluations, and behaviors (Trope et al., 2007). When individuals perceive an event or object to be psychologically distant, high-level construals occur; when they perceive it to be close, low-level construals occur. High-level construals are abstract, schematic, and decontextualized representations that extract the essence from available information (Trope & Liberman, 2003), whereas low-level construals are concrete, contextualized representations that incorporate incidental details of the event (Trope et al., 2007). For example, when observing two children playing catch, individuals engaging in low-level construal think about specific details such as the children’s ages, the color of the ball, or the outside temperature, whereas individuals engaging in high-level construal simply think, “That looks fun” (Trope et al., 2007).

In research conducted within the loss domain of health risks, Chandran and Menon (2004) proposed that elements related to psychological distance can be used to manipulate the concreteness of risk information, which subsequently affects individuals’ risk perceptions and behavioral intentions. Their study showed that seemingly neutral temporal reference periods—such as “a day” versus “a year”—induce different levels of proximity and concreteness, and that manipulations of temporal frame (daily vs. yearly) and temporal distance (tomorrow vs. next year) operate in similar ways. In their experiment, within negatively framed health messages, a “daily” frame was more effective than a “yearly” frame.

The explanation offered was that in negative outcome framing, a “daily” frame makes the health threat appear more concrete, proximal, and ominous. In contrast, within positive outcome framing, a “daily” frame makes “avoidance of threat” feel closer, inducing slight threat perception, whereas a “yearly” frame makes “avoidance of threat” feel more distant, rendering the health threat more abstract and decontextualized, thus eliciting little to no sense of threat. Therefore, in positive framing, a “yearly” frame is more effective. This finding is consistent with previous research showing that distant-future events are evaluated more simply and positively than near-future events (Liberman et al., 2002), and with the “affect-as-information model,” which argues that positive emotions are evaluated

simply (Mitchell et al., 1997), whereas negative emotions are evaluated concretely (Patrick et al., 2007).

However, Chandran and Menon (2004) noted that although their research demonstrates that framing effects differ depending on temporal frame, the study was conducted in the loss domain (health risks). Thus, negative framing was more effective than positive framing because the target of the frame—heart disease—already contained inherent risk. This aligns with extensive prior research on health behaviors, which frequently finds that loss-framed messages are more persuasive than gain-framed messages when the content involves health threats (Block & Keller, 1995).

The air–ship distinction generalizes beyond the scenario because transportation speed, duration, and predictability systematically shape perceived psychological distance (Trope & Liberman, 2010). Air travel, being faster and more time-compressed, evokes a proximal construal, whereas ship travel, with slower and longer duration, evokes a distal construal. When a social-distance cue is added, these distance signals can reach a ceiling, limiting the incremental influence of framing. Thus, loss framing should be more persuasive under the proximal mode (air), gain framing under the distal mode (ship), and this mode × framing effect should weaken when social-distance cues further elevate perceived distance.

### 2.3. Cognitive Depletion and Heuristic Judgment

Cognitive resources refer to the mental capacities individuals possess (Baumeister & Vohs, 2007) - also called self-regulation resources - that enable them to consciously modify their thoughts and behavioral responses in the process of pursuing specific goals or ideals (Vohs & Schmeichel, 2003). The degree to which cognitive resources are depleted varies depending on the situation in which they are used as well as the complexity of the information or task to be processed, and individuals also differ in the amount of resources they possess. For example, solving difficult math problems or performing demanding tasks requires a greater amount of cognitive resources, whereas completing simple addition or engaging in an easy task requires far fewer resources. Likewise, in decision-making situations, the amount of required cognitive resources increases when information is complex or when the number of alternatives is large.

In consumer decision-making, individuals with sufficient cognitive resources are able to process information adequately and make purchase decisions through rational evaluation. However, when cognitive resources are limited, consumers tend to consider only a small number of alternatives and rely on heuristic decision making (Vohs et al., 2008). Assuming that cognitive

resources are limited, the self-regulatory strength model—which likens the depletion of cognitive resources to the depletion of physical strength after muscle use—can be applied to explain these processes (Agrawal & Wan, 2009). Fatigue induced by resource use varies depending on the extent of depletion; when resources are depleted, fatigue is greater than when resources remain intact, reducing self-control and impairing performance on subsequent tasks (Wan & Agrawal, 2011).

In the existing literature on cognitive resource regulation, many studies on resource depletion have examined contexts such as dieting or smoking cessation, where individuals pursue clear goals through self-control. From the perspective of situational demands on cognitive resources, resource depletion has been observed in behavioral control tasks such as hand immersion in cold water, gripping a hand dynamometer, and holding physically demanding positions, as well as in cognitively demanding tasks such as solving complex math problems or identifying specific letters within English passages (Muraven et al., 2006). Resource depletion also occurs in situations involving mental control, such as effortful concentration or suppressing and redirecting thoughts (Baumeister & Newman, 1994); emotional control, such as suppressing or exaggerating emotions (Vohs & Heatherton, 2000; Baumeister et al., 1998); and restraint of appetite or resistance to temptations (Vohs & Heatherton, 2000).

When individuals fail to regulate their resources, negative emotions increase, logical reasoning and comprehension decline (Schmeichel et al., 2003), and heuristic information processing increases (Wheeler et al., 2007; Vohs & Faber, 2007). Depleted individuals also show greater impulsive behavior, higher tendencies for overspending, and increased preference for hedonic products (Baumeister, 2002).

Cognitive resources refer to the mental capacities individuals possess—also called self-regulation resources—that enable them to consciously modify their thoughts and behavioral responses in the process of pursuing specific goals or ideals (Vohs & Schmeichel, 2003). The degree to which cognitive resources are depleted varies depending on the situation in which they are used as well as the complexity of the information or task to be processed, and individuals also differ in the amount of resources they possess. For example, solving difficult math problems or performing demanding tasks requires a greater amount of cognitive resources, whereas completing simple addition or engaging in an easy task requires far fewer resources. Likewise, in decision-making situations, the amount of required cognitive resources increases when information is complex or when the number of alternatives is large.

In consumer decision-making, individuals with sufficient cognitive resources are able to process

information adequately and make purchase decisions through rational evaluation. However, when cognitive resources are limited, consumers tend to consider only a small number of alternatives and rely on heuristic decision making (Vohs et al., 2008). Assuming that cognitive resources are limited, the self-regulatory strength model—which likens the depletion of cognitive resources to the depletion of physical strength after muscle use—can be applied to explain these processes. Fatigue induced by resource use varies depending on the extent of depletion; when resources are depleted, fatigue is greater than when resources remain intact, reducing self-control and impairing performance on subsequent tasks (Wan & Agrawal, 2011).

In the existing literature on cognitive resource regulation, many studies on resource depletion have examined contexts such as dieting or smoking cessation, where individuals pursue clear goals through self-control. From the perspective of situational demands on cognitive resources, resource depletion has been observed in behavioral control tasks such as hand immersion in cold water, gripping a hand dynamometer, and holding physically demanding positions, as well as in cognitively demanding tasks such as solving complex math problems or identifying specific letters within English passages (Muraven et al., 2006). Resource depletion also occurs in situations involving mental control, such as effortful concentration or suppressing and redirecting thoughts (Baumeister & Newman, 1994); emotional control, such as suppressing or exaggerating emotions (Vohs & Heatherton, 2000); and restraint of appetite or resistance to temptations (Vohs & Heatherton, 2000).

