MULTISENSORY INFORMATION AND TARGETED ONLINE ADVERTISING:
A MENTAL IMAGERY APPROACH

A Dissertation in
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by
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ABSTRACT

Despite substantial investment in online advertising by hospitality companies, online advertising strategy remains an underexplored topic in the hospitality literature. Taking a mental imagery approach, the current dissertation examines how to effectively incorporate multisensory information in various types of online hospitality ads. Its three major objectives are: 1) to explore additional psychological mechanisms behind consumer responses to multisensory information in online hospitality ads; 2) to contribute to our understanding of how multisensory information interplay with higher-order cognitive constructs such as consumers’ previous preferences to influence consumption behaviors; and 3) to provide insights into how to use multisensory information to present vice vs. virtue food in the context of targeted online hospitality advertising.

Specifically, this dissertation examines the assimilation effect of multisensory imagery in the context of targeted advertising. Targeted online advertising can be defined as any form of online advertising that is based on information the advertiser has about the advertising recipient, such as demographics, current or past browsing or purchase behavior (Schumann, von Wangenheim, & Groene, 2014). With the results from one pilot test and two main experiments, this research demonstrated that the effectiveness of targeted advertising can be both fostered and impeded by prompting consumers to engage in multisensory imagery, depending on the timing to introduce multisensory imagery. It was found that the positive effects of multisensory imagery will be significant only when it is introduced after the product pair information. Such a
timing based effect of multisensory imagery was significant only among participants who
chronically adopt experiential style of processing.

All together, this dissertation demonstrated that effectively incorporating
multisensory sensory information in targeted hospitality ads can enhance consumers’ pre-
purchase evaluations. With specific relevance to targeted advertising, the findings of this
dissertation have important theoretical contributions and managerial implications for both
the hospitality literature and hospitality marketing practices.
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CHAPTER 1
INTRODUCTION

Online advertising, in the forms of firm-to-customer and customer-to-customer communications, is highly effective in driving market awareness, sales volume and customer engagement. Compared to traditional advertising such as TV commercials and radio advertising, online advertising is less expensive and more influential in driving market awareness, and thus has drawn increased attention from hospitality marketers (Yadav & Pavlou, 2014). In 2013, hotels and resorts in the United States were projected to spend as much as 28% of their overall marketing dollars on online advertising, a proportion that is expected to climb even higher, considering the industry’s growing reliance on online booking (Starkov & Safer, 2013).

Despite substantial investment in online advertising by hospitality companies, online advertising strategy remains an underexplored topic in the hospitality literature. While the broad area of digital marketing is receiving increased attention from hospitality scholars (Bilgihan, Peng, & Kandampully, 2014; Inversini & Masiero, 2014; Melián-González, Bulchand-Gidumal, & López-Valcárcel, 2013), most research has been exploratory in nature. Theory-driven understanding of how consumers respond to and engage in online advertising is an important research topic because such knowledge will help hospitality firms enhance the effectiveness of online advertising at driving market awareness, sales volume and customer engagement.
The Intangibility Challenge of Hospitality Advertising

A key barrier to effective hospitality advertising lies in the intangible nature of hospitality services (Grove, Carlson, & Dorsch, 2002; Koernig, 2003; Laroche, Bergeron, & Goutaland, 2001; Laroche, McDougall, Bergeron, & Yang, 2004; Laroche, Yang, McDougall, & Bergeron, 2005; Mittal, 1999, 2002; Mittal & Baker, 2002; Rushton & Carson, 1989; Shostack, 1987; Stafford, 1996). Even though advanced technology has helped address this problem in the online environment, limitations still exist. In the case of hotel booking for example, consumers can now take virtual room tours before they purchase, yet they still cannot touch the “heavenly pillow” or smell the hotel’s signature scent. The intangibility challenge of service communications thus remains significant in the online environment (Laroche, et al., 2005).

Intangibility can be conceptualized as a multidimensional construct that revolves around three key dimensions: physical intangibility, generality, and mental intangibility (Laroche, et al., 2001). First, unlike tangible goods that can be physically touched and evaluated, most services have fewer physical or sensory attributes that customers can access and evaluate before they purchase (Kotler, Bloom, & Hayes, 1984; Kotler & Connor Jr, 1977; Laroche, et al., 2001; Shostack, 1987). In the case of hotel booking for example, consumers can now take virtual room tours before they purchase, yet they still cannot touch the “heavenly pillow” or smell the hotel’s signature scent. Second, many service providers use similar terms in general phrases such as “wonderful experience” and “high customer satisfaction” to describe their services and such descriptions do not help consumers compare service providers (Dube-Riou, Regan, & Schmitt, 1990;
McDougall & Snetsinger, 1990). Finally, in addition to being physically intangible, service experiences are also mentally intangible. Especially when a service experience is unfamiliar (e.g., taking a trip to a foreign country), it is very difficult for a consumer to visualize and fully understand the service experience before s/he makes a purchase (Bebko, 2000; Berry, 1980; McDougall & Snetsinger, 1990).

Service intangibility can lead to various challenges in consumers’ pre-purchase evaluations (Mittal, 2002). The lack of tangibility limits consumer awareness of service options (Bebko, 2000; Wirtz & Mattila, 2003) resulting in higher levels of purchase uncertainty (Murray, 1991) and perceived risk (Boshoff, 2002; Laroche, et al., 2004). Intangibility also makes it challenging for consumers to evaluate an advertised service (Laroche, et al., 2005) and make comparisons among various service providers (Sun, Keh, & Lee, 2012) at the pre-purchase stage. When such perceived difficulty in the decision-making process is erroneously attributed to the service itself, consumers’ pre-purchase evaluations deteriorate.

Previously, researchers proposed various strategies to overcome the intangibility challenge in service advertising (Mittal, 1999, 2002; Mittal & Baker, 2002). It has been suggested that service advertisements should highlight the physical elements of the service delivery process (Berry & Clark, 1986; Mittal, 1999, 2002; Mittal & Baker, 2002) and include service consumption episodes such as narrative portrayals to enhance the concreteness and the specificity of the claimed benefits (Berry & Clark, 1986; Mattila, 2000, 2002; Mittal, 1999).
Incorporating Multisensory Information in Hospitality Advertisements

Extending the stream of research on the intangibility challenge of service advertising, this study emphasizes the importance of incorporating multisensory information in online advertising. Consumption experiences for hospitality services are multisensory in nature (Krishna, 2012). Oftentimes, the most memorable hospitality services are characterized by their memorable gratification of the five senses. In a memorable dining experience, the background music, lighting, aromas, and tastes of the food together influence the overall appreciation of the experience. In contrast to the multisensory nature of those hospitality service experiences, hospitality advertising, in most cases, does not, or cannot provide an adequate level of access to multisensory information (Laroche, et al., 2001; Mittal & Baker, 2002).

Effectively incorporating multisensory information in online hospitality advertising can enhance consumers’ pre-purchase evaluations and lead to favorable marketing outcomes. Elder and Krishna (2010) showed that an ad that attempts to engage consumers five senses (e.g., “this gum is going to stimulate all your five senses”) outperformed an ad that only incorporates taste information (e.g., “this gum is going to provide a long-lasting flavor”) in driving positive pre-purchase evaluations and stimulating buying behaviors. Following Laroche et al.’s (2001) framework, this study proposes that presenting multisensory information in service ads can help hospitality firms overcome the intangibility challenge. Incorporating multisensory information in an ad enhances the vividness of the anticipated service experience and highlights specific multisensory benefits, thereby stimulating more buying behavior. By showcasing the
service delivery process, a multisensory ad can also enhance consumer confidence in the service provider.

Some hospitality companies have utilized multisensory advertisements and experienced favorable marketing outcomes. For example, in South Korea, Dunkin Donuts installed scent diffusers on buses so that a light coffee scent could be released simultaneously with a Dunkin Donuts radio ad (Dublino, 2012). This campaign was a huge success: approximately 350,000 people were exposed to the multisensory ad, resulting in a 16% increase in traffic to stores and a 29% increase in sales. Domino’s Pizza Brazil is another pioneer in multisensory service advertising. Partnering with video rental stores, Domino’s Pizza Brazil placed multisensory pizza ads on DVDs (Mitchell, 2013). As a DVD is played, the disc heats up and releases an enticing pizza aroma. Thanks to thermal ink, the heat also makes a pizza image appear on the disc. When the movie is done, consumers take a “miniature pizza” out of the DVD player complete with aroma and a printed message: “Did you enjoy the movie? The next one will be even better with a hot and delicious Domino’s pizza.”

**Extending Multisensory Advertising into the Online Environment**

Despite an increase in multisensory advertising in the hospitality industry, the practice has yet to be extended to the online environment. Online advertising is a large and rapidly expanding marketing practice in almost all industry sectors. In 2011, internet advertising yielded USD 31.7 billion in revenues for companies in the United States, exceeding, for the very first time, the revenues attributed to traditional advertising media
such as cable television, and in 2012, internet advertising revenues in the United States increased by another 15.2% (PricewaterhouseCoopers, 2012).

