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The Effects of Glossy Versus Matte Imagery on Purchase Decisions: The Mediating Role of Optimism and Risk

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Abstract

In this research, we propose that the use of glossy imagery in advertising, independent of its visual attractiveness, could trigger two diverging abstract concepts: optimism and risk. Further, drawing upon the grounded cognition literature, which suggests that positive embodied concepts are automatically activated, we hypothesize that exposure to glossy imagery is likely to positively influence purchase intention through optimism. However, given that negative concepts are not activated automatically, the association with risk is only likely to be activated in the presence of suitable contextual cues. In their presence, the activation of risk is likely to attenuate the positive automatic effects of glossiness. We report two experiments that provide support for our conceptualization. By being the first to propose and test how glossiness causally influences consumers' decisions, our research makes a theoretical contribution to both aesthetics and grounded cognition. It also provides practical implications for practitioners.

Keywords: visual background, optimism, grounded cognition, aesthetics, online consumption

Cutting-edge digital technologies are revolutionizing the ways consumers make decisions. Myriads of purchase decisions are now made based on online pictures, without direct contact with real products (Laroche et al, 2005; Shavitt et al., 1998). Accordingly, marketers worry about how their products are visually exhibited online, going so far as to use photo-editing software (e.g., photoshop) to manipulate visual features (Danciu, 2014). One easily manipulatable and obvious feature is visual glossiness: a feature that, in today's commercial world, is used in many categories (e.g., books, cars, floor-tiles, lipsticks) to attract consumers' attention and boost sales (Cressy, 2004; Durbin, 2014; Huggins & Probert, 2004; Meyers, 2007). Glossy finishes are considered 'standard' and used in up to 80-90% of cases for paperbacks, photographic prints, and luxury cars (e.g., Baldwin & Baldwin 1984; Domanski & Irvine 2006; Pulp and Paper Staff, 2001; Pritchard, 2017). In this research, we ask: could the choice of glossy finishes for online pictures impact consumers' product perceptions and purchase decisions, independent of aesthetic value? If so, how?

Despite its popularity and marketing relevance, glossiness largely remains an underexplored visual cue (Cloonan & Decré, 2015; Meert, Pandelaere, & Patrick, 2013), and how glossy imagery influences consumers' decision making remains unclear. Prior research has revealed that glossiness connotes smoother as well as wetter perceptions (Cloonan & Decre 2016; Coss & Moore, 1990). We posit that these two perceptual connotations—wetness and smoothness—could activate two diverging abstract concepts: optimism and risk (e.g., Dahir, 1990; Schaefer et al., 2014). Further, drawing upon the literature on grounded cognition, which suggests that positive embodied concepts, but not negative concepts, are automatically activated (Bargh et al. 2012; Tettamanti et al. 2008), we hypothesize that exposure to glossy imagery is likely to automatically activate optimism and, thus, augment purchase intention. Only in the presence of cues that prime risks associated with glossiness (e.g., slipping and falling on smooth or wet surfaces), exposure to glossiness is also likely to activate the concept of risk, thereby attenuating the automatic positive effects of optimism.

Our work makes two theoretical contributions. First, we believe we are the first to identify visual glossiness as a specific aesthetic element that causally impacts consumers' decision making, thereby contributing to the growing body of aesthetics research, with a focus on its role in decision making. Second, by being the first to clarify two abstract concepts through which glossy imagery

affects decision making, our findings add to the literature on the causal relationship between aesthetics and grounded cognition. In addition, our research provides practical implications for marketers with respect to the use of glossy versus matte finishes in the design of packaging, advertising, brand websites, and more broadly, collateral materials. In the sections that follow, we first review the relevant literature and then present two studies that test our conceptualization.

Theoretical Underpinnings

Glossiness as a visual cue

Albeit largely underexplored, a number of studies in psychology and marketing have investigated the nature of, as well as preference for, glossiness. According to Hunter (1937), one type of perceptual gloss is the absence-of-surface-texture, which leads to the perception of smoothness of a surface. Consistent with this, consumer research has shown that products in glossy (vs. matte) packaging are perceived as smoother (Cloonan & Decre 2016). Thus, glossiness connotes haptic smoothness.

Inspired by evolutionary theory, which suggests that humans' biological need for water undergirds their preference for mirrored surfaces, Coss and Moore (1990) tested four different types of surface finishes (glossy, matte, sandy, and sparkling) and found that glossy (vs. matte) surfaces appeared significantly wetter to participants, concluding that glossiness connotes wetness. Further, Meert and colleagues (2013) found that feeling thirst significantly enhanced participants' preference for glossiness. These two studies indicate close connotative connections between glossiness and wetness.