When individuals fail to regulate their resources, negative emotions increase (Schmeichel et al., 2003), logical reasoning and comprehension decline (Schmeichel et al., 2003), and heuristic information processing increases (Wheeler et al., 2007). Depleted individuals also show greater impulsive behavior, higher tendencies for overspending, and increased preference for hedonic products (Vohs & Faber, 2007).

### **3. Study 1**

#### **3.1. Process**

Study 1 was undertaken to develop a more detailed understanding of how consumers interpret and evaluate discount promotions delivered through mobile booking platforms, particularly in situations where the nature of the transportation mode and the framing of the promotional message may interact to shape psychological responses. The study was motivated by a broader theoretical concern within the literature on construal-level theory: namely, that psychological distance embedded in different consumption

contexts can fundamentally alter how individuals construe persuasive information, process message content, and ultimately form judgments. Building on this rationale, the investigation pursued two overarching questions.

Participants were undergraduate students enrolled in business-related courses, and they received course credit as compensation for their participation. The framing stimuli used in the experiments were presented in two versions: a gain-framed message ('you gain a benefit') and a loss-framed message ('you prevent the loss of an equivalent benefit'). The stimuli were selected through a preliminary qualitative interview process to ensure clarity and appropriateness before the main studies.

The first question asked whether loss-framed messages—those emphasizing the negative consequences of not obtaining a discount—would provoke stronger reactions in the context of airline ticket purchases. Air travel is often associated with immediacy, higher stakes, and relatively urgent decision-making, which may heighten consumers' sensitivity to the possibility of incurring losses. In contrast, the study examined whether gain-framed messages—those highlighting the positive outcomes of receiving a discount—would be more persuasive in scenarios involving ship travel, which typically carries a different psychological meaning, including longer planning horizons and a more leisurely, less urgent decision context. Such conditions may predispose consumers to respond more favorably to benefit-focused messaging.

The second question explored whether these possible differences in message effectiveness could be attributed to systematic variations in psychological distance that distinguish air travel from ship travel. From a construal-level perspective, psychologically close events tend to evoke lower-level, concrete mental representations that emphasize specific details and immediate implications. Conversely, psychologically distant events encourage higher-level, abstract construals centered on overarching meanings and broader interpretations. Air travel, widely perceived as fast, immediate, and time-sensitive, may therefore elicit detail-oriented processing, whereas ship travel—often imagined as slower, more distant, and less time-pressured—may activate more abstract cognitive processing. Study 1 sought to determine whether these theoretically grounded distinctions would manifest in participants' responses to framed promotional content.

To investigate these hypotheses, a  $2 \times 2$  between-participants factorial design was employed. The first independent variable was the transportation mode, operationalized as airplane versus ship. The second independent variable involved the framing strategy of the promotional message within a mobile reservation application, contrasting gain-oriented language with loss-oriented phrasing. The principal dependent variable

consisted of participants' evaluations of the promotional message, measured as their subjective perception of its persuasiveness, attractiveness, or overall favorability. Conducting the study online ensured consistent presentation of stimuli while reducing environmental variability that might otherwise influence responses.

After providing informed consent, participants were first presented with an introductory passage explaining the general purpose of the research and outlining how they should navigate the questionnaire. Subsequently, they encountered an experimental scenario tailored to the condition to which they had been randomly assigned. In this scenario, participants were asked to imagine using a mobile booking app and encountering a notification indicating that purchasing an airline or ship ticket would either allow them to obtain a 50% discount coupon for a future trip or, alternatively, that failing to obtain such a coupon could result in paying 50% more. This dual manipulation of transportation context and message framing enabled a systematic comparison of how positive versus negative messaging influences consumer attitudes under varying psychological conditions. Immediately after reading the promotional text, participants rated the degree to which they found the message compelling or appealing. The gain-framed version was closely modeled on authentic promotional wording used by transportation service providers, whereas the loss-framed version was carefully constructed for experimental symmetry.

The next phase of the study introduced a construal-level assessment intended to provide a behavioral indicator of participants' cognitive orientation. Participants completed a visual comparison task involving two sequential illustrations. The first image depicted a community worker offering food to a woman wearing a dress. The second image portrayed a woman in similar attire feeding a squirrel. Participants were asked to choose which element in the second image they believed was most similar to the woman shown in the first. Selection of the woman indicated reliance on perceptual, surface-level attributes, reflecting a lower-level construal. Selection of the squirrel indicated an emphasis on relational or thematic meaning—specifically, the shared idea of receiving assistance—reflecting a higher-level, more abstract construal. This task allowed researchers to infer participants' dominant construal mode in a nonverbal, psychologically sensitive manner.

In addition to the main experimental variables, the survey incorporated a range of covariates to capture potential individual differences. Participants reported how frequently they traveled by air or ship, how involved or engaged they felt with each transportation mode, how often they used mobile booking applications, and whether they had previously participated in discount or promotional programs. These measures provided valuable contextual

information, enabling more nuanced interpretation of attitudinal responses and helping to rule out alternative explanations for observed effects.

The survey concluded with standard demographic questions, after which participants were thanked for their time and contribution. Upon completion of data collection, the dataset was organized and prepared for statistical analyses aimed at testing the study's hypotheses and uncovering patterns consistent with the broader theoretical framework regarding psychological distance, construal level, and message framing.

### 3.2. Results

A two-factor analysis of variance (ANOVA) was conducted to provide a comprehensive examination of how transportation mode and message framing jointly shape consumers' responses to mobile app-based promotional messages. Rather than merely comparing mean differences, this analytical approach allowed us to determine whether the persuasive power of message framing is contingent upon the broader booking context in which the message is encountered. Specifically, the analysis tested the proposition that loss-oriented messages—those emphasizing the negative financial consequences of not obtaining a discount—would be more influential when individuals consider purchasing airplane tickets, whereas gain-oriented messages—those highlighting the benefit of receiving a discount—would be more persuasive when individuals consider reserving ship travel.

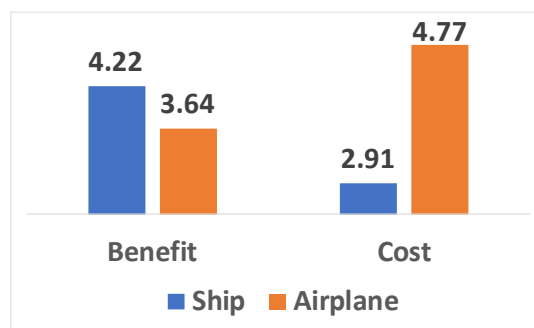
Before proceeding with the hypothesis tests, a manipulation check was conducted to assess whether the experimental manipulations were perceived as intended by participants. First, participants rated the psychological proximity of the two transportation modes. They viewed air travel as substantially more psychologically close ( $M = 3.40$ ) compared to ship travel ( $M = 6.48$ ), producing a large and statistically robust difference ( $F(1,191) = 104.69, p < .001$ ). This outcome confirms that participants indeed perceived air travel as a context involving immediacy, faster temporal progression, and shorter psychological distance. Second, participants distinguished clearly between the message framings: gain-framed statements ( $M = 6.97$ ) were perceived as delivering markedly greater benefits compared to loss-framed messages ( $M = 4.87$ ), as indicated by another strong effect ( $F(1,191) = 42.74, p < .001$ ). Collectively, these results verify that the manipulations of both transportation mode and message framing successfully created the intended psychological distinctions.