Online advertising takes various forms such as targeted advertising, viral marketing, and mobile advertising (Ha, 2008). Previous research results have suggested that online advertising outperforms traditional advertising, such as print advertising, in achieving positive brand evaluation (Sundar & Kim, 2005), is accomplishing better comprehension and recall of the ad contents (Dahlén, Murray, & Nordenstam, 2004) and enhanced purchase intentions (Kimelfeld & Watt, 2001). Compared with traditional advertising, online advertising is relatively inexpensive in nature (Danaher & Dagger, 2013). Furthermore, the vast amount of information in the online environment makes it possible for online advertising to be highly customized in the form of targeted advertising (Lambrecht & Tucker, 2013; Schumann, et al., 2014; Tucker, 2014). The highly interactive nature of the online environment is also increasing customer-to-customer interactions, making it possible for advertising messages to go viral or quickly spread among consumers (Yadav & Pavlou, 2014; Yadav & Varadarajan, 2005). In addition, since today’s consumers regularly use multiple interfaces to engage with internet content (i.e., computers, smart phones, tablets), effective multimedia integration may create a synergy effect and further amplify the positive impact of online advertising (Danaher & Dagger, 2013; Yadav & Pavlou, 2014). While these unique characteristics of online advertising offer innovative possibilities for advertising practices, they also highlight new directions for scholarly research (Yadav & Pavlou, 2014).
How to incorporate multisensory information in online advertising is an unexplored yet highly important subject, particularly for the field of hospitality marketing. Given the industry’s growing reliance on online bookings, online advertising is critical for hospitality firms’ survival in today’s extremely competitive market place (Starkov & Safer, 2013). While presenting multisensory information can help address the intangibility challenge in hospitality advertising, the targeted characteristics of online advertising can critically influence how consumers process the information. This dissertation therefore examines the impact of multisensory information on consumers’ pre-purchase evaluations of hospitality services, in the context of targeted online hospitality advertising.

Overview

From both a managerial and theoretical perspective, it is important to explore how consumers process and respond to multisensory information in targeted online hospitality advertisements. As multisensory processing is the focus and theoretical basis of this dissertation, it will first present a critical review of research on multisensory processing. Building upon a critical analysis of the extant body of literature on multisensory processing, it will then present the problem statement and its research objectives. Then, the major of hypotheses of this dissertation research will be stated, following with the report of findings from one pilot test and two main studies. Finally, potential findings and contributions of this dissertation will be summarized and discussed.
CHAPTER 2
BACKGROUND RESEARCH ON MULTISENSORY PROCESING

To generate a thorough understanding of how consumers process multisensory information, a critical review of relevant consumer behavior research in three contexts is provided: servicescape, product evaluation and advertising. Previous research findings are synthesized into three major themes: (1) cross-modal transfer effects in multisensory processing, (2) cross-modal inhibition effects in multisensory processing, and (3) the congruency rule in multisensory integration and multisensory processing.

Cross-Modal Transfer Effects in Multisensory Processing

One stream of research suggests that multisensory processing follows a cross-modal transfer pattern, meaning that perception in one sensory modality is transferred to other sensory modalities (Krishna & Morrin, 2008; Lwin, Morrin, & Krishna, 2010; Shen & Sengupta, 2014; Xu & Labroo, 2013). Information delivered in one sensory modality directs consumer attention, perception, elaboration and retention of information delivered in other sensory modalities.

First, empirical evidence suggests that sensory perception in one modality directs attention in other sensory modalities. Focused on the attention and perception stage of the consumer decision-making process, Shen and Sengupta (2014) developed a two-stage model of cross-modal attention to account for the impact of an aversive ambient sound
(e.g., an annoying promotions audio clip played repetitively by a loudspeaker) on product choice. At the involuntary stage in which consumers were involuntarily exposed to an aversive ambient sound, their visual attention was directed toward products that were located in the same (vs. the opposite) direction of the sound signal. At the voluntary stage, as consumers voluntarily wanted to avoid the aversive ambient sound, their visual attention was directed toward products that were located in the opposite (vs. the same) direction of the sound signal. Further, such cross-model transfer effects on visual attention were extended influence consumers’ product choice behaviors.

Second, sensory perceptions in one modality can direct consumers’ perceptions and evaluations in other sensory modalities. In the context of product evaluations, Krishna and Morrin (2008) showed that non-diagnostic haptic perceptions can influence consumers’ taste perceptions. For example, when evaluating the taste quality of a bottle of water, the haptic feelings of the bottle is non-diagnostic information for the focal judgment task of taste evaluations. Contradicting the rational belief that the way a container feels in a person’s hand should be unrelated to the quality evaluation of its contents, Krishna and Morrin (2008) showed that the haptic characteristics of a product container (e.g., the firmness of a cup) can significantly influence the taste perceptions of a product (e.g., water). Likewise, Xu and Labroo (2013) found that a visual perception of bright lighting can make consumers feel warmer, even when physical temperature is kept constant.

Third, sensory perception in one modality (e.g., scent) can influence consumers’ elaboration and learning of information delivered in other sensory modalities (e.g., visual
information). Lwin et al. (2010) found that scent enhanced consumers’ recall of verbal information beyond the influence of pictures. When the retrieval cue was unscented, the presence of a visual image in the retrieval cue did not significantly improve recall. However, when the retrieval cue was scented, the presence of the visual image significantly improved recall. The enhanced effect of scent on recall remained, even after a delay.

Last, sensory perceptions in one modality can influence consumers’ preferences for particular types of sensory experiences in other sensory modalities. Xu and Labroo (2013) empirically showed that the visual effect of bright lighting can influence consumers’ taste preferences. They found that, because brightness influences the perception of heat, turning on a light makes consumers feel warmer, which in turn triggers their thrill-seeking intention and desire for spicier foods.

Cross-Modal Inhibition Effects in Multisensory Processing

As consumers possess limited processing capacity, their senses may compete to influence perceptions and evaluations when they are exposed to multisensory information. Since sensory perceptions in certain modalities are particularly dominant, they may hinder or even inhibit other sensory perceptions from affecting consumers’ product evaluations. Specifically, one stream of research is focused on the visual dominance effect. Hoegg and Alba (2007) found that visual cues dominate consumers’ product evaluations in blind tasting experiences. When evaluating whether two beverage
products are the same or different, consumers tend to rely more on visual cues such as color while unconsciously ignoring taste perceptions in their evaluation processes.

Visual input also inhibits the impact of haptic perceptions on product evaluations. Previous research found that participants tend to perceive the taller of two equal volume objects as bigger and pour less orange juice into the taller glass (i.e., elongation bias). According to Krishna’s (2006) explanation, this elongation bias is due to the dominance of visual perception over haptic perception in consumers’ evaluations of spatial volume. While evaluations of spatial volume should be based on both vertical and horizontal dimensions, the human eye mainly relies on the vertical dimension. Although haptic feeling delivers information related to the horizontal dimension such as width, people tend to ignore haptic inputs and rely heavily on visual information when evaluating spatial volume. That is why individuals erroneously perceive the taller of two equal volume objects as being bigger. Findings from three laboratory experiments support this explanation (Krishna, 2006); the elongation bias failed to emerge among participants who were instructed to touch the glasses with their eyes closed.

The Congruency Rule in Multisensory Integration and Multisensory Processing

In certain contexts, multisensory information is integrated into a holistic perception that influences consumers’ emotions, perceptions, evaluations and behaviors. In servicescape and product evaluation contexts, evidence from this research stream demonstrates that multisensory information should be congruent in order to generate positive impact on individual consumers.
Gestalt Integration in Servicescape Design

A servicescape is defined as the manmade physical surroundings in which a service is delivered (Bitner, 1992). Rooted in environmental psychology, the servicescape framework postulates that individuals perceive the various aspects of a physical environment (e.g., ambient conditions; spatial layout and functionality; and signs, symbols and artifacts) in a holistic manner (Bitner, 1992). These holistic perceptions of the environment further influence consumer behaviors in the servicescape. Based on the Gestalt notion, Mattila and Wirtz (2001) highlighted the role of congruency in the multisensory integration of ambient music and scent. Drawing on Mehrabian and Russell’s (1974) affect model, the authors proposed that when the arousing dimensions of ambient scent and music are matched (vs. mismatched), consumers’ emotional and behavioral responses toward the environment should be enhanced. Results of their field experiment largely confirmed their theoretical predictions. The positive effect of congruent multisensory integration was significant for approach behavior, impulse purchases and satisfaction. Meanwhile, the congruency effect was marginal for self-reported levels of pleasure and non-significant for store evaluations.