In sum, previous research provides correlational evidence for two different, but related, perceptual connotations of glossiness: wetness and smoothness. However, past research has not examined the causal mechanisms through which glossiness might influence decision making. In the following sections, we elaborate on how the association with wetness and smoothness in turn trigger two abstract concepts—optimism and risk—and examine how they causally impact consumers'

purchase decisions.

Glossiness and optimism

Extant literature suggests that the two connotations of glossiness—smoothness and wetness—are both semantically associated with the abstract concept: optimism. First, according to the online Merriam-Webster English dictionary, the adjective smooth denotes "free from difficulties or impediments", as exemplified by "we wish you a smooth journey." The synonyms for smooth also include "easy, uneventful, and undisturbed" (Thesaurus.com). In the *Glossary of Cognitive Linguistics*, Evans (2007) introduces "things are going smoothly", signifying "things are going well," as a primary example of the metaphorical usage of English. Thus, smoothness has frequently been used as a linguistic metaphor of easygoing and hassle-free situations.

Consistent with the above, Schaefer and colleagues (2014) conducted an experiment, in which passersby completed a five-piece puzzle and subsequently formed impressions of a seemingly ambiguous social interaction. One group of participants completed a version with the pieces uncovered (smooth condition) while the other group completed a version with pieces covered in rough sandpaper (rough condition). Results showed that participants who completed the smooth version rated the social interaction as significantly easier and less harsh, providing evidence for smoothness as a linguistic metaphor for an optimistic outcome.

In addition to the smoothness connotation, water or wetness has also been used as a linguistic metaphor for easygoingness and, hence, optimism (e.g., Hill, 2011; Riestenberg, 2013; Stephenson & Kirakosyan, 2015). 'An oasis in a desert', or 'Rain after a long drought', for example, are both commonly used metaphors that refer to optimistic beliefs in the future, implying that things will go smoothly (e.g., Arsel & Spoor, 2009; Newmyer, 1986; Johnson, 2015; Morris, 1988). Conversely, the metaphor of dryness, as exemplified by the biblical expression 'dry bones' in the book of Ezekiel, has often been semantically associated with an absence of hope and optimistic belief (e.g., Allen, 1993; Dixon, 2016; McDonald, 2004).

Thus, both smoothness and wetness are likely to trigger the semantic association of

easygoingness, which in turn would result in optimistic beliefs about the future. However, the consequence of this relationship for decision making has not been explored.

Glossiness and risk

The two connotations of glossiness—smoothness and wetness—may also activate another abstract concept: risk. When surfaces are rendered wet or smooth by water or other liquids, e.g., oil, frictional forces are greatly reduced, and objects on these surfaces can slide, a state described as slippery (Dahir, 1990; Madanhire & Mbohwa, 2016). Therefore, perceptions of wetness and smoothness can semantically be associated with slipperiness. Importantly, many slippery surfaces (e.g., floors) can be perceived as potentially risky (Campbell & Langford, 1990; Florczak & Roughton, 2001), since they tend to cause individuals to slide, potentially resulting in slip-and-fall accidents (Houglum, 2016; Whiting & Zernicke, 2008). As such, pedestrians are often warned against nearby wet floors through salient public signs (Charlton, 2006).

In line with the above, Ruppert (1987) reports correlational evidence that factory workers classified the glossy surface of a wet floor as an indicator of risk, because of its slippery characteristic. Likewise, Joh and colleagues (2009) report that 91% of survey respondents replied they would use glossiness as a cue for slipperiness, and thus, risk. These studies provide correlational evidence to suggest a semantic link between glossiness and risk via slipperiness is common knowledge.

The effects of exposure to glossy images on decision making

The use of linguistic metaphors, grounded in our daily life, often involve concrete perceptual processes that in turn activate the representation of abstract concepts, which affect subsequent decision making (Landau, Meier, & Keefer 2010; Lakoff & Johnson 1980; Hong & Sun, 2011). For instance, based on the "heavy=important" linguistic metaphor, Jostmann and colleagues (2009) found that participants who held a heavy (vs. light) clipboard judged the decision-making processes to be

more important. Chae et al. (2013) found that the more spatially proximal a potential cause and effect in advertising are, the more effective the target product is judged to be, based on the "closeness is strength of effect" metaphor.