Turning to the primary research question, the ANOVA revealed a significant interaction between transportation mode and message framing ( $F(1,189) = 17.76, p < .001$ , partial  $\eta^2 = .09$ ). This interaction demonstrates that the

persuasiveness of the two message formats is not uniform across contexts; instead, it shifts meaningfully depending on whether the promotional offer concerns air travel or ship travel. When participants evaluated promotional messages for airplane tickets, loss-framed messages ( $M = 4.77, n = 56$ ) produced significantly more favorable evaluations than gain-framed messages ( $M = 3.64, n = 46; p < .001$ ). This pattern suggests that in contexts where speed, urgency, and potential financial consequences may be salient, consumers are especially responsive to information that emphasizes what they stand to lose.

In contrast, when participants evaluated promotions for ship travel, the pattern reversed. Gain-oriented framing elicited more favorable reactions ( $M = 4.22, n = 44$ ) compared to loss-oriented framing ( $M = 2.91, n = 47; p < .001$ ). This shift is consistent with the notion that ship travel, which tends to evoke longer planning horizons and greater psychological distance, may encourage consumers to focus on positive benefits rather than potential losses. A visual representation of this crossover interaction is provided in Figure 1, illustrating that the framing effect cannot be interpreted without considering the transportation context in which the message is embedded.

The construal-level mediator was measured using a similarity judgment item (woman vs. squirrel), consistent with prior studies employing similarity-based high-low construal measures (Trope & Liberman, 2003; Fujita et al., 2008). Nonetheless, the use of a single binary mediator presents limitations in terms of restricted reliability and the analytic challenges associated with non-continuous measures. Although Study 1's design did not allow inclusion of a multi-item CLT scale, future work would benefit from adopting a standardized, multi-item construal measure to capture psychological distance more comprehensively.



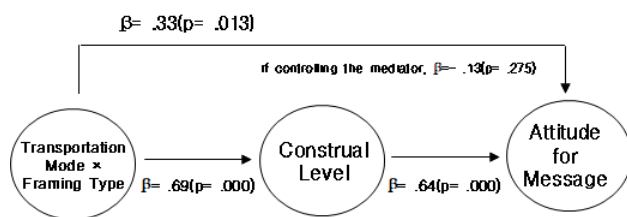
**Figure 1:** Interaction Between Transportation Mode and Message Framing (source: own)

To identify the psychological mechanism underlying this interaction, a mediation analysis was conducted with construal level serving as the mediator. As expected, the combined influence of transportation mode and message framing significantly predicted participants' construal levels

( $\beta = .69$ ,  $t = 5.86$ ,  $p < .001$ ), indicating that different message-context pairings systematically influenced whether individuals adopted a more concrete or abstract mindset. In turn, construal level exerted a strong and statistically significant effect on message evaluations ( $\beta = .64$ ,  $t = 10.57$ ,  $p < .001$ ), demonstrating that individuals' cognitive orientation—whether they processed the scenario in a concrete versus abstract fashion—was closely tied to how persuasive they found the promotional message.

The indirect effect of the interaction term on message attitudes through construal level was significant ( $\beta = .33$ ,  $t = 2.52$ ,  $p < .05$ ), confirming that construal level served as a mediating mechanism linking contextual and message-based factors to attitudinal outcomes. Importantly, once construal level was statistically controlled, the direct effect of the interaction on message attitudes was no longer significant ( $\beta = -.13$ ,  $t = -1.10$ ,  $p = .275$ ). This reduction in significance indicates full mediation, meaning that the impact of the transportation mode  $\times$  message framing interaction on message attitudes is largely transmitted through differences in construal level rather than arising independently from the manipulated variables. This mediation analysis employed a regression-based approach rather than a bootstrapping procedure. Figure 2 sequentially depicts these mediational pathways.

Finally, supplemental analyses were conducted to determine whether individual characteristics related to travel habits or mobile app usage might confound the primary results. Variables such as frequency of use for each transportation mode, level of involvement with each mode, frequency of mobile app usage, and participation in discount programs were entered as covariates. None produced significant effects on the outcome variables (all  $F_s < 1$ ), reinforcing the conclusion that the observed findings are attributable to the experimental manipulations and not to pre-existing behavioral differences among participants.



**Figure 2:** Construal-Level Mediation in Context-Framing Effects (source: own)

Taken together, these results demonstrate a coherent psychological process: the persuasive influence of discount promotions depends both on the contextual meaning of the transportation mode and on the level of mental construal that the message elicits. This underscores the importance of designing promotional messages that align with the

psychological structure of the consumption context, rather than relying on a one-size-fits-all framing strategy.

## 4. Study 2

### 4.1. Process

The purpose of Study 2 was to examine how consumers react to framed promotions in situations where several psychological-distance signals are simultaneously present.

Whereas a substantial body of construal-level theory research has usually examined distance cues in isolation—such as how far an event feels in time, space, or social relevance—far less attention has been given to situations in which these cues converge. Yet, simultaneous distance signals do not simply additively influence cognition; instead, combinations of proximal and distal cues generate unique patterns of mental representation.

Previous findings indicate that introducing a distal cue into a situation that is otherwise experienced as psychologically close typically shifts individuals toward more abstract interpretations. However, layering another distant cue on top of an already remote context produces minimal additional change, suggesting the presence of a ceiling effect for abstraction. Conversely, concrete, detail-based processing is most likely to emerge only when two proximal cues jointly create a strong sense of immediacy and familiarity (Kim et al., 2008). These principles formed the conceptual foundation for Study 2.

Guided by this theoretical reasoning, Study 2 examined whether consumers' appraisal of mobile booking app promotions depends on how the temporal characteristics of a transportation mode combine with the social meaning of the travel destination. We anticipated that loss-framed offers would be especially compelling when both psychological signals point toward closeness—for instance, when the short-term nature of air travel is paired with a destination perceived to be socially near. Under such dual-proximity conditions, individuals are expected to adopt a more concrete construal, heightening their sensitivity to potential losses presented in the message and thereby increasing message impact.

When the transportation mode inherently conveys temporal distance—such as ship travel, which is typically associated with slower movement and a longer sense of duration—the cognitive landscape is different. Because these contexts encourage abstract construal by default, adding a second distant cue (e.g., a socially far destination) is unlikely to appreciably alter consumers' mental processing. As a result, gain-framed messages, which align more naturally with high-level construal, should remain persuasive whether the destination is socially close or

distant.

To empirically test these predictions, Study 2 employed a fully crossed  $2 \times 2 \times 2$  factorial design. Two of the manipulated factors were identical to those used in Study 1: the mode of transportation (airplane vs. ship) and the framing of the promotional message (gain vs. loss). A third variable—social distance—was added to capture perceptions of relational closeness or separation between travelers and the destination country.