Extending the “congruency” line of research, Spangenberg, Grohmann, and Sprout (2005) argued that ambient senses should have semantic congruency, meaning that the various ambient senses should feature the same theme. To test their hypotheses, the authors conducted a laboratory experiment. Controlling the ambient scent and music at experimental levels, the authors showed student participants a series of slides depicting a typical department store. Afterwards, participants were asked to evaluate the store
environment. The results revealed a significant scent-by-music interaction effect on store evaluations. Specifically, when there was Christmas music in the background, participants’ attitudes toward the store, visit intentions, pleasure, arousal, dominance and environment evaluations were significantly higher when the scent was Christmas themed as well (vs. no scent). In contrast, when the background music was irrelevant to the Christmas theme, an ambient Christmas scent (vs. no scent) lowered participants’ attitudes toward the store and weakened their retention intentions.

Moreover, store atmosphere and product type should also be congruent in terms of consumption identity. Based on the functional theory of attitude, Schlossor (1998) argued that the retail store ambience functions as a social identity appeal for the products being sold: high quality store ambiance conveys a sense of prestige. Therefore, those products for which social identity values are important (e.g., perfume or cologne) would be rated of higher quality when sold in a prestigious store environment as compared when sold in a discount store environment. Conversely, as for utilitarian products for which social identity values are not important (e.g., toothbrush), the quality of store ambience will not matter for product evaluations. In other words, utilitarian products will be evaluated of equal quality levels when sold in a prestigious store vs. a discount store. In two experiments, the authors found supporting evidence for such theoretical predictions.

**Extension of Gestalt Notion to Product Evaluations**

Extending the Gestalt notion to the context of product perceptions, Krishna, Elder, and Caldara (2010) investigated the impact of an interaction effect of scent and touch on consumers’ product evaluations. Based on the congruency rule in the Gestalt notion, the
authors argued that the scent and the touch of products should convey congruent semantic meanings to generate enhanced product evaluations. The authors demonstrated that when scent and touch were semantically congruent (vs. incongruent), participants evaluated product quality as significantly higher. For example, when both the temperature and the scent of a gel pack were warm, consumers perceived it to be high quality and were more interested in purchasing it than when the temperature and the scent were not congruent.

In sum, previous research revealed that sensory perceptions may transfer among the various modalities to influence consumers’ perceptions and evaluations. In particular, sensory perceptions in one modality can direct consumer attention, perception, elaboration and preference toward information delivered in other sensory modalities. In addition, prior studies revealed a cross-modal inhibition effect, demonstrating that input from dominant sensory modalities (e.g., visual input) can hinder or even inhibit other sensory information from affecting consumers’ product evaluations. Finally, in certain contexts, multisensory information is integrated into a holistic perception that influences consumers’ emotions, perceptions, evaluations and behaviors. In such circumstances, multisensory information should be congruent in order to positively influence individual consumers.
CHAPTER 3
STATEMENT OF RESEARCH OBJECTIVES & THEORETICAL APPROACH

Problem Statement

A review of the literature revealed that the emerging stream of multisensory research has mainly focused on consumers’ consumption experiences with tangible goods (e.g., Hoegg & Alba, 2007; Krishna, et al., 2010). Empirical evidence from the context of intangible services is lacking. In the field of services marketing, previous multisensory research has only addressed the impact of multiple ambient senses on consumers’ perceptions and purchase behaviors (e.g., Mattila & Wirtz, 2001; Zemke & Shoemaker, 2007). Although the topic of multisensory processing has recently begun to be addressed in the advertising literature, the accumulated knowledge in this stream of research is rather sparse, and no empirical research has focused on the emerging area of multisensory online advertising yet.

Statement of Purpose

To address this gap in the literature, the global objective of this dissertation is to contribute to our understanding of consumer responses to multisensory information in the context of online hospitality advertising. Its three major objectives are: 1) to explore additional psychological mechanisms behind consumer responses to multisensory information in online hospitality ads; 2) to contribute to our understanding of how
multisensory information interplay with higher-order cognitive constructs such as consumers’ previous preferences to influence consumption behaviors; and 3) to provide insights into how to use multisensory information to present vice vs. virtue food in the context of targeted online hospitality advertising.

**Understanding Consumer Responses to Multisensory Information in Online Hospitality Advertising: A Mental Imagery Approach**

To date, sensory information has been delivered mainly via visual or audio channels in the online environment. Although other senses such as scent, touch and taste are not directly accessible in online communications, marketers can indirectly promote these sensory aspects of the service experience via an imagery approach. With a creative twist, online hospitality advertising can prompt consumers to engage in vivid mental imagery of the multisensory service experience without the physical presence of multisensory stimuli. For example, when promoting the new “Chocolate Chai Tea Latte,” Starbucks engages consumers’ senses to develop an enticing consumption image: “The creamy warmth of sweet foam (taste) swirling (vision) with decadent spice (scent and taste). We’ve taken this seasonal favorite and added a kiss of creamy chocolate flavor (taste). Every delicious sip, a warm blend of spices, black tea and chocolaty goodness that melts into joy” (Starbucks, 2014).

This dissertation thus follows a mental imagery approach to understand consumer responses to multisensory information incorporated in online hospitality ads. As a mode of processing, mental imagery represents concrete sensory experiences in working
memory in the absence of physical sensory stimuli (MacInnis & Price, 1987; Yuille & Catchpole, 1977). Evidence from previous research suggests that the evocation and vividness of imagery processing depends on an individual’s previous experiences (Yuille & Catchpole, 1977), level of knowledge (Smith, Houston, & Childers, 1984), style of processing (Chang, 2013), imagery ability (Lee & Qiu, 2009), availability of cognitive processing resources (Unnava, Agarwal, & Haugtvedt, 1996), and external resources and opportunities in the advertising context (Schlosser, 2003; Unnava, et al., 1996; Unnava & Burnkrant, 1991). Further, modality specific mental imagery effects have been demonstrated among the five senses.

**Visual Imagery**

In previous research, it has been shown that with appropriate external facilitation, consumers can successfully imagine what an object looks like without actually seeing it. Prior studies show that visual imagery has an important impact on consumer responses toward advertisements, leading to higher levels of pre-purchase evaluations and purchase intentions (Adaval, Isbell, & Wyer Jr, 2007; Adaval & Wyer Jr, 1998; Dahl, Chattopadhyay, & Gorn, 1999; Escalas, 2004; Hung & Wyer Jr, 2011; Jiang & Wyer Jr, 2009; Peck & Shu, 2009; Rajagopal & Montgomery, 2011; Shiv & Huber, 2000; Unnava, et al., 1996; Wyer Jr, Hung, & Jiang, 2008).
Auditory Imagery

In another stream of research, scholars have investigated the phenomena of auditory imagery: the imagined experience of as if hearing a sound (for an extensive review, see Hubbard, 2010). Evidence from previous research suggests that auditory imagery preserves many properties of real sound (e.g., pitch, timbre and loudness) (Hubbard, 2010). In addition, Functional Magnetic Resonance Imaging evidence revealed that auditory imagery seems to activate brain areas that are typically involved in auditory perceptions (Yoo, Lee, & Choi, 2001). As with visual imagery, the auditory imagery process employs individuals’ limited cognitive resources. However, unlike visual imagery, auditory imagery is more dependent on a higher order elaboration process; the evocation of auditory imagery and its vividness often rely on an individual’s interpretation of the stimulus.

Haptic Imagery

Evidence related to haptic imagery is rather scarce. Peck, Barger, and Webb (2013) examined the impact of haptic imagery on consumers’ perceived ownership. They found that when visual input was absent (i.e., participants were asked to close their eyes), haptic imagery (i.e., imagining touching an object without actually doing so) produced a similar effect as actual touch on consumers’ perceptions of physical control. The enhanced sense of physical control further increased psychological ownership of the stimuli. More vivid haptic imagery was associated with greater perceived physical control and psychological ownership among participants.
Olfactory Imagery

Most recently, Krishna, Morrin, and Sayin (2014) investigated olfactory imagery, or the ability “to experience the sensation of smell when an appropriate stimulus is absent” (Stevenson & Case 2005, p. 244). The authors found that olfactory imagery, just like actual olfactory experiences, can enhance consumer physiological, evaluative and consumptive responses (Stevenson & Case, 2005). Consistent with prior psychology research (Djordjevic, Zatorre, Petrides, & Jones-Gotman, 2004), Krishna et al. (2014) also demonstrated that olfactory imagery is highly dependent on visual imagery, and olfactory imagery effects occur only when consumers can create a visual image of the odor reference.

Gustatory Imagery

Further, empirical evidence on gustatory imagery remains unclear. On the one hand, research evidence reveals the difficulty of imagining taste alone, as taste has been shown to be a combined reflection of other sensory inputs (Djordjevic, et al., 2004; Elder & Krishna, 2012). On the other hand, functional imaging evidence shows that gustatory imagery involves the same brain areas as gustatory perceptions (Farah, 1989; Kikuchi, Kubota, Nisijima, Washiya, & Kato, 2005; Kobayashi et al., 2004; Kosslyn, 2005; Palmiero et al., 2009), indicating the possibility that gustatory imagery does not necessarily rely on other sensory imagery.