Research suggests that exposure to concrete perceptual stimuli, as in the research cited above, activate related metaphors automatically. According to the scaffolding model (Williams, Huang, & Bargh, 2009), perceptual stimuli activate higher-order cognition (e.g., abstract concepts) automatically because they are grounded in physical life (e.g., size, weight, temperature) and acquired early in childhood through repeated experiences (Williams, Huang, & Bargh, 2009). Consistent with this, grounded cognition research has shown that mere exposure to perceptual stimuli is enough to automatically activate their metaphorically-related abstract concepts (e.g., Bargh et al., 2012; Meier & Keeper, 2010), which in turn produces relevant behavioral effects (e.g., Ackerman et al., 2012, Zhong & Liljenquist, 2006). One study, for example, has shown that the metaphorical association between physical warmth and romantic affection was automatically activated among participants feeling physically cold, which further motivated them to like and consume romantic movies more (Hong & Sun, 2011).

Notwithstanding the above findings, research has also shown that an abstract concept may not be automatically activated when people have negative feelings toward the concept (Bargh et al. 2012; Tettamanti et al. 2008). Cesario et al. (2006), for example, showed that the well-known elderly-walking-slow priming effect (Bargh, Chen, & Burrows, 1996), in which participants primed with elderly-related words walked more slowly, was not automatically observed among those who reported disliking the elderly. Thus, despite it being common knowledge, because risk is negative, it may not be activated automatically on exposure to glossy images, and people may need to be exposed to primes to activate the risk implied by smoothness and wetness.

In sum, we argue that exposure to glossy imagery is likely to activate two distinct abstract concepts—optimism and risk. Further, we propose that the underlying mechanism whereby the two concepts are activated is likely to be different. Optimism, since it is positive, is likely to be activated automatically upon exposure to glossiness. However, since riskiness is typically negatively valenced, it is unlikely to be automatically activated. We argue that contextual cues that remind people of the

risk posed by slippery surfaces would be required to activate the risk association. Once activated, we expect the riskiness associations to attenuate the automatic positive effect of optimism. Figure 1 presents a flowchart that summarizes our conceptualization. We next present two experiments that support our conceptualization.

[Insert Figure 1 about here]

Study 1: Effect of glossiness and mediating role of optimism

Employing an Airbnb setting, Study 1 aimed to establish the effect of glossiness on booking (i.e., purchase) intention and provide direct causal evidence for the underlying mechanism by manipulating the proposed mediator, optimism (Imai, Tingley, & Yamamoto, 2013). Consistent with our conceptualization, we anticipated that participants exposed to glossy imagery would view their future stay at an Airbnb lodging more optimistically and that their booking intention would increase accordingly, when primed with neutral words. However, we predicted that for participants primed with optimism-related words, since the concept of optimism would already be activated, the difference in booking intention, as a function of glossy imagery, would be attenuated.

Method

Stimuli. We downloaded eleven room images from the web that could realistically be used as Airbnb postings, all of which had a glossy finish. Using the stamp function of Adobe Photoshop CS6, we transformed the glossy room images to matte, while leaving all other features intact. As a result, we created two different versions of the same rooms, differing only in perceived glossiness. Based on an MTurk pretest (N=50), we selected a pair of images that differed significantly on glossiness (2 items, glossiness and shininess, $\alpha = .95$) ($M_{glossy} = 8.29$ vs. $M_{matte} = 6.36$; $F(1, 48) = 13.58$, $p < .001$), while matching other dimensions such as preference, familiarity, and arousal (all $ps > .8$)

Participants and Procedure. Participants (N=209), recruited via Mechanical Turk, took part

in a 2 (imagery: glossy vs. matte) x 2 (prime: optimism vs. control) between-subjects study. The data from one individual who did not follow the instructions appropriately (i.e., for the scrambled sentence task; see details below) was excluded from the analysis, yielding a final sample of 208 participants (42% female, median age 34, age-range 18–71).

The study began with a scrambled sentence task adopted from Fosnaugh et al. (2009), in which participants were presented with strings of five scrambled words and asked to generate grammatically correct sentences using only four of the five words in each string. The scrambled words included optimism-related words (e.g., optimism, hopeful, easygoingness, hassle-free) in the optimism prime condition, whereas we used neutral words (e.g., kite, paper, magnetic, minute) in the control prime condition. As demonstrated by Fosnaugh and colleagues (2009), we predicted that this semantic priming would temporarily increase participants' optimism.

Thereafter, participants read a travel scenario to Florida and were presented with either a glossy or matte Airbnb room picture, depending on the condition. Participants then answered how likely they were to reserve the room on a 10-point scale (1= definitely not, 10 = definitely). Below this question, participants indicated their extent of agreement with the following three statements on a 7-point Likert scale (1= disagree, 7 = agree): 'staying in this room is likely to be smooth/hassle-free/convenient'. They then filled out demographic questions, followed by several open-ended questions about the questionnaire (e.g., how did you find the survey?), and concluded the study after being paid and debriefed.