To operationalize social distance, participants read one of two short texts about Korea–Japan relations. The distant social-distance condition consisted of historically framed information referencing the colonial era, which reliably heightens perceived intergroup separation. The near-distance condition used a forward-looking narrative describing future cooperation between the two nations, thereby fostering a sense of relational closeness.

To address concerns regarding the realism and familiarity of the social-distance manipulation, we clarified that the narratives describing Korea–Japan relations were highly realistic for Korean participants and that the historical and future-oriented scenarios elicited reliably distinct perceptions of social distance. A preliminary pretest confirmed that Korean respondents demonstrated strong familiarity with the Korea–Japan context, and supplemental analyses showed that variations in familiarity had only minimal influence on the outcome measures.

Once the manipulation was introduced, the subsequent steps—scenario presentation, outcome assessments, and response collection—followed the same protocol as Study 1 to preserve procedural uniformity among the studies.

## 4.2. Results

To verify that all experimental manipulations operated as intended, we conducted a series of manipulation checks designed to confirm whether participants accurately perceived the differences embedded in each condition.

First, the analysis showed that participants associated ship travel with a substantially greater sense of psychological distance compared to air travel. Mean scores indicated that traveling by ship ( $M = 4.64$ ) elicited a stronger perception of remoteness than traveling by airplane ( $M = 3.28$ ), a difference that proved to be highly significant ( $F(1, 266) = 32.41, p < .001$ ). This result aligns with prior construal-level theory research, which has consistently demonstrated that slower and more time-consuming transportation modes naturally evoke feelings of temporal and experiential distance.

Second, the manipulation of social distance through narratives about Korea–Japan relations functioned as expected. Participants exposed to the historically framed scenario—highlighting past political tensions—perceived

the destination country as markedly more distant ( $M = 5.88$ ) than did those who read the future-oriented, cooperation-focused scenario ( $M = 2.95$ ). The statistical test confirmed a robust effect ( $F(1, 266) = 132.29, p < .001$ ). This strong distinction indicates that the social-distance manipulation effectively activated either a sense of long-standing separation or relational closeness depending on the framing provided.

Third, participants' evaluations of message framing further validated the manipulation. Consistent with the intended contrast, respondents judged gain-framed promotional messages ( $M = 4.47$ ) as emphasizing benefits more convincingly than loss-framed messages ( $M = 3.71$ ), a difference that reached statistical significance ( $F(1, 266) = 10.196, p < .01$ ). This pattern mirrors long-standing findings in framing research showing that gain-oriented content more readily highlights advantages, whereas loss-oriented messages tend to foreground potential risks or missed opportunities.

Collectively, these three checks confirm that the experimental manipulations successfully shaped participants' perceptions across all target variables.

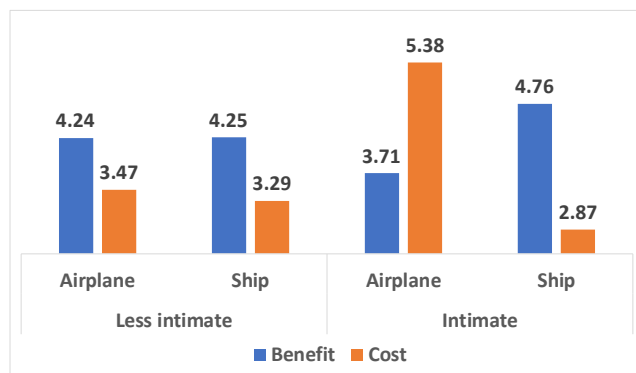
After establishing the validity of the manipulations, we proceeded to examine how these layered cues of psychological distance jointly influenced participants' evaluations of promotional messages in the mobile application. To address this question, a three-way ANOVA was conducted using transportation mode, social distance, and message framing as factors. The analysis identified a notable three-way interaction on message attitude ( $F(1, 260) = 13.74, p < .001, \text{partial } \eta^2 = .05$ ), highlighting that framing effects are contingent on how transportation mode and social distance together structure the psychological context in which promotional messages are processed.

As anticipated, air travel produced perceptions of psychological closeness—but only when the destination country was presented as socially near. Under this combination of proximal cues, participants were more likely to adopt a concrete, low-level construal, focusing on specific details and potential negative consequences. In this psychologically close context, loss-framed messages gained notable persuasive strength and were evaluated substantially more favorably than gain-framed messages ( $M = 5.38$  vs.  $3.71$ ;  $F(1, 260) = 11.96, p < .001$ ). These findings demonstrate that the persuasive impact of loss framing is highly dependent on contextual signals that compress psychological distance.

In contrast, ship travel consistently induced a sense of psychological distance regardless of participants' perception of social distance toward the destination country. The inherently slow and extended nature of ship travel appears to promote abstract, high-level construals across the board, minimizing the relevance of nearer or farther social cues.

Consequently, gain-framed messages—whose structure aligns of naturally with abstract thinking—were preferred over loss-framed alternatives in every experimental condition. This pattern reinforces the idea that distal psychological contexts encourage individuals to think broadly and focus on positive, value-oriented gains rather than specific losses.

Figure 3 provides a detailed illustration of these interaction patterns, visually depicting how the combined distance cues systematically shaped message evaluations across all conditions.



**Figure 3:** The Effect of Perceived Closeness to the Destination Country (source: own)

## 5. Study 3

### 5.1. Process

In Study 3, the focus was on examining whether the earlier transportation–framing interaction varies when participants evaluate messages under differing levels of cognitive capacity. Building on findings from the earlier studies, this experiment aimed to clarify the underlying psychological mechanism that gives rise to the distinct effectiveness of different message frames. In particular, the study examined whether the enhanced persuasiveness of loss-framed messages in the air-travel context—a condition that conveys psychological proximity—and the stronger impact of gain-framed messages in ship travel—a context associated with psychological distance—can be attributed to a resource-intensive, systematic reasoning process. Alternatively, the study considered the possibility that these effects might instead stem from rapid, low-effort heuristic judgments that require minimal engagement of cognitive resources. By probing this question, Study 3 sought to determine not only whether the interaction exists but also why it emerges.

To address these objectives, the experiment adopted a  $2 \times 2 \times 2$  factorial structure that allowed for the simultaneous

examination of multiple psychological influences. The first experimental factor was the type of transportation, operationalized through two contrasting conditions: air travel, characterized by speed and familiarity, and ship travel, typically perceived as slower and more distant. The second factor was message framing, manipulated by presenting participants with either a gain-oriented version of a promotional message or a loss-oriented alternative. The third factor centered on the availability of cognitive resources. This was manipulated by assigning participants either to a cognitive-depletion condition—where they were required to memorize a nine-digit number while responding to the questionnaire—or to a no-load condition, in which participants completed the task without any secondary cognitive demand. This design enabled the study to isolate whether message-processing patterns differ when individuals experience cognitive strain versus when they have full mental capacity.