Taken together, previous research has explored mental imagery effects in various sensory modalities, with the majority of attention dedicated to visual and auditory
imagery. While prior studies revealed some interesting cross-modal dependency effects in sensory imagery, few researchers have engaged in systematic investigations of the impact of multisensory imagery on consumer behavior (Peck & Childers, 2008). In the contexts of targeted online advertising, this dissertation will examine the impact of multisensory information on consumers’ mental imagery process and their pre-purchase evaluations of the advertised hospitality service.

Multisensory Imagery and Targeted Advertising: Research Questions

Traditionally, advertising messages tend to be generically directed to the mass public. Nowadays, with advanced technology, companies can direct their advertising efforts toward individual customers through targeted online advertising (Lambrecht & Tucker, 2013; Schumann, et al., 2014). Targeted online advertising can be defined as any form of online advertising that is based on information the advertiser has about the advertising recipient, such as demographics, current or past browsing or purchase behavior (Schumann, et al., 2014). By 2014, corporate spending on targeted online advertising is expected to surpass USD 2.6 billion (Schumann, et al., 2014).

Among various types of targeted online advertising, behavioral targeting has received major attention from practitioners due to its significant impact on sales and revenues (Danaher & Dagger, 2013; Lambrecht & Tucker, 2013). Behavioral targeting customizes the advertising message according to individual consumers’ previous purchase behaviors and preferences, and hence is perceived as of high personal relevance and receives more positive consumer responses (Lambrecht & Tucker, 2013). For
example, companies can now incorporate guest’s previous purchase and preference information when introducing new products and services to the market. Based on a customer’s “like” and “heart” histories, companies now can personalize their advertising appeals toward each individual customer’s specific preferences: “You like our product A? You will like our product B as well.” Though an average consumer might have seen this type of advertising propaganda over and over again, the effectiveness of this type of targeted advertising is not thoroughly understood by the extant body of hospitality marketing literature. How can targeted ads enable consumers to transfer their liking for an existing favorite to an advertised product? With the focus on behavioral targeting, this research aims to provide answers to this question.

Specifically, the current research highlights the role of multisensory imagery in the effectiveness of targeted advertising. Since the consumption experiences for many hospitality services are multisensory in nature, inviting consumers to engage in multisensory imagery is a widely used advertising tool for hospitality companies. For example, Starbucks engages consumers’ five senses to promote their Chocolate Chai Tea Latte:

“The creamy warmth of sweet foam swirling with decadent spice. We’ve taken this seasonal favorite and added a kiss of creamy chocolate flavor. Every delicious sip, a warm blend of spices, black tea and chocolaty goodness that melts into joy." (Starbucks, 2014)

The current research proposes that, when incorporated in a targeted ad, the above type of multisensory imagery links the base and target products and enables the desired
transfer effects. Further, building upon the previous research that revealed both positive and negative effects of mental imagery on product preferences (Escalas, 2004; MacInnis & Price, 1987; Petrova & Cialdini, 2005), the current research also reveals the circumstances under which multisensory imagery will foster or attenuate the effect of targeted advertising. To that end, this research focuses on the timing to introduce multisensory imagery. In advertising practice, multisensory imagery can be introduced both before and after new product information. Will such a trivial difference shed significant impact on the effectiveness of targeted advertising? While this question is perhaps raised by many advertisers during their day to day practices, it remains underexplored by theoretical research. This research aimed to provide answer to this question.
CHAPTER 4
HYPOTHESES DEVELOPMENT

A targeted ad such as “if you like our product A, you will like our product B” uses an experiential analogy that cues ad viewers to develop prepurchase evaluations for the target product (product B) based on his/her own personal knowledge of the base product (product A) (Gentner, 1989; Gentner & Holyoak, 1997; Gentner & Markman, 1997; Goode, Dahl, & Moreau, 2010). Previous research revealed an “access-mapping-transfer” process by which experiential analogy influences target product evaluations (Goode, et al., 2010). To have an experiential analogy influence an ad viewer’s attitude towards the target product, one should first activate his/her knowledge related to the base experience, and then identify the relational similarities between base and target experiences, and finally generate emotional inferences regarding the target product. If any step along the process broke down, experiential analogy would fail to influence the ad viewer’s attitude towards the target product (Goode, et al., 2010). Given such fragility of experiential analogy, marketing practitioners are looking into ways to foster the “access-mapping-transfer” process so that the effectiveness of the targeted ad can be ensured.

Engaging consumers to develop multisensory imagery for the target product can be an operable solution. Multisensory imagery activates an individual’s memory of past experiences (Elder & Krishna, 2010; MacInnis & Price, 1987) to project and fantasize about future experiences (Burns, Biswas, & Babin, 1993; Escalas, 2004; MacInnis &
Price, 1987). As such an “integration-projection” process fuses the past consumption experience of base product together with one’s anticipation of the target product, it can facilitate the mapping process and hence foster the effectiveness of targeted advertising. In addition, experiential analogy can also be seen as a memory-based choice task since the success of experiential analogy relies on the individual’s access to his/her knowledge of a past experience. Along this line of thinking, the addition of multisensory imagery shall enhance the persuasive power of targeted ads since memory-based choice tasks were found to favor immediately enticing, affect rich options (Rottenstreich, Sood, & Brenner, 2007).

**Timing to Introduce Multisensory Imagery**

Yet, the positive impact of multisensory imagery on targeted advertising is conditioned on the timing to introduce multisensory imagery. In a targeted ad, the company may first introduce the new product by associating it to a consumer’s existing favorite (i.e., product pair information; e.g., “We know you love our Caramel Latte, now please allow us to introduce our Caramel Mocha”), and then promote consumers to engage in the multisensory imagery of the target product. Likewise, the ad may first engage consumers in multisensory imagery and then introduce the product pair information. This research expects that the timing to introduce multisensory imagery (i.e., before vs. after the product pair information) will influence the effectiveness of targeted advertising, particularly for certain consumers.
When multisensory imagery is introduced after product pair information, both base and target product information is readily accessible. Introducing multisensory imagery then can help the ad viewer link past consumption experience of the base product and anticipation of the target product and identify relational similarities, or alignability between the paired products (Biswas, Labrecque, Lehmann, & Markos, 2014). The fostered mapping process will further enable the ad viewer to transfer his/her preference for the base product to the target product (Gentner, 1989; Gentner & Holyoak, 1997; Gentner & Markman, 1997; Goode, et al., 2010). In other words, when multisensory imagery is introduced after product pair information, consumers’ prepurchase evaluations for the target product such as anticipated taste and product attitude will be assimilated toward their preference for the base product.

However, when multisensory imagery is introduced before product pair information, the effects will be different. Introducing multisensory imagery without access to both base and target product information will fail to provide mapping points to enable the transfer process. Further, while mental imagery is cognitively taxing by nature (Bone & Ellen, 1992; Bruyer & Scailquin, 1998; Escalas, 2004; Mazzocco & Brock, 2006; Unnava, et al., 1996), the mapping and transfer steps of analogical thinking require abundant amount of cognitive resources (Goode, et al., 2010; Kubose, Holyoak, & Hummel, 2002; Roehm & Sternthal, 2001). Therefore, when multisensory imagery is introduced before product pair information, the ad viewers’ cognitive resources will be strained (Mazzocco & Brock, 2006) and the transfer process will be blocked (Goode, et al., 2010). In other words, when multisensory imagery is introduced before product pair
information, consumers’ preference for the base product will fail to influence their prepurchase evaluations for the target product.

**Boundary Factor of Chronic Processing Orientation**

The individual ad viewer’s chronic processing orientation will further complicate the above effects. According to the cognitive-experiential self theory (Epstein, 1994, 1998; Epstein, Pacini, Denes-Raj, & Heier, 1996), individuals adopt two parallel information processing systems: an analytical system and an experiential system. The analytical system predominantly employs a rational style of processing that is characterized by the conscious piece-meal appraisal of events. The experiential system employs an intuitive-based style of processing that is characterized by the holistic or global evaluation of events. In general, individuals have the chronic orientation to rely more on either the analytical or the experiential system when attending to external stimuli.