Results and Discussion

Booking intention. A two-way ANOVA revealed no effect of optimism-prime ($F(1, 204) = 0.07$, $p = .78$), a significant effect of glossiness ($F(1, 204) = 4.15$, $p = .042$), and an interaction between glossiness and optimism-prime ($F(1, 204) = 5.51$, $p = .019$). As anticipated, participants in the control-prime condition reported a significantly higher booking intention when exposed to the glossy room image ($M_{controlprime--glossy} = 8.23$ vs. $M_{controlprime--matte} = 6.94$; $F(1, 204) = 9.81$, $p = .002$). However, as anticipated, participants in the optimism-prime condition did not reveal any

difference between the glossy and matte images ($M_{optimismprime--glossy}$ = 7.62 vs. $M_{optimismprime--matte}$ = 7.71; $F(1, 204) = 0.05$, $p = ns$; see Fig. 2). Further, the booking intention in the two optimism-prime conditions was significantly higher than in the control-prime--matte image condition ($M_{optimismprime}$ = 7.66 vs. $M_{controlprime--matte}$ = 6.94; $F(1, 204) = 3.97$, $p < .05$), but not different from the control-prime--glossy image condition ($M_{controlprime--glossy}$ = 8.23; $F(1, 204) = 2.55$, $p = .46$).

[Insert Figure 2 about here]

Optimism. The mean of the three items, easygoing, hassle-free, and convenient, served as the operational measure of optimism ($M = 6.62$, $SD = 1.18$; $\alpha = .86$). Identical to booking intention, a two-way ANOVA showed a significant effect of glossiness ($F(1, 204) = 7.68$, $p = .006$), a marginally significant effect of optimism-prime ($F(1, 204) = 2.93$, $p = .08$), and, more importantly, an interaction between glossiness and optimism-prime ($F(1, 204) = 5.98$, $p = .015$). Participants in the control condition viewed their future stay more optimistically, when exposed to the glossy room image ($M_{controlprime--glossy}$ = 6.89 vs. $M_{controlprime--matte}$ = 6.06; $F(1, 204) = 13.88$, $p < .001$), whereas participants in the optimism prime condition did not exhibit any difference ($M_{optimismprime--glossy}$ = 6.77 vs. $M_{optimismprime--matte}$ = 6.72; $F(1, 204) = 0.05$, $p = ns$). Further, optimism was higher in the two optimism-prime conditions compared to the control-prime--matte room image condition ($M_{optimismprime}$ = 6.74 vs. $M_{controlprime--matte}$ = 6.06; $F(1, 204) = 12.22$, $p < .001$), but not different from the control-prime--glossy image condition ($M_{controlprime--glossy}$ = 6.89; $F(1, 204) = 0.55$, $p = .45$).

[Insert Figure 3 about here]

Moderated Mediation Analysis. Using the bootstrapping technique for conditional indirect effects (Preacher and Hayes 2008; Preacher, Rucker, and Hayes 2007), we ran a moderated mediation analysis to estimate the indirect effects of glossiness among participants assigned to the two priming conditions. Bootstrapping results with 5000 resamples found that the effect of glossiness on booking

intention was mediated by optimistic beliefs among participants in the control prime condition (*b* = .85, Z= 3.40, SE=.25, *p* = .001, 95% CI [0.43, 1.41]). However, there was no corresponding indirect effect among those in the optimism-prime condition (*b* = .05, Z= 0.81, SE=.23, *p* = .81, 95% CI [-0.41, 0.51]), thereby supporting our hypothesized mechanism.

[Insert Figure 4 about here]

Discussion. In support of our theorizing, the results of Study 1 demonstrated that, in the control-prime condition, exposure to glossy imagery activated participants' optimistic beliefs, and did so automatically, which in turn enhanced their booking intentions. However, when participants were primed with optimism-related words, their optimistic beliefs were activated, which led to enhanced booking intentions, regardless of whether the room image was glossy. The moderated mediation analysis demonstrated that optimistic beliefs mediated the indirect effect of glossiness in the control prime condition, but not in the optimism prime condition.

Study 2: Priming the potential hazards of slipperiness

Study 2 built on study 1 by examining whether priming the riskiness association would attenuate the automatically activated positive effect of glossy imagery on booking intention, as observed in Study 1. We also provide further evidence for the mediating role of optimism.