Study 3 utilized a questionnaire modeled after that of Study 1, maintaining consistency in structure and response assessment across the experiments. Items were carefully designed to measure participants' perceived psychological distance, their judgments of the promotional messages, and the degree to which they found each frame compelling. Maintaining such methodological consistency ensured that any observed differences across conditions could be attributed to the experimental manipulations rather than variations in measurement instruments. Through this approach, Study 3 provided a more nuanced understanding of how cognitive effort interacts with psychological distance and message framing during consumer decision-making.

### 5.2. Results

To rigorously assess whether each experimental manipulation operated as intended, we implemented an extensive series of diagnostic evaluations focused specifically on the effectiveness of the cognitive-resource manipulation and the clarity with which participants perceived the remaining experimental distinctions. The first assessment centered on the cognitive-depletion procedure. Participants who were required to memorize a nine-digit sequence while completing the survey reported markedly higher levels of irritation and fatigue ( $M = 4.94$ ) compared with those in the no-load condition ( $M = 2.94$ ). This difference was corroborated by a highly significant statistical effect ( $F(1, 335) = 186.21, p < .001$ ), providing strong empirical support that the depletion manipulation successfully imposed a measurable cognitive burden. These results suggest that the task meaningfully reduced participants' available attentional and processing resources, thereby validating the manipulation's intended purpose.

To address reviewers' concerns regarding the memory-

recall task, we noted that participants were informed that successful completion of the nine-digit recall would enter them into a prize lottery, which helped maintain motivation and engagement during the cognitive-load manipulation. Additionally, supplemental analyses examining response consistency and response-time patterns indicated that data quality did not significantly deteriorate under cognitive-load conditions, suggesting that the depletion task did not compromise the reliability of participants' evaluations.

A second manipulation check examined the psychological distance induced by transportation mode, focusing on participants' perception of temporal distance. Although the scenarios described identical physical travel distances, respondents nonetheless interpreted ship travel as involving a substantially longer perceived duration ( $M = 5.47$ ) compared with air travel ( $M = 3.51$ ). This pattern, confirmed by a strong statistical test ( $F(1, 335) = 199.49, p < .001$ ), is consistent with prior research showing that slower, less predictable modes of transportation elicit heightened impressions of temporal extension. The magnitude of this effect indicates that the transportation manipulation reliably evoked differentiated psychological-distance cues, thereby validating the theoretical framework underlying the study.

The final manipulation check assessed whether participants distinguished between the evaluative emphasis of gain- versus loss-framed promotional messages. As anticipated, participants rated gain-framed messages ( $M = 4.64$ ) as more persuasive in communicating benefits than loss-framed messages ( $M = 3.38$ ). This difference was again statistically significant ( $F(1, 335) = 76.07, p < .001$ ), confirming that the framing manipulation elicited the intended perceptual distinctions. Collectively, the three manipulation checks provide convergent evidence that the independent variables were successfully implemented and that participants encoded the manipulations as theoretically intended.

Having established the robustness of the manipulations, we proceeded to examine whether the influence of message framing across transportation types varied as a function of cognitive-resource availability. A three-way ANOVA incorporating cognitive-resource condition, transportation mode, and framing type revealed no significant three-way interaction on message evaluations within the mobile-application context ( $F(1, 329) = .01, p = .906, \text{partial } \eta^2 = .00$ ). The absence of this effect suggests that cognitive-resource depletion does not moderate the manner in which consumers process the interaction between psychological distance cues and message framing.

Although cognitive resources did not exert a higher-order moderating effect, the analysis revealed a strong and reliable two-way interaction between transportation mode and message framing ( $F(1, 329) = 36.18, p < .001$ ). Strikingly, this pattern persisted across both the depletion

and no-load conditions. Whether cognitively strained or not, participants consistently evaluated loss-framed promotions more favorably when presented alongside air-travel scenarios and judged gain-framed promotions as more compelling in the context of ship travel. This invariance across cognitive-resource conditions is theoretically meaningful: it implies that participants rely not on effortful, systematic reasoning but on a rapid, intuitive interpretive mechanism when evaluating framed messages paired with transportation modes.

Taken together, these findings strongly indicate that the observed "fit" between psychological distance and message framing reflects an automatic heuristic process. Rather than engaging in deliberative analysis, individuals appear to unconsciously map loss frames onto psychologically proximal contexts and gain frames onto psychologically distal contexts. The stability of these effects—despite substantial differences in available cognitive resources—suggests that such heuristic matching processes operate independently of resource-intensive cognitive engagement. A graphical representation of these relationships is provided in Figure 4, illustrating the robustness and consistency of the interaction across experimental conditions.

Rather than concluding that the framing effects necessarily reflect purely automatic heuristic processing, the discussion was revised to acknowledge alternative explanations and the study's statistical power constraints. Although the interaction between transportation mode and framing remained stable across cognitive-load conditions, this pattern does not definitively rule out the possibility that more subtle, resource-dependent processes may also contribute to message evaluation. Given that the cognitive-load manipulation and sample size may limit the ability to detect small moderation effects, the findings should be interpreted as suggestive rather than conclusive, calling for future research using diverse depletion paradigms and larger samples to more rigorously test the boundary conditions of the proposed mechanism.

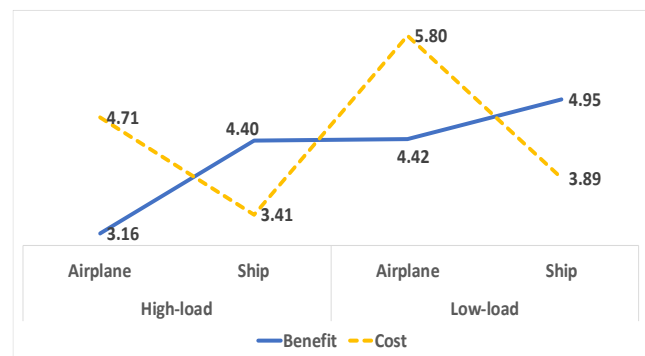


Figure 4: Stability of Framing Effects Across Cognitive Resource Conditions (source: own)

## 6. Conclusions

### 6.1. Summary

This research presents a series of three experimental investigations that explore how people evaluate promotional messages in mobile reservation settings when different forms of psychological distance intersect with message framing strategies. Instead of focusing solely on message content, the studies examine how consumers' interpretations shift depending on the perceived distance associated with various travel modes and the cognitive processes activated under different conditions.

The first study demonstrates that individuals interpret air and sea travel in fundamentally different psychological terms. Air travel tends to evoke a sense of immediacy, whereas sea travel is perceived as more remote. These contrasting impressions guide how people react to promotional messages: messages stressing potential negative outcomes resonate more strongly in situations that feel psychologically close, while messages highlighting positive consequences carry greater weight when the context feels distant. Differences in construal level fully account for these effects, indicating that transportation mode shapes how abstractly or concretely consumers think about the offer.

The second study extends this reasoning by adding a social-distance dimension derived from narratives about relations between two countries. When both temporal and social signals point toward closeness, participants show a stronger inclination toward messages framed around potential losses. When distance cues accumulate—as with sea travel—messages centered on gains retain their persuasive strength regardless of interpersonal proximity. These findings reveal that distance cues do not simply add together; their combination produces distinctive mental representations that guide message interpretation.