Linked to the current research, compared to their analytical counterparts, the experiential processors will more likely to piece-up the information to form a holistic assessment when exposed to both product pair and multisensory imagery information. Such a holistic style of processing is, by nature, congruent with the “integration-projection” process in multisensory imagery and experiential analogy thinking (Chang, 2013; Khooshabeh, Hegarty, & Shipley, 2013; MacInnis & Price, 1987). Thus, the timing-moderated base preference transfer effect will be significant among experiential processors.
Meanwhile, the analytical processors process information in a piece-meal manner (Epstein, 1998; Pacini & Epstein, 1999). Such a processing style is incompatible with the holistic characteristic of imagery processing and experiential analogy thinking (Chang, 2013; Khooshabeh, et al., 2013; Thompson & Hamilton, 2006). Since the analytical processors are “bad imagers”, their responses to the ad will not follow the “integration-projection” process in multisensory imagery and experiential analogy thinking. In other words, multisensory imagery information will not influence, but only product pair information will influence analytical processors’ pre-purchase evaluations. Therefore, the timing effect of multisensory imagery will not influence this group of consumers’ pre-purchase evaluations. Regardless of the timing to introduce multisensory imagery, analytical processors’ pre-purchase evaluations for the target product will be influenced by their base product preference alone. Taken together, the following hypotheses are proposed:

**H1:** For experiential processors, when exposed to multisensory imagery after the product pair information, (a) anticipated taste and (b) attitude toward the target product will be assimilated toward base product preference.

**H2:** For experiential processors, when exposed to multisensory imagery before the product pair information, the assimilation effect of base product preference on (a) anticipated taste and (b) attitude toward the target product will be attenuated.
H3: For analytical processors, regardless of when multisensory imagery is introduced, (a) anticipated taste and (b) attitude toward the target product will be assimilated toward base product preference.

The proposed hypotheses are visualized in Figure 4-1.

![Figure 4-1 Conceptual Diagram](image_url)

**Virtue vs. Vice Food Consumption**

The previous hypotheses focused on the conditional assimilation effects on affect- and sensory-based pre-purchase evaluations. Do these assimilation effects extend to cognitive processes such as calories estimations? The next series of hypotheses explore this question along the stream of research on vice vs. virtue food consumption (Mishra & Mishra, 2011; Shiv & Fedorikhin, 1999; Wertenbroch, 1998).

The school of research on vice vs. virtue food consumption revealed that, oftentimes, taste and health goals cannot be met simultaneously in food consumptions
and hence consumers tend to categorize food products in two groups: virtue or vice. While virtue foods are perceived as being healthy but not tasty (e.g., green salad), vice foods are perceived as being tasty but not healthy (e.g., chocolate cake) (Chernev, 2011). With the end goal to curb unhealthy choices, this stream of research has examined various mechanisms (e.g., satiation, Redden & Haws, 2013; trade-offs and depletion, Wang, Novemsky, Dhar, & Baumeister, 2010; self-signaling, Dhar & Wertenbroch, 2000; embodied myopia, Van den Bergh, Schmitt, & Warlop, 2011) that shape consumers’ prepurchase evaluations and purchase behaviors for both single food items (e.g., Chernev, 2011) and vice-virtue bundles (e.g., Chernev & Gal, 2010). In addition, prior studies also revealed that the choice between vice vs. virtue food can be influenced by various product (e.g., product size, Haws & Winterich, 2013), consumer trait (e.g., belief in malleable fate, Kim, Kulow, & Kramer, 2014) and contextual factors (e.g., assortment size, Sela, Berger, & Liu, 2009; other customers, McFerran, Dahl, Fitzsimons, & Morales, 2010; promotion type, Mishra & Mishra, 2011).

More recently, Liu et al. (forthcoming) examined customer segmentation effect yielded by the virtue vs. vice food categorization. The authors found three different consumer segments: vice-lovers vs. virtue accepters vs. virtue lovers (Liu, et al., forthcoming). Vice lovers are those consumers who perceive vices as tastier than virtues and tend to prioritize taste over health goals when these two goals cannot be met simultaneously. In turn, vice lovers typically choose vices over virtues. Virtue accepters, on the other hand, prioritize health over taste goals and typically choose virtues over
vices. Finally, virtue lovers are those who do not perceive vice food as tastier than virtue food – in simple words, they perceive green salad as delicious.

A significant proportion of the U.S. population is suffering from overweight issues. To help consumers make better food purchase decisions and derive enhanced enjoyment in food consumption process, a recent trend in the restaurant industry is to provide hybrid menu items that are featured as both tasty and healthy (e.g., virtue and vice bundles, Liu, et al., 2014). However, as consumers tend to position healthiness and tastiness perceptions in opposition to each other, such hybrid items could be perceived as “not tasty” by vice lovers but “not healthy” by virtue accepters. In the end, such perceptions may cause those hybrid menu items to be not well received by the market.

So, how to advertise a hybrid food item that is both healthy and tasty to different consumer segments? This dissertation research also aims to explore if targeted promotion of such hybrid food items can benefit from the incorporation of multisensory imagery. Specifically, this study focuses on the two consumer segments: the vice lovers and the virtue accepters.

Assume that a casual dining restaurant has the Creamy Mango Smoothie (a vice item) and the Non-fat Mango Smoothie (a virtue item) on the menu and now wants to promote a new beverage item, Non-fat Creamy Mango Smoothie, which is a perfect blend of healthiness and tastiness. Promotions for this new beverage may be targeted toward two different groups of customers based on their existing preferences: the vice lovers and the virtue accepters. Before the new hybrid item is introduced to the market, the vice lovers are already in love with the Creamy Mango Smoothie (a vice item), while
the virtue accepters prefer the Non-fat Mango Smoothie knowing the fact that the Creamy Mango Smoothie tastes better.

Previous research suggests that consumers typically position tastiness and healthiness qualities in opposite to each other. As such, the healthiness attribute added to a hybrid product may actually attenuate its tastiness quality while the tastiness attribute added to a hybrid product may diminish its healthiness quality. Linked to the context of current research, without multisensory imagery information, the vice lovers will question the product’s tastiness given that the hybrid product is “non-fat” while the virtue accepters will question the product’s healthiness given that it is also “creamy”. In either case, consumers’ pre-purchase evaluations for the new product will be diminished.

For experiential processors, when multisensory imagery is introduced after (vs. before) the product pair information, the imagery process will foster (vs. impede) the ad viewer to assimilate the target product to the base product. Therefore, when exposed to a target ad that introduces multisensory imagery after (vs. before) the product pair information, the vice lovers will perceive the new beverage item to be more tasty, while the virtue lovers will perceive the new product to be healthier (i.e., to contain fewer calories). Taken together, I propose that, when promoting a new hybrid food item in a targeted manner:

**H4: Among experiential processors, consumer segment moderates the effect of multisensory imagery timing on anticipated taste.**
H₄ₐ: Among experiential processors, **vice lovers** will anticipate the new beverage as more tasty when the targeted ad introduces multisensory imagery after (vs. before) the product pair information.

H₄₇: Among experiential processors, **virtue accepters** will exhibit no difference for anticipated taste when the targeted ad introduces multisensory imagery after vs. before the product pair information.

H₅: Among analytical processors, the interaction effect of timing and consumer segment on anticipated taste will be attenuated and there will be no timing-based difference for anticipated taste among either consumer segments.

H₆: Among experiential processors, consumer segment moderates the effect of multisensory imagery timing on estimated calories.

H₆ₐ: Among experiential processors, **virtue accepters** will estimate the new beverage as to contain fewer calories when the targeted ad introduces multisensory imagery after (vs. before) the product pair information.

H₆₇: Among experiential processors, **vice lovers** will exhibit no difference for estimated calories when the targeted ad introduces multisensory imagery after vs. before the product pair information.
H7: Among analytical processors, the interaction effect of timing and consumer segment on estimated calories will be attenuated and there will be no timing-based difference for estimated calories among either consumer segments.
CHAPTER 5
METHOD AND RESULTS OF THE PILOT STUDY

Before conducting the main studies, there is an important question that needs to be answered: Can the incorporation of multisensory imagery really enhance the persuasive power of targeted advertising? After all, if the incorporation of multisensory imagery does not provide additional value to the targeted ad, why should advertisers consider the question of when to introduce multisensory imagery? A pilot study was thus carried out to explore this question.

Design and Participants

The pilot study adopted a simple one-way experimental design with three experimental conditions: 1) the ad only introduces product pair information, or 2) multisensory imagery was introduced before the product pair information, or 3) multisensory imagery was introduced after the product pair information.

Forty five adult participants were recruited on Amazon Mechanical Turk as participants of this study. The participants were randomly assigned to one of the three experimental conditions. Due to the context of the study stimuli, all of our participants were required to be coffee drinkers. On average, the participants purchased coffee drinks about 2 times in the preceding week. The sample consisted of 22 female participants and
23 male participants. More than 55% of the participants hold a bachelor’s degree, and approximately 69% of the participants were Caucasian. The average age of the sample was 32 years old.

**Procedure and Stimuli**

In the scenario, participants were instructed to imagine being a loyal customer to a hypothetical café company named Café Villa. One day, while browsing online, they receive a direct advertising email from Café Villa. This video-based email ad promotes a new coffee beverage, Hazelnut Cappuccino, in association with a base coffee beverage, Almond Cappuccino. Specifically, the product pair information reads as the following:

"If you like our Almond Cappuccino, you will like our Hazelnut Cappuccino as well”.