Method

Participants and Procedure. Participants (N=294) recruited via Mturk participated in a 2 (imagery: glossy vs. matte) x 2 (prime: slippery vs. control) between-subjects study. We excluded data from twelve participants that did not answer the dependent variable/open-ended questions appropriately (e.g., Q: how would you describe the purpose of this study? A: to take a long time for

no reason), yielding a final sample of 282 participants (51% female, median age = 42, range 18–83)[1].

Upon starting the study, participants read an article from a health magazine and answered questions about its contents. Participants in the slippery prime condition read an article about how slippery floors may cause injuries, whereas participants in the control prime condition read an article about how high doses of vitamin C injections could destroy cancer cells. The stimuli and rest of the procedure were identical to those of Study 1.

Results and Discussion

Booking intention. A two-way ANOVA revealed a significant effect of glossiness ($F(1, 278) = 9.27$, $p = .002$), no effect of slippery-prime ($F(1, 278) = .08$, $p = .77$), and an interaction between glossiness and slippery-prime ($F(1, 278) = 5.84$, $p = .016$). Participants in the control-prime condition showed significantly higher booking intentions when exposed to the glossy room image ($M_{controlprime--glossy} = 7.91$ vs. $M_{controlprime--matte} = 6.38$; $F(1, 278) = 13.84$, $p < .001$), replicating previous results. No such difference was observed for participants in the slippery-prime condition ($M_{slipperyprime--glossy} = 7.31$ vs. $M_{slipperyprime--matte} = 7.13$; $F(1, 278) = 0.21$, $p = ns;$ see fig. 5).

[Insert Figure 5 about here]

Optimism. We averaged the three items measuring optimism to create the operational measure ($M = 6.29$, $SD = 1.25$; $\alpha = .87$). A two-way ANOVA revealed a significant effect of glossiness ($F(1, 278) = 7.14$, $p = .008$), no effect of slipperiness-prime ($F(1, 278) = .23$, $p = .62$), and a significant interaction between glossiness and slipperiness-prime ($F(1, 278) = 4.12$, $p = .043$). As anticipated, participants in the control-prime condition were more optimistic when they were exposed to the

[1] The sample size was increased by approximately 50% following a power analysis using the effect size observed in Study 1.

glossy image ($M_{contolprime--glossy}$ = 6.67 vs. $M_{controlprime--matte}$ = 5.97; $F(1, 278) = 10.25$, p =001), while participants in the slippery-prime condition did not show any difference as a function of glossiness ($M_{slipperyprime--glossy}$ = 6.30 vs. $M_{slipperyprime--matte}$ = 6.20; $F(1, 278) = 0.22$, $p = ns$).

[Insert Figure 6 about here]

Moderated Mediation Analysis We again conducted a moderated mediation analysis among participants in the control and slippery-prime conditions. Consistent with our conceptualization, bootstrapping results with 5000 resamples found that the effect of glossiness on booking intention was mediated by optimistic beliefs in the control-prime condition (b = .90, Z= 3.10, SE=.29, p = .002, 95% CI [0.331, 1.47]), but not in the slippery-prime condition (b = .12, Z= 0.48, SE=.25, p = .063, 95% CI [-0.37, 0.62]).

[Insert Figure 7 about here]

General Discussion and conclusion

This paper sheds light on the impact of glossy imagery on decision making, with a particular focus on abstract concepts (i.e., optimism vs. risk) triggered by visual glossiness. In Study 1, participants in the control-prime condition expressed greater optimistic beliefs about their future stay in the room and were more likely to reserve the room, when exposed to the glossy room image. This effect disappeared when participants were primed with optimism-related words. In addition, participants primed with optimism-related words, irrespective of glossy imagery, revealed a significantly higher optimistic view and booking intention than those exposed to matte room images, in the control condition. By directly manipulating optimism, the proposed mediator (Imai, Tingley & Yamamoto, 2013), these results provide strong evidence that optimism mediates the impact of glossy images on decision making.

In Study 2, participants who read an article about potential injuries of slip-and-fall accidents

did not show any difference between glossy and matte room conditions, although participants who read an irrelevant article replicated prior results, showing higher booking intentions, mediated by optimism. These results suggest that the negative abstract concept of glossiness is only activated in the presence of a conceptual prime, and once activated, attenuates the effect triggered by the automatic activation of the positive abstract concept.

Our work contributes to the growing research on glossiness within commercial settings (e.g., Cloonan & Decré, 2015; Meert, Pandelaere, & Patrick, 2013) and, more broadly, on the role of aesthetics in consumer behavior (e.g., Hoyer & Stokburger-Sauer, 2012). Although research has shown the effects of physical attractiveness or beauty on consumers' purchase behavior (e.g., DeShields, Kara & Kaynak, 1996; Till & Busler, 2000), prior research has mostly focused on the effects of aesthetics stemming from positive feelings and has not distinguished general aesthetics or beauty from more specific aesthetic elements. Our research is the first to identify visual glossiness as a specific aesthetic element that impacts consumers' decision making in a non-hedonistic fashion, thereby further elucidating the causal relationship between aesthetics and decision making.