The third study asks whether these effects depend on the cognitive resources people have available. Participants either completed the task under conditions designed to tax their mental capacity or responded without any additional cognitive burden. Results show that the core interaction between travel mode and framing remains unchanged across both groups. The stability of this pattern indicates that consumers rely on fast, intuitive associations rather than resource-demanding reasoning when evaluating framed messages in travel contexts.

Across all three studies, the findings demonstrate that the impact of promotional messages is shaped primarily by the psychological environment in which they are encountered. Signals derived from transportation mode influence temporal distance, narratives influence perceived social proximity, and together they alter consumers' construal levels and message preferences. The research highlights the

importance of aligning message framing with contextual distance cues and shows that distance-based heuristics exert a powerful influence on decision-making in mobile travel-booking environments.

Rather than interpreting the observed pattern as definitive evidence of automatic heuristic matching, this study highlights distance-framing fit as a plausible explanation while acknowledging potential alternative mechanisms and boundary conditions. We note that contextual factors—such as trip purpose, perceived risk, ticket price, and prior experience with the travel mode—may moderate the strength and direction of the effects. We also outline ethical considerations, particularly the possibility that loss framing may be perceived as fear-based in certain contexts. Finally, we provide a concise practical guide for mobile platforms, suggesting the use of loss framing in psychologically proximal contexts and gain framing in distal contexts, offering actionable implications for improving key performance indicators such as conversion and click-through rates.

### 6.2. Implication

#### 6.2.1. Theoretical Implications

This research advances understanding of how psychological distance shapes promotional message processing across mobile travel-booking contexts by analyzing consumers' responses to framed information presented alongside different transportation options. Rather than relying on traditional laboratory manipulations of distance, the studies demonstrate that transportation modes themselves embed naturally occurring distance cues that meaningfully shift cognitive interpretation. Air travel, which tends to be associated with immediacy and efficiency, prompted participants to think in more concrete terms, while ship travel—often linked with longer durations and slower movement—encouraged a more abstract mental perspective. In this way, the findings extend Construal Level Theory by illustrating that distance can be conveyed through real-world consumption environments rather than only through controlled manipulations.

The work further reveals that psychological distance is multidimensional and does not necessarily operate in a linear or additive fashion. When temporal and social proximity coincide, as shown in Study 2, individuals appear more sensitive to messages that highlight what could be lost. However, when distance signals accumulate, additional cues do not necessarily deepen abstraction; instead, distance effects may plateau. This offers a more nuanced theoretical perspective on how multiple forms of distance jointly influence mental representation and message interpretation.

Finally, the results clarify the cognitive nature of the distance-framing relationship. Study 3 shows that even

when participants' mental resources were constrained, the preference for loss framing in psychologically close settings and gain framing in distant settings remained intact. This suggests that people draw on quick associative processes rather than effortful analysis when evaluating framed information linked to travel choices. Such evidence indicates that the fit between distance cues and framing is driven by intuitive heuristics rather than cognitively demanding reasoning.

### **6.2.2. Practical Implications**

The findings point to actionable strategies for firms operating in digital mobility and travel-booking markets. Interfaces for air travel can benefit from emphasizing the negative outcomes associated with missing a promotion, whereas ship-travel interfaces should highlight favorable outcomes or added benefits. Since distance cues originate organically from the transportation mode selected by the user, platforms can seamlessly integrate dynamic message-framing algorithms that automatically match message tone to the psychological context.

In addition, incorporating destination-related social information—such as cultural affinity, perceived friendliness, or historical closeness—may allow for further refinement. When users perceive both the mode of travel and the destination as psychologically near, loss framing becomes especially influential. Similarly, in contexts where destinations feel unfamiliar or remote, emphasizing gains may heighten message persuasiveness.

Importantly, the robustness of the framing effect under cognitive strain suggests that mobile users need not engage in deep processing for messages to be effective. Because many travel-related decisions occur under distraction or time pressure, framing strategies that rely on intuitive distance–frame alignment can improve performance without adding complexity to message design.

### **6.2.3. Policy and Industry Implications**

Public tourism agencies may apply distance-congruent framing in outreach campaigns. Destinations that feel accessible—socially or geographically—might secure greater engagement by warning audiences of missed opportunities, while distant destinations could highlight appealing benefits or novel experiences.

Booking platforms and travel apps could also implement dynamic messaging that aligns with users' evolving psychological states. For example, during early trip exploration, when users think abstractly, gain-oriented messages may be more impactful. As the point of purchase approaches and decisions feel more concrete, loss-framed prompts may encourage conversion.

Across all studies, the results converge on a coherent psychological sequence in which contextual cues shape

perceived distance, distance influences construal level, and construal level modulates framing effectiveness. This pattern remains stable regardless of cognitive load, indicating that heuristic processes dominate message interpretation in travel-booking environments. By identifying how contextual distance and message framing intersect, the research strengthens theoretical understanding while offering practical guidance for developing adaptive, psychologically informed promotional strategies.

### **6.3. Limitation and Future Research**

Although this research presents a coherent pattern of results across three controlled experiments, several boundaries of the current work warrant discussion and open avenues for future investigation. To begin with, all studies relied on experimentally constructed mobile-booking scenarios rather than on naturally occurring behavioral traces. While this methodological choice allowed precise manipulation of psychological-distance cues and message framing, it also means that participants did not experience the time pressure, uncertainty, or financial consequences that typically accompany real travel-purchase decisions. Future researchers could therefore employ field deployments, A/B testing within live booking platforms, or analyses of actual user behavior to evaluate whether the same psychological mechanisms operate under genuine decision constraints.

A second limitation concerns the selective use of psychological-distance cues. In this program of research, distance was induced through transportation mode and through country-related narratives intended to evoke temporal and social separation. Although these cues proved effective, psychological distance encompasses additional facets—such as spatial separation, hypotheticality, perceived risk, or emotional detachment—that were not incorporated into the present design. Exploring a broader set of distance manipulations may help determine whether the intuitive mapping between distance cues and message framing generalizes beyond temporal and social domains.

Third, the messages used in the experiments were short, isolated promotional statements presented in a controlled environment. Mobile travel applications often expose users to a sequence of prompts, dynamic price information, alerts, and personalized recommendations. Given this complexity, it is possible that repeated exposures or conflicting cues may shift how consumers respond to framed content over time. Longitudinal paradigms or multi-stage decision simulations could clarify how the effectiveness of psychological-distance framing evolves across the full journey from initial exploration to final purchase.

Finally, the cognitive-resource manipulation in Study 3 relied on a single type of depletion task. Although the

findings indicate that the core interaction between distance cues and message framing persists under reduced cognitive capacity, real-world environments involve many different forms of cognitive constraint—such as multitasking, emotional fatigue, environmental noise, or information overload. Future work should examine whether such varied forms of strain influence reliance on the heuristic matching process identified here.

Together, these considerations outline several promising directions that can enrich theoretical understanding of psychological distance and enhance the applicability of message-framing strategies in real consumer decision environments.

## Declarations

### Ethics Approval and Consent to Participate

Not applicable. This study did not involve human participants or animal subjects.

### Competing Interests / Conflicts of Interest

The authors declare that they have no competing interests.

### Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors

### Author Contributions

As a sole author, I conducted all aspects of the research, including conceptualization, methodology, data analysis, and manuscript preparation.

### Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

### Declaration of Generative AI and AI-assisted Technologies in the Writing Process

AI not used

## References

- Agrawal, N., & Wan, E. (2009). Regulating Risk or Risking Regulation? Construal Levels and Depletion Effects in the Processing of Health Messages. *Journal of Consumer Research*, 36(3), 448–462. <https://doi.org/10.1086/597137>
- Amagai, Y. (1996). The Relationship Between Psychological Distance and Trust of Junior and Senior High School Students. *Japanese Journal of Counseling Science*, 29(1), 130–134.
- Ayduk, O., & Kross, E. (2010). From a Distance: Implications of Spontaneous Self-Distancing for Adaptive Self-Reflection. *Journal of Personality and Social Psychology*, 98(5), 809–829. <https://doi.org/10.1037/a0019205>
- Baskin, E., Wakslak, C. J., Trope, Y., & Novemsky, N. (2014). Why Feasibility Matters More to Gift Receivers Than to Givers: A Construal-Level Approach to Gift Giving. *Journal of Consumer Research*, 41(1), 169–182. <https://doi.org/10.1086/675737>
- Baumeister, R. F. (2002). Yielding to Temptation: Self-Control Failure, Impulsive Purchasing, and Consumer Behavior. *Journal of Consumer Research*, 28(4), 670–676.
- Baumeister, R. F., & Newman, L. S. (1994). How Stories Make Sense of Personal Experiences: Motives That Shape Autobiographical Narratives. *Personality and Social Psychology Bulletin*, 20(6), 676–690.
- Baumeister, R. F., & Vohs, K. D. (2007). Self-Regulation, Ego Depletion, and Motivation. *Social and Personality Psychology Compass*, 1(1), 115–128.
- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego Depletion: Is the Active Self a Limited Resource? *Journal of Personality and Social Psychology*, 74(5), 1252–1265. <https://doi.org/10.1037/0022-3514.74.5.1252>
- Block, M. B., & Keller, P. A. (1995). When to Accentuate the Negative: The Effects of Perceived Efficacy and Message Framing on Intentions to Perform a Health-Related Behavior. *Journal of Marketing Research*, 32(2), 192–203. <https://doi.org/10.1177/002224379503200206>
- Chandran, S., & Menon, G. (2004). When a Day Means More Than a Year: Effects of Temporal Framing on Judgments of Health Risk. *Journal of Consumer Research*, 31(2), 375–389. <https://doi.org/10.1086/422116>
- Davis, J. I., Gross, J. J., & Ochsner, K. N. (2011). Psychological Distance and Emotional Experience: What You See Is What You Get. *Emotion*, 11(2), 438–444. <https://doi.org/10.1037/a0021783>
- Eyal, T., Liberman, N., & Trope, Y. (2008). Judging Near and Distant Virtue and Vice. *Journal of Experimental Social Psychology*, 44(4), 1204–1209. <https://doi.org/10.1016/j.jesp.2008.03.012>
- Eyal, T., Liberman, N., Trope, Y., & Walther, E. (2004). The Pros and Cons of Temporally Near and Distant Action. *Journal of Personality and Social Psychology*, 86(6), 781–795. <https://doi.org/10.1037/0022-3514.86.6.781>
- Eyal, T., Sagristano, M. D., Trope, Y., Liberman, N., & Chaiken, S. (2009). When Values Matter: Expressing Values in Behavioral Intentions for the Near vs. Distant Future. *Journal of Experimental Social Psychology*, 45(1), 35–43. <https://doi.org/10.1016/j.jesp.2008.07.023>
- Fiske, S. T., Neuberg, S. L., Beattie, A. E., & Milberg, S. J. (1987). Category-Based and Attribute-Based Reactions to Others: Some Informational Conditions of Stereotyping and Individuating Processes. *Journal of Experimental Social Psychology*, 23(5), 399–427. [https://doi.org/10.1016/0022-1031\(87\)90038-2](https://doi.org/10.1016/0022-1031(87)90038-2)
- Fujii, K. (2004). The Research Trend About the Psychological Distance in the Friend Relation of Adolescence and Development-Meaning. *Bulletin of Comprehensive Center for Education Practice*, 7(1), 279–288.
- Fujita, K., Eyal, T., Chaiken, S., Trope, Y., & Liberman, N. (2008). Influencing Attitudes Toward Near and Distant Objects. *Journal of Experimental Social Psychology*, 44(3), 562–572.