In the multisensory imagery before (later) condition, the ad describes the following multisensory imagery of the consumption experience, before (after) the beverage pair is introduced:

"Take a deep breath...And just imagine the enticing aroma, the foamy kiss, and the luscious mixture of steamed milk and darkly roasted espresso...”

In the product pair information only condition, no multisensory imagery information is provided. Screen shots of the experiment stimuli are enclosed as Appendix A.
Measures

After the scenario, participants were asked to finish a short survey in which participants’ anticipated taste and attitude towards the advertised product were measured. **Anticipated taste** was measured with a two item scale adapted from Elder and Krishna (2012) (1pt - very poor taste, 7-pt - very good taste; 1pt – not at all delicious, 7-pt – very delicious; r=0.913, p-value =0.000). **Attitude toward the beverage product** was measured with a three item scale adapted from Elder and Krishna (2012) (1pt - bad/unfavorable/ unpleasant; 7pt - good/favorable /pleasant; Cronbach’s α = 0.926).

**Imagery vividness** was measured with a battery of items adapted from Tuan Pham, Meyvis, and Zhou (2001) (How clear and vivid was your imagination for: the visual appearance of the coffee; the enticing aroma; the tasting experience; the first sip; the foamy cream; the taste of the mixture of espresso and cream; the touch of the coffee cup; the sound of drinking the coffee; 1-not at all clear and vivid, 7-very clear and vivid; Cronbach’s α = 0.861). In addition, **perceived similarity** between the base and target products was measured with a four item scale (1pt - not alike/not at all similar/do not match/do not fit; 7pt – very much alike/very similar/match very well/fit very well; Cronbach’s α =0.951). Finally, participants’ demographic information was measured.

Manipulation Check

Participants’ response to the **imagery vividness** measures demonstrated that the instruction of multisensory imagery was quite effective (M=5.45). Participants in the two
multisensory imagery conditions reported significantly higher levels of imagery vividness as compared with their counterparts the product information only condition (contrast=0.87, t=-2.765, p-value=0.011). Meanwhile, imagery vividness was found to be no different between the multisensory imagery before vs. after conditions (contrast=0.21, t=0.732, p-value=0.470). In addition, reported levels of perceived similarity between the base and target products were no different among the experimental conditions (M=5.18; F(2,42)=1.11, p-value=0.338). Finally, participants reported high levels of perceived realism (M=5.93) and comprehendingability (M=6.02) for the experiment stimuli.

**Analysis and Results**

A one-way ANOVA with planned contrasts was conducted to test if incorporating multisensory imagery in a targeted ad can enhance consumers’ prepurchase evaluations for the advertised products.

Results suggested that both anticipated taste (F(2,42)=10.70, p-value=0.000) and product attitude (F(2,42)=7.68, p-value=0.001) were significantly different among the three experiment conditions. Further, planned contrast tests revealed that compared with the two multisensory imagery conditions, the product pair information only condition resulted in significantly lower levels of anticipated taste (contrast=-2.30, t=3.568, p-value=0.003) and product attitude (contrast=-1.97, t=2.989, p-value=0.009). Meanwhile, between the two multisensory imagery conditions, anticipated taste (contrast=0.03, t=-
0.205, p-value=0.839) and product attitude (contrast=0.00, t=0.000, p-value=1.000) were not significantly different.

Figure 5-1 visualizes the cell means for anticipated taste and product attitude.

![Means Plot of Pilot Study Results](image)

**Figure 5-1 Means Plot of Pilot Study Results**

Discussion

Results of the pilot study demonstrated that the instruction used in the experiment stimuli was effective to evoke vivid multisensory imagery. The chosen paired products were found to be reasonably similar between each other. Overall, the stimuli were found to be realistic and comprehensible by the participants. In addition, consistent with the line of reasoning in previous literature (Rottenstreich, et al., 2007), the findings of this pilot study suggested that multisensory imagery can indeed enhance the impact of
targeted advertising on consumers’ prepurchase evaluations such as anticipated taste and product attitude.

Though the results showed no overall difference in anticipated taste and product attitude when multisensory imagery is introduced before vs. after the product pair information, such timing-based difference may exist among certain consumer segments and in certain advertising and product contexts. With stimuli ready and such curiosities in mind, I thus proceed to the following two main studies to test the proposed hypotheses.
CHAPTER 6
METHOD AND RESULTS OF STUDY 1

Design and Participants

The objective of study 1 was to test the proposed hypotheses of H1 to H3. Study 1 adopted a between-subject experiment with one manipulated factor - the timing to introduce multisensory imagery (before vs. after the product pair information) and two measured factors – participants’ preference for base product and chronic processing orientation.

A total of 241 adult participants were recruited on Amazon Mechanical Turk to participate in this study, and all participants were randomly assigned to one of the experimental conditions. All of our participants were coffee drinkers and they patron coffee shops 1.5 times on average in the previous week. The gender split of the sample was 44% female and 56% male. About 91.7% of the participants hold a college degree, and 84% of the participants were Caucasian. The average age of the participants was 34 years old.

Procedure and Stimuli

First, participants were directed to fill out a chronic processing orientation measure. Then, following the same stimuli as in the pilot study, participants were
instructed to imagine being a loyal customer and receive a direct promotion email from a hypothetical café company named Café Villa. The video based ad promotes a new coffee beverage, Hazelnut Cappuccino, in association with a baseline coffee beverage, Almond Cappuccino. Specifically, the product pair information reads as the following:

“If you like our Almond Cappuccino, you will like our Hazelnut Cappuccino as well”.

In addition, the following multisensory imagery of the consumption experience was introduced, either before or after the beverage pair is introduced:

“Take a deep breath…And just imagine the enticing aroma, the foamy kiss, and the luscious mixture of steamed milk and darkly roasted espresso…”

Screen shots of the experiment stimuli are enclosed as Appendix A. After the scenario, participants were asked to finish a short survey in which their preference for the baseline beverage, Almond Cappuccino, is measured. Stimuli and measurement scales of the study were the same as in study 1.

Measures

Participants’ chronic processing orientation was measured with a twelve-item scale adapted from Pacini and Epstein (1999) (for analytical processing orientation: “I try to avoid situations that require thinking in depth about something (reversely coded)”, “I enjoy solving problems that require hard thinking”, “I prefer complex problems to simple
problems”, “I have a logical mind”, “Using logic usually works well for me in figuring out problems in my life”, “I usually have clear, explainable reasons for my decisions”; 1pt – This statement does not describe me at all, 7-pt – This statement describes me very well; Cronbach’s α = 0.849; for experiential processing orientation: “I like to rely on my intuitive impressions,” “Using my gut feelings usually works well for me in figuring out problems,” “Intuition can be a very useful way to solve problems,” “I trust my initial feelings about people,” “I tend to use my heart as a guide for my actions,” and “I can usually feel when a person is right or wrong, even if I can't explain how I know”; 1pt – This statement does not describe me at all, 7-pt – This statement describes me very well; Cronbach’s α = 0.895). Consistent with previous research (e.g., Chang, 2013), participants’ **chronic processing orientation score** was calculated by taking average of the reversed analytical processing index and the experiential processing index (lower scores indicating analytical processors and higher scores reflecting experiential processors).

Participants’ **preference for the base product**, almond cappuccino, was measured with a three-item scale adapted from Elder and Krishna (2012) (“Almond Cappuccino is very delicious”, “I personally like Almond Cappuccino a lot”, and “Almond Cappuccino is very tasty”; 1pt – Strongly Disagree, 7-pt – Strongly Agree; Cronbach’s α =0.962).

Measures for the two dependent variables follow the same scale used in the pilot study. **Anticipated taste** was measured with a two item scale adapted from Elder and Krishna (2012) (1pt - very poor taste, 7-pt - very good taste; 1pt – not at all delicious, 7-pt – very delicious; r=0.869, p-value =0.000). **Attitude toward the beverage product** was
measured with a three item scale adapted from Elder and Krishna (2012) (1pt - bad/unfavorable/ unpleasant; 7pt - good/favorable /pleasant; Cronbach’s α = 0.946).

Participants’ **imagery vividness** was measured with a battery of items adapted from Tuan Pham, et al. (2001) (How clear and vivid was your imagination for: the visual appearance of the coffee; the enticing aroma; the tasting experience; the first sip; the foamy cream; the taste of the mixture of espresso and cream; the touch of the coffee cup; the sound of drinking the coffee; 1-not at all clear and vivid, 7-very clear and vivid; Cronbach’s α = 0.861).

Finally, **perceived similarity** between the base and target products was measured with a four item scale (1pt - not alike/not at all similar/do not match/do not fit; 7pt – very much alike/very similar/match very well/fit very well; Cronbach’s α =0.945). In addition, participants’ demographic information and previous experiences of visiting coffee shops, general liking of coffee beverage were also measured.