Second, while extant research has examined the perceptual connotations of glossiness (e.g., water, smoothness) (Coss & Moore, 1990) and the fundamental reasons for preferences of glossy objects (Meert, Pandelaere, & Patrick, 2013), previous research has not examined how exposure to glossiness affects decision making. While several studies have provided evidence that glossiness (or smoothness) is semantically linked with risk or optimism (Joh et al., 2009; Ruppert, 1987; Schaefer et al., 2014), the evidence revealed in these studies was correlational, and the question of how exposure to glossiness causally impacts decision making has remained unclear. Thus, our research contributes by theorizing and showing that visual glossiness affects consumers' decision making through two abstract concepts—optimism and risk—and that these two concepts are activated through different mechanisms. As such, our findings contribute to the extant literature on the causal relationship between glossiness and grounded cognition and opens up a new avenue for research.

Given that glossy products are used in a variety of commercial settings, our research provides valuable practical insights for practitioners. For example, the 'smooth=easygoing' metaphor of visual glossiness may enhance consumers' goal perception and persistence. Thus, for instance, diet or

wellness offerings could be presented against glossy backgrounds to make consumers feel that their goals are more achievable, and thus nudge their behavior in the desired direction. The same metaphorical link may also help patients undergo medical treatment more comfortably, since they may feel more optimistic about the recovery process if the hospital rooms use glossy paint. Thus, insights from our theorizing and results can help practitioners make better decisions.

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Figure 1

Conceptual framework for the effect of glossiness on purchase intention

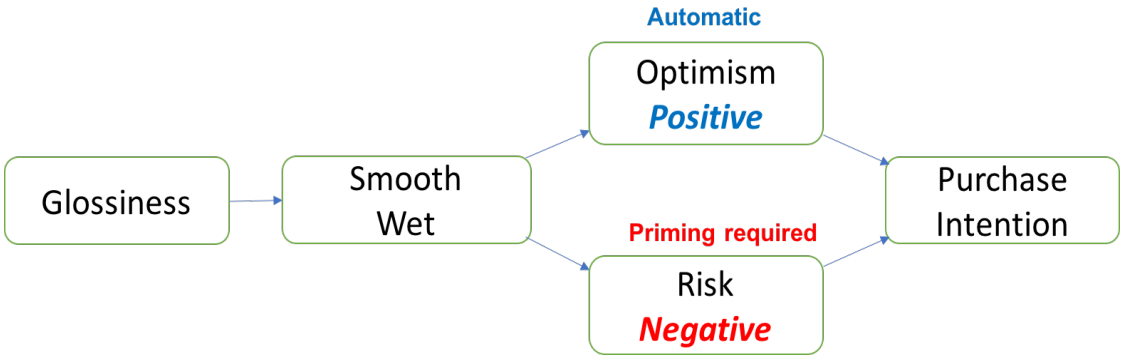

Figure 2

Study 1: Effects of glossy vs. matte images on booking intention moderated by optimism prime