- <https://doi.org/10.1016/j.jesp.2007.10.005>
- Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision Under Risk. *Econometrica*, 47(2), 263–291. <https://doi.org/10.2307/1914185>
- Kahneman, D., & Tversky, A. (1984). Choices, Values, and Frames. *American Psychologist*, 39(4), 341–350. <https://doi.org/10.1037/0003-066X.39.4.341>
- Kiene, S. M., Barta, W. D., Zelenski, J. M., & Cothran, D. L. (2005). Why Are You Bringing Up Condoms Now? The Effect of Message Content on Framing Effects of Condom Use Messages. *Health Psychology*, 24(3), 321–326. <https://doi.org/10.1037/0278-6133.24.3.321>
- Kim, K., Zhang, M., & Li, X. (2008). Effects Of Temporal And Social Distance On Consumer Evaluations. *Journal of Consumer Research*, 35(4), 706–713. <https://doi.org/10.1086/592131>
- Kühberger, A. (1998). The Influence of Framing on Risky Decisions: A Meta-Analysis. *Organizational Behavior and Human Decision Processes*, 75(1), 23–55. <https://doi.org/10.1006/obhd.1998.2781>
- Kuwamura, S. (2009). Empathic Embarrassment and Psychological Distance. *Japanese Journal of Personality*, 17(1), 311–313. <https://doi.org/10.2132/personality.17.311>
- Leeper, T. J., & Slothuus, R. (2018). How the News Media Persuades: Framing Effects and Beyond. In B. Grofman, E. Suhay, & A. Trechsel (Eds.), *The Oxford Handbook of Electoral Persuasion*. New York, NY: Oxford University Press.
- Lerner, E., Streicher, B., Sachs, R., Raue, M., & Frey, D. (2015). The Effect of Construal Level on Risk-Taking. *Journal of Experimental Social Psychology*, 45(1), 99–109. <https://doi.org/10.1002/ejsp.2067>
- Lerner, E., Streicher, B., Sachs, R., Raue, M., & Frey, D. (2016). Thinking Concretely Increases the Perceived Likelihood of Risks: The Effect of Construal Level on Risk Estimation. *Risk Analysis*, 36(3), 623–637. <https://doi.org/10.1111/risa.12445>
- Liberman, N., & Trope, Y. (1998). The Role of Feasibility and Desirability Considerations in Near and Distant Future Decisions: A Test of Temporal Construal Theory. *Journal of Personality and Social Psychology*, 75(1), 5–18. <https://doi.org/10.1037/0022-3514.75.1.5>
- Liberman, N., Sagristano, M. D., & Trope, Y. (2002). The Effect of Temporal Distance on Level of Mental Construal. *Journal of Experimental Social Psychology*, 38(6), 523–534. [https://doi.org/10.1016/S0022-1031\(02\)00535-8](https://doi.org/10.1016/S0022-1031(02)00535-8)
- Liberman, N., Trope, Y., & Wakslak, C. (2007). Construal Level Theory and Consumer Behavior. *Journal of Consumer Psychology*, 17(2), 113–117. [https://doi.org/10.1016/S1057-7408\(07\)70017-7](https://doi.org/10.1016/S1057-7408(07)70017-7)
- Liviatan, I., Trope, Y., & Liberman, N. (2008). Interpersonal Similarity as a Social Distance Dimension: Implications for Perception of Others' Actions. *Journal of Experimental Social Psychology*, 44(5), 1256–1269. <https://doi.org/10.1016/j.jesp.2008.04.007>
- Mitchell, T. R., Thompson, L., Peterson, E., & Cronk, R. (1997). Temporal Adjustments in the Evaluation of Events: The “Rosy View”. *Journal of Experimental Social Psychology*, 33(4), 421–448. <https://doi.org/10.1006/jesp.1997.1333>
- Muraven, M., Shmueli, D., & Burkley, E. (2006). Conserving Self-Control Strength. *Journal of Personality and Social Psychology*, 91(3), 524–537. <https://doi.org/10.1037/0022-3514.91.3.524>
- Patrick, V. M., MacInnis, D. J., & Park, C. W. (2007). Not as Happy as I Thought I'd Be? Affective Misforecasting and Product Evaluations. *Journal of Consumer Research*, 33(4), 479–489. <https://doi.org/10.1086/510221>
- Petty, R. E., Cacioppo, J. T., & Goldman, R. (1981). Personal Involvement as a Determinant of Argument-Based Persuasion. *Journal of Personality and Social Psychology*, 41(5), 847–855. <https://doi.org/10.1037/0022-3514.41.5.847>
- Rabbie, J. M., & Horwitz, M. (1988). Categories Versus Groups as Explanatory Concepts in Intergroup Relations. *European Journal of Social Psychology*, 18(2), 117–123. <https://doi.org/10.1002/ejsp.2420180204>
- Raue, M., Lerner, E., Streicher, B., & Slovic, P. (Eds.) (2018). *Psychological Perspectives on Risk and Risk Analysis: Theory, Models, and Applications*. Zürich: Springer.
- Rivers, S. E., Salovey, P., Pizarro, D. A., Pizarro, J., & Schneider, T. R. (2005). Message Framing and Pap Test Utilization Among Women Attending a Community Health Clinic. *Journal of Health Psychology*, 10(1), 65–77. <https://doi.org/10.1177/1359105305048556>
- Scheufele, D. A., & Iyengar, S. (2016). The State of Framing Research: A Call for New Directions. In K. Kenski & K. H. Jamieson (Eds.), *The Oxford Handbook of Political Communication* (pp. 619–632). New York, NY: Oxford University Press.
- Schmeichel, B. J., Vohs, K. D., & Baumeister, R. F. (2003). Intellectual Performance and Ego Depletion: Role of the Self in Logical Intellectual Performance and Ego Depletion. *Journal of Personality and Social Psychology*, 85(1), 33–46. <https://doi.org/10.1037/0022-3514.85.1.33>
- Son, J., Lee, J.-S., Kim, Y., & Kim, D. H. (2014). Effects of the Fit between Psychological Distance and Emotion for Online Word-of-Mouth on Shift of Preference and Recommendation Intention. *Korean Journal of Marketing*, 29(4), 45–67. UCI: G704-000341.2014.29.4.003
- Todorov, A., Goren, A., & Trope, Y. (2007). Probability as a Psychological Distance: Construal and Preferences. *Journal of Experimental Social Psychology*, 43(3), 473–482. <https://doi.org/10.1016/j.jesp.2006.07.004>
- Todorov, A., Goren, A., & Trope, Y. (2007). Probability as a Psychological Distance: Construal and Preferences. *Journal of Experimental Social Psychology*, 43(3), 473–482. <https://doi.org/10.1016/j.jesp.2006.07.004>
- Trope, Y., & Liberman, N. (2003). Temporal Construal. *Psychological Review*, 110(3), 403–421. <https://doi.org/10.1037/0033-295X.110.3.403>
- Trope, Y., & Liberman, N. (2010). Construal-Level Theory of Psychological Distance. *Psychological Review*, 117(2), 440–463. <https://doi.org/10.1037/a0018963>
- Trope, Y., Liberman, N., & Wakslak, C. (2007). Construal Levels and Psychological Distance: Effects on Representation, Prediction, Evaluation, and Behavior. *Journal of Consumer Psychology*, 17(2), 83–95. [https://doi.org/10.1016/S1057-7408\(07\)70013-X](https://doi.org/10.1016/S1057-7408(07)70013-X)
- Tversky, A., & Kahneman, D. (1981). The Framing of Decisions and the Psychology of Choice. *Science*, 211(4481), 453–458. <https://doi.org/10.1126/science.7455683>

- Tversky, A., & Kahneman, D. (1992). Advances in Prospect Theory: Cumulative Representation of Uncertainty. *Journal of Risk and Uncertainty*, 5(4), 297–323. <https://doi.org/10.1007/BF00122574>
- Vasquez, N. A., & Buehler, R. (2007). Seeing Future Success: Does Imagery Perspective Influence Achievement Motivation? *Personality and Social Psychology Bulletin*, 33(10), 1392–1405. <https://doi.org/10.1177/0146167207304541>
- Vohs, K. D., & Faber, R. J. (2007). Spent Resources: Self-Regulatory Resource Availability Affects Impulse Buying. *Journal of Consumer Research*, 33(4), 537–547. <https://doi.org/10.1086/510228>
- Vohs, K. D., & Heatherton, T. F. (2000). Self-Regulatory Failure: A Resource-Depletion Approach. *Psychological Science*, 11(3), 249–254.
- Vohs, K. D., & Schmeichel, B. J. (2003). Self-Regulation and the Extended Now: Controlling the Self Alters the Subjective Experience of Time. *Journal of Personality and Social Psychology*, 85(2), 217–230.
- Vohs, K. D., Baumeister, R. F., Schmeichel, B. J., Twenge, J. M., Nelson, N. M., & Tice, D. M. (2008). Making Choices Impairs Subsequent Self-Control: A Limited-Resource Account of Decision Making, Self-Regulation, and Active Initiative. *Journal of Personality and Social Psychology*, 94(5), 883–898. <https://doi.org/10.1037/0022-3514.94.5.883>
- Wan, E., & Agrawal, N. (2011). Carryover Effects of Self-Control on Decision Making: A Construal-Level Perspective. *Journal of Consumer Research*, 38(1), 199–214. <https://doi.org/10.1086/659908>
- Wheeler, S. C., Briñol, P., & Hermann, A. D. (2007). Resistance to Persuasion as Self-Regulation: Ego-Depletion and Its Effects on Attitude Change Processes. *Journal of Experimental Social Psychology*, 43(1), 150–156. <https://doi.org/10.1016/j.jesp.2006.01.001>