**Manipulation Check**

Participants report equally high levels of **imagery vividness** in both before and after conditions (M=5.09; M_{MIfirst}=5.12, M_{MIfater}=5.07; t=0.38, p-value=0.70). Participants’ **preference for the base product**, the Almond Cappuccino, were consistent in both MI first and MI later conditions (M=5.11; M_{MIfirst}=5.12, M_{MIfater}=5.11; t=0.06, p-value=0.96). In addition, participants’ reported scores of **chronic processing orientation** were not significantly different in MI first and MI later conditions (M=3.25; M_{MIfirst}=3.30,
Finally, perceived similarity between the base product and advertised product were not significantly different in MI first vs. MI later conditions (M=5.25; M\text{MI first}=5.29, M\text{MI after}=5.21; t=0.45, p-value=0.65).

### Analysis & Results

Along with H₁, H₂ and H₃, it is expected that, among experiential but not analytical processors, base product preference predicts anticipated taste and product attitude when multisensory imagery is introduced after (vs. before) product pair information. Descriptive statistics of the experimental cells are displayed in Table 6-1.

**Table 6-1 Descriptive Statistics of the Experimental Cells**

<table>
<thead>
<tr>
<th>Experimental Cells</th>
<th>N</th>
<th>Mean (S.D.)</th>
<th></th>
<th>Mean (S.D.)</th>
<th>Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Base Preference</td>
<td>Chronic Processing Orientation</td>
<td>Taste</td>
<td></td>
</tr>
<tr>
<td>MI Later</td>
<td>117</td>
<td>5.12 (1.24)</td>
<td>3.30 (0.87)</td>
<td>6.06 (0.89)</td>
<td>6.15 (0.91)</td>
</tr>
<tr>
<td>MI Later</td>
<td>124</td>
<td>5.11 (1.35)</td>
<td>3.21 (0.79)</td>
<td>6.00 (0.86)</td>
<td>6.07 (0.90)</td>
</tr>
</tbody>
</table>
To test the proposed three way interaction effect of base product preference, timing and chronic processing orientation, multiple-regression based moderation analyses were conducted on anticipated taste and product attitude (PROCESS model 3). Specifically, base product preference was used as the independent variable (variable X), while timing (variable M) and chronic processing orientation (variable W) were entered as moderating variables. Both base product preference and chronic processing orientation were mean centered before entering into the testing models. Regression results are displayed in Table 6-2 and Table 6-3.

Consistent with the theoretical predictions, the three way interaction effect was significant for both anticipated taste ($\beta=0.207$, $t=2.223$, p-value=0.027) and product attitude ($\beta=0.250$, $t=2.540$, p-value=0.012). The same as predicted, the interaction term of base product preference and timing has significant effects on anticipated taste among experiential processors (+ 1 SD; for anticipated taste, $\beta=0.361$, $t=3.097$, p-value=0.002; for product attitude, $\beta=0.257$, $t=2.087$, p-value=0.038) but no significant effects among analytical processors (- 1 SD; for anticipated taste, $\beta=0.018$, $t=0.165$, p-value=0.869; for product attitude, $\beta=-0.158$, $t=-1.413$, p-value=0.159).
Table 6-2  Regression Table of Study 1 Results – Anticipated Taste

<table>
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<tr>
<th></th>
<th>Coefficient</th>
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<th>t</th>
<th>p-value</th>
<th>LLCI</th>
<th>ULCI</th>
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<tr>
<td>Base Preference</td>
<td>0.162</td>
<td>0.059</td>
<td>2.725</td>
<td>0.007</td>
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<td>0.278</td>
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<td>MI Timing</td>
<td>-0.149</td>
<td>0.108</td>
<td>-1.377</td>
<td>0.170</td>
<td>-0.361</td>
<td>0.064</td>
</tr>
<tr>
<td>Chronic Processing Orientation (CPO)</td>
<td>0.264</td>
<td>0.097</td>
<td>2.714</td>
<td>0.007</td>
<td>0.072</td>
<td>0.456</td>
</tr>
<tr>
<td>Base Preference X MI Timing</td>
<td>0.191</td>
<td>0.080</td>
<td>2.387</td>
<td>0.018</td>
<td>0.033</td>
<td>0.349</td>
</tr>
<tr>
<td>Base Preference X CPO</td>
<td>-0.162</td>
<td>0.072</td>
<td>-2.245</td>
<td>0.026</td>
<td>-0.304</td>
<td>-0.020</td>
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<tr>
<td>MI Timing X CPO</td>
<td>-0.242</td>
<td>0.137</td>
<td>-1.766</td>
<td>0.079</td>
<td>-0.513</td>
<td>0.028</td>
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<td>3-way Interaction</td>
<td>0.207</td>
<td>0.093</td>
<td>2.223</td>
<td>0.027</td>
<td>0.024</td>
<td>0.391</td>
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<td><strong>Model Summary</strong></td>
<td>R</td>
<td>R-square</td>
<td>F</td>
<td>df1</td>
<td>df2</td>
<td>p-value</td>
</tr>
<tr>
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<td>0.460</td>
<td>0.211</td>
<td>8.911</td>
<td>7.000</td>
<td>233.000</td>
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Table 6-3  Regression Table of Study 1 Results – Product Attitude

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<th>LLCI</th>
<th>ULCI</th>
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</thead>
<tbody>
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<td>0.082</td>
<td>74.139</td>
<td>0.000</td>
<td>5.896</td>
<td>6.218</td>
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<td></td>
</tr>
<tr>
<td>Base Preference</td>
<td>0.227</td>
<td>0.063</td>
<td>3.624</td>
<td>0.000</td>
<td>0.104</td>
<td>0.351</td>
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<td>MI Timing</td>
<td>-0.137</td>
<td>0.114</td>
<td>-1.201</td>
<td>0.231</td>
<td>-0.362</td>
<td>0.088</td>
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<td>Chronic Processing Orientation (CPO)</td>
<td>0.275</td>
<td>0.103</td>
<td>2.674</td>
<td>0.008</td>
<td>0.072</td>
<td>0.478</td>
</tr>
<tr>
<td>Base Preference X MI Timing</td>
<td>0.052</td>
<td>0.085</td>
<td>0.615</td>
<td>0.539</td>
<td>-0.115</td>
<td>0.219</td>
</tr>
<tr>
<td>Base Preference X CPO</td>
<td>-0.217</td>
<td>0.076</td>
<td>-2.838</td>
<td>0.005</td>
<td>-0.367</td>
<td>-0.066</td>
</tr>
<tr>
<td>MI Timing X CPO</td>
<td>-0.220</td>
<td>0.145</td>
<td>-1.517</td>
<td>0.131</td>
<td>-0.506</td>
<td>0.066</td>
</tr>
<tr>
<td>3-way Interaction</td>
<td>0.250</td>
<td>0.099</td>
<td>2.540</td>
<td>0.012</td>
<td>0.056</td>
<td>0.444</td>
</tr>
</tbody>
</table>

**Model Summary**

<table>
<thead>
<tr>
<th>R</th>
<th>R-square</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.428</td>
<td>0.183</td>
<td>7.471</td>
<td>7.000</td>
<td>233.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Simple slope tests were conducted to facilitate interpretation and exposition of the three way interaction effect. Regression lines were plotted separately for different timing conditions among analytical (one standard deviation below the mean on chronic processing orientation index) vs. experiential processors (one standard deviation above the mean on chronic processing orientation index). Results of the simple slope tests are visualized in Figure 6-1 and Figure 6-2. The presence (vs. absence) of a star connotes the presence of a non-significant slope coefficient.

Among experiential processors, when the ad introduces multisensory imagery after the product pair information, consumers’ evaluations for the base product significantly predicts their *anticipated taste* ($\beta=0.390$, $t=4.965$, $p$-value=0.000) and *product attitude* ($\beta=0.307$, $t=3.698$, $p$-value=0.000) ($H_1$ supported). When the ad introduces multisensory imagery before the product pair information, the effects of baseline preference on *anticipated taste* ($\beta=0.029$, $t=0.334$, $p$-value=0.738) and *product attitude* ($\beta=0.050$, $t=0.546$, $p$-value=0.586) were both attenuated among high experiential processors ($H_2$ supported).
Figure 6-1 Simple Slope Results of Anticipated Taste

Analytical Processors
(- 1 SD)  
Experiential Processors
(+ 1 SD)

Figure 6-2 Simple Slope Results of Product Attitude

Analytical Processors
(- 1 SD)  
Experiential Processors
(+ 1 SD)

- - - - MI First  --- MI Later
- - - - MI First  --- MI Later
Meanwhile, among analytical processors, whenever multisensory imagery is introduced (MI first or MI later), consumers’ evaluations for the baseline product significantly predicts their anticipated taste (for MI first conditions: $\beta=0.297$, $t=3.614$, p-value=0.000; for MI later conditions: $\beta=0.315$, $t=4.761$, p-value = 0.000) and attitude towards the advertised product (for MI first conditions: $\beta=0.409$, $t=4.698$, p-value=0.000; for MI later conditions: $\beta=0.251$, $t=3.590$, p-value=0.000). Therefore, H3 was supported.