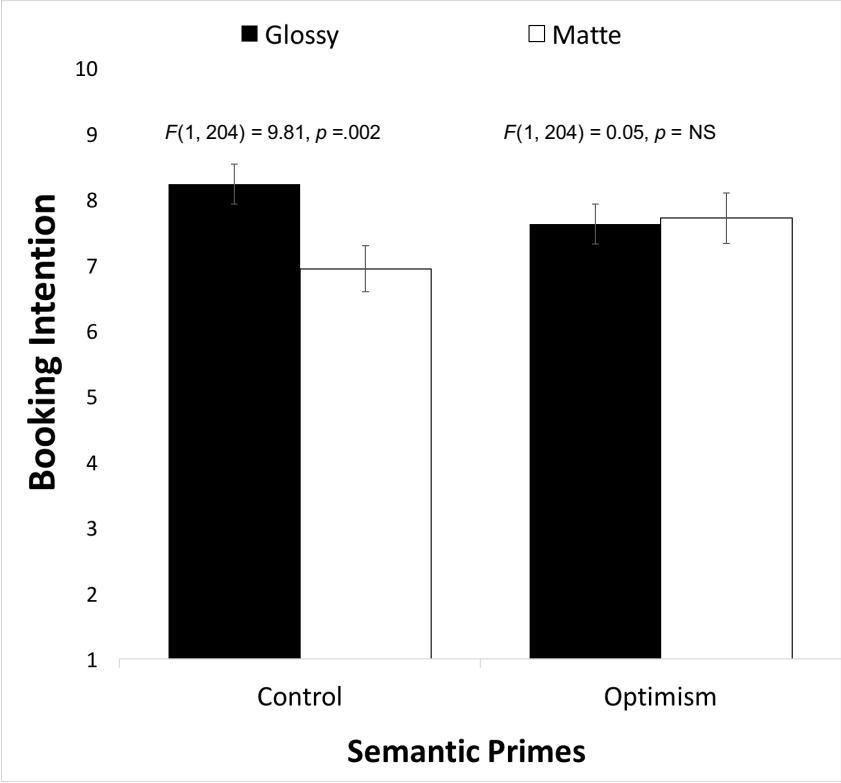

Figure 3

Study 1: Effects of glossy vs. matte images on optimistic beliefs moderated by optimism prime

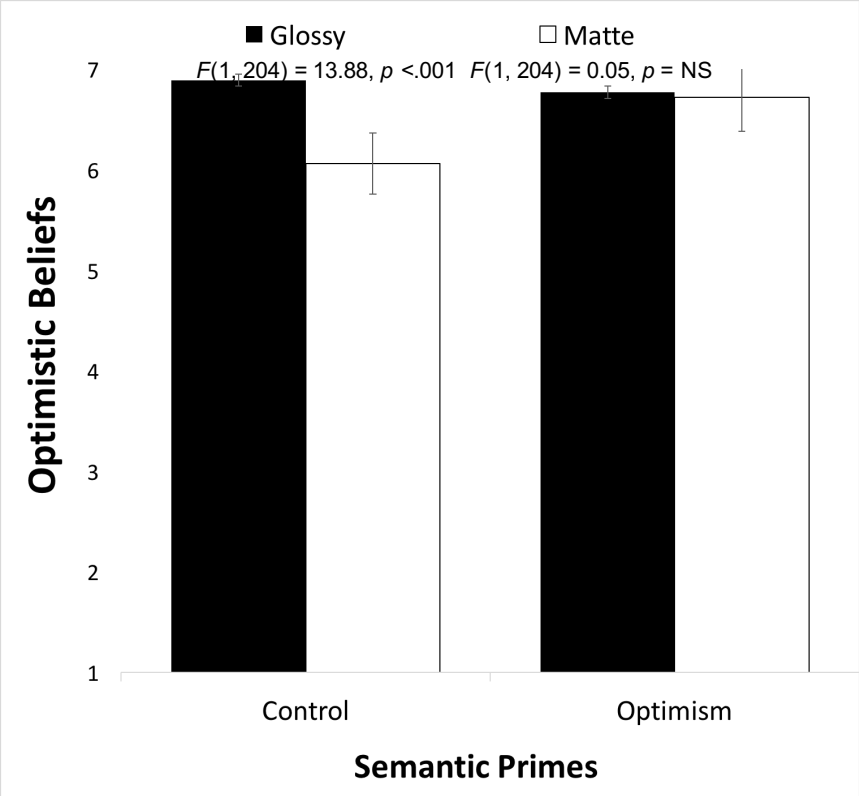

Figure 4

Study 1: Indirect effect of glossiness moderated by optimism prime

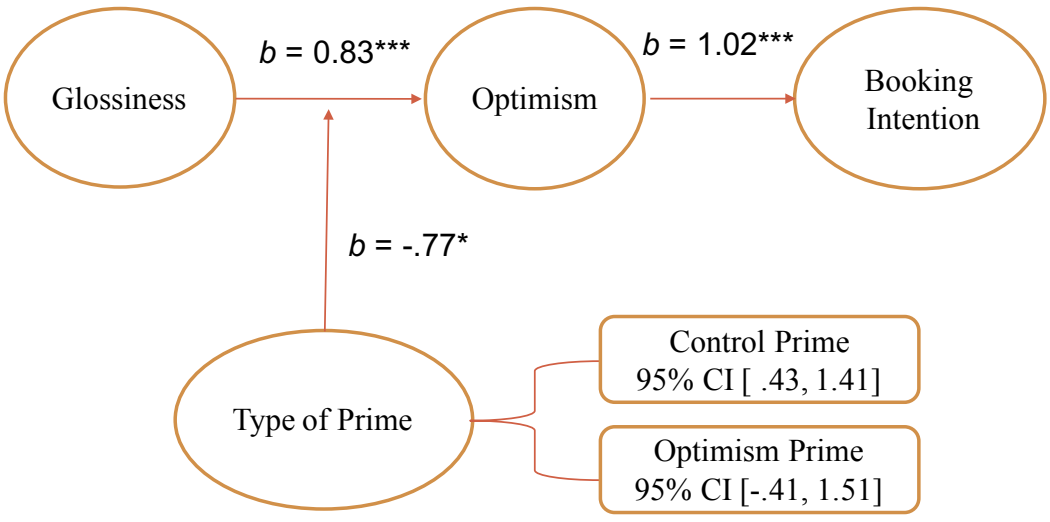

Figure 5

Study 2: Effects of glossy vs. matte images on booking intention moderated by slippery prime

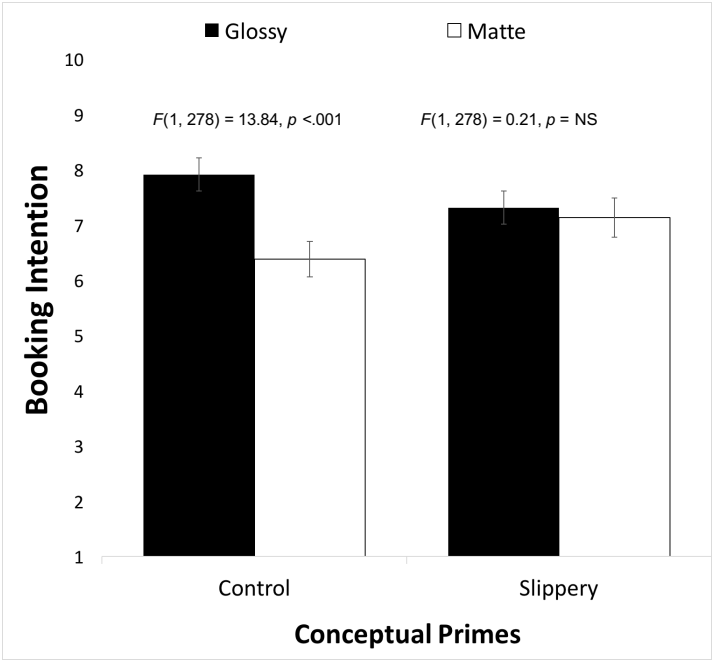

Figure 6

Study 2: Effects of glossy vs. matte images on optimistic belief moderated by slippery prime

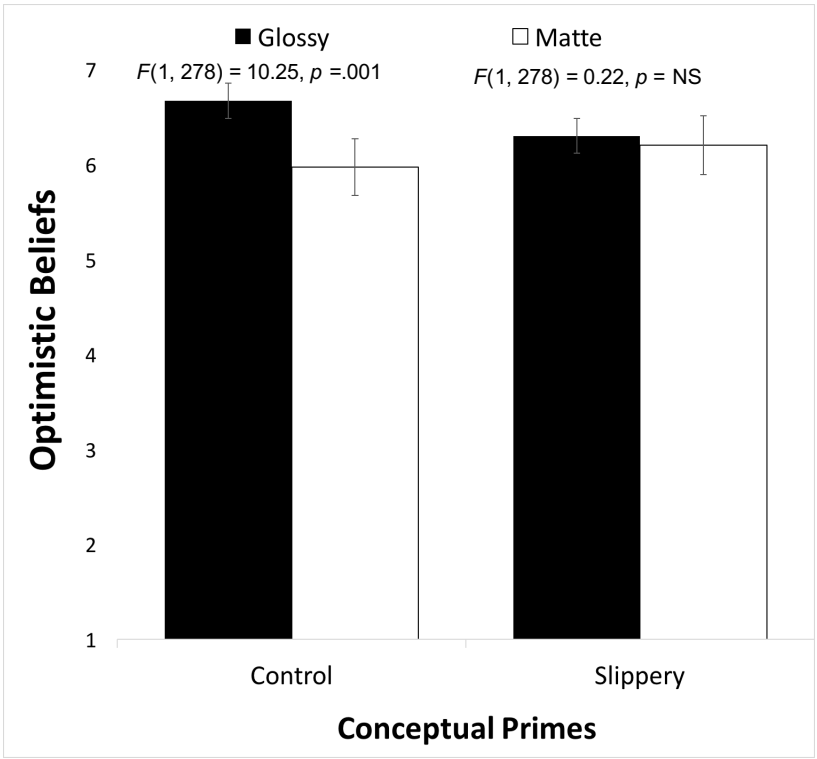

Figure 7

Study 2: Indirect effect of glossiness moderated by slippery prime