**Discussion**

“If you like our Hazelnut Cappuccino, you will like our Almond Cappuccino as well”. Such type of targeted advertising utilizes an analogical framework that transfers consumers’ preferences for the base product to the advertised product. Results of study 1 confirmed that incorporating multisensory imagery in such targeted ads can both foster and impede the preference transfer process for the experiential processors. Specifically, results suggest that when multisensory imagery was introduced after the product pair information, experiential processors’ pre-purchase evaluations for the target product were assimilated to their preference for the base product. However, when multisensory imagery was introduced before the product pair information, the assimilation effect was attenuated. Consistent with our theoretical predictions, this effect does not apply to analytical processors who possess the chronic tendency to process information in a piece-meal fashion.
To date, behavioral research is rather sparse in the arena of targeted advertising (Lambrecht & Tucker, 2013; Tucker, 2014). While previous research focuses on how the intrusiveness of targeted advertising influences consumers’ ad acceptance, this research took a step further to examine the impact of targeted advertising on consumers’ prepurchase evaluations. Specifically, this research contributes to the targeted advertising literature with a new theoretical perspective of analogical thinking. Drawing on both experiential analogy and mental imagery literature, this study found that advertisers can utilize individual’s preferences for a product to targetedly promote a new product. Such an “I like A, thus I will like B” thinking process transfers consumers’ preference from an existing favorite to the advertised product.

More importantly, the findings of this study demonstrated that the base to target transfer process can be both fostered and impeded with the addition of multisensory imagery. Previous research revealed both positive and negative effects of mental imagery on product preferences (Escalas 2004; MacInnis & Price 1987, Petrova & Cialdini, 2005). Focused on the specific case of multisensory imagery, the current research reveals an important condition that determines if consumption imagery will foster or attenuate the effect of targeted advertising. Building upon the literature on experiential analogy and mental imagery, this research found that the timing to introduce multisensory imagery should be after the base and target product information become available. At such timing, multisensory imagery can enhance the alignability between the base and the target product. Contrarily, when multisensory imagery is introduced before
product pair information, due to its resource taxing nature, it will block the transfer processes.
CHAPTER 7

METHOD AND RESULTS OF STUDY 2

Results from study 1 demonstrated that, when introduced after (vs. before) product pair information, multisensory imagery can foster (vs. impede) the transfer effects on sensory-based and affect-based pre-purchase evaluations. The second study aims to further extend study 1 findings to explore if the same effects would apply to more cognitive processes such as calories estimations. In the context of vice vs. virtue food advertising, study is designed to test the proposed hypotheses of $H_4$ to $H_7$.

Design and Participants

The second study adopted a 2 (customer segment: vice lover vs. virtue accepter) by 2 (timing of multisensory imagery: before vs. after introduction of new product) by 2 (chronic processing orientation) quasi-experimental design.

A total of 265 adult participants were recruited on Amazon Mechanical Turk to participate in this study. The gender split was even between female (49.8%) and male (50.2%) participants. About 51.4% of the participants hold a college degree, and 74% of the participants were Caucasian. The average age of the participants was 35 years old. Finally, the participants purchased smoothie beverages 2.5 times on average in the previous month.
Procedure and Stimuli

First, the same as in study 1, participants were directed to fill out the chronic processing orientation measure.

Second, to classify participants as vice lover vs. virtue accepter, participants were asked to view a virtue food item and a vice food item and to rate each option in terms of tastiness (“How tasty do you think this side dish option is?”) and to estimate calories amount (“How many calories do you think this side dish option contains?”). Following Liu, et al. (2014), the virtue food item was baby carrots and the vice food items was French fries. Presentation sequence of the two food items was randomized. After finishing the rating task, participants were asked to imagine getting lunch from their workplace cafeteria and having to select one of the two options as a side dish. Please note that, along with Liu, et al. (2014), the initial virtue choosers who perceive vice item as more tasty than virtue item were classified as virtue accepters, while the initial vice choosers who also perceive vice item as more tasty than virtue food were categorized as vice lovers.

Next, participants were instructed to proceed to the targeted advertising scenario. Before the ad plays, participants were asked to write down a casual dining brand to which they consider themselves loyal and to write down one previous purchase experience with this brand. Then, they were instructed to imagine that one day while browsing online, they receive an email ad from this company. This video based ad was promoting a new smoothie beverage item (Non-fat Creamy Mango Smoothie), which is described as both
healthy and tasty, in association with either a vice (Creamy Mango Smoothie) or a virtue (Non-fat Mango Smoothie) base product. Those who initially chose the virtue item were directed to the virtue base product condition, while those who initially chose the vice item were assigned to the vice base product condition. In the video, multisensory imagery of the new smoothie beverage was promoted either before or after the product pair information. Specifically, the product pair information was:

“We know you love our Non-fat (Creamy) Mango Smoothie. So yes, you will fall in love with our new Non-fat Creamy Mango Smoothie as well.”

The multisensory imagery information was:

“Take a deep breath and imagine the fresh aroma, the enticing color, and the delicious, smooth taste...”

After the scenario, participants were asked to finish a short survey.

**Measures**

Participants’ *chronic processing orientation* was measured by the same scale as used in study 1 (for analytical scale, Cronbach’s α = 0.807; for experiential scale, Cronbach’s α = 0.867). Calculation of the chronic processing orientation index was the same as in study 1.

The measures for *anticipated taste* (r=0.912, p-value =0.000), *imagery vividness* (Cronbach’s α = 0.885), *perceived similarity* of the base and target smoothie products
(Cronbach’s $\alpha = 0.957$) also used the same scales as in study 1. Estimated calories amount was measured by asking participants: “How many calories does this beverage contain?” with a 1000-point ungraded scale (represented as a slider, adapted from Chernev, 2011).

Participants’ restrained eating tendency was measured by a four-item scale adapted from Polivy and Herman (1985) (“I often go on diet to control my weight”, “I tend to eat sensibly in front of others but splurge alone”, “I feel guilty after overeating”, “I give too much time and thought to food”; 1pt – This statement does not describe me at all, 7-pt – This statement describes me very well; Cronbach’s $\alpha = 0.844$).

For exploratory purposes, participants’ purchase intention was also measured. The measurement scale was adapted from Elder and Krishna (2012): “I would like to buy this beverage item”, “The next time I purchase a smoothie beverage, I would like to purchase the advertised item” and “I would look for this smoothie beverage to purchase next time in store” (1pt – strongly disagree, 7-pt – strongly agree; Cronbach’s $\alpha = 0.969$). Finally, demographic information and previous purchase experiences of smoothie beverage were collected.

**Manipulation Check**

Participants report equally high levels of imagery vividness in both MI first and MI later conditions (M=4.67; $M_{\text{MI first}}=4.53$, $M_{\text{MI later}}=4.80$; F=1.63, p-value=0.20).

Participants’ preference for the base product were consistent across MI first vs. MI later
conditions (M=5.43; M_{MI\text{first}}=5.37, M_{MI\text{later}}=5.49; F=0.21, p-value=0.64) and among vice lovers vs. virtue accepters (M_{vice}=5.40, M_{virtue}=5.52; F=0.14, p-value=0.71). In addition, participants’ reported scores of *chronic processing orientation* were not significantly different in MI first and MI later conditions (M=3.29; M_{MI\text{first}}=3.33, M_{MI\text{later}}=3.25; F=0.49, p-value=0.49) nor among vice lovers vs. virtue accepters (M_{vice}=3.31, M_{virtue}=3.24; F=0.02, p-value=0.88). *Perceived similarity* between the base product and advertised product were not significantly different in MI first vs. MI later conditions (M=4.97; M_{MI\text{first}}=4.91, M_{MI\text{later}}=5.03; F=0.04, p-value=0.84) nor among vice lovers vs. virtue accepters (M_{vice}=4.94, M_{virtue}=5.05; F=0.36, p-value=0.55). Finally, anticipated taste and estimated calories were not significantly correlated (r=0.02, p-value=0.74).

**Analysis & Results**

To test the proposed three way interaction effect of *multisensory imagery timing*, *customer segment* and *chronic processing orientation*, multiple-regression based moderation analyses were conducted on *anticipated taste* and *estimated calories*, controlling for participants’ *restrained eating tendency* (PROCESS model 3). Specifically, *multisensory imagery timing* was used as the independent variable (variable X), while *customer segment* (variable M) and *chronic processing orientation* (variable W) were entered as moderating variables. Descriptive statistics of the experimental cells are displayed in Table 7-1.
Table 7-1 Descriptive Statistics of the Experimental Cells

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<td></td>
<td></td>
<td>Taste</td>
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<td>Calories</td>
<td></td>
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<td>Vice Lovers</td>
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<td>MI First</td>
<td>98</td>
<td>4.84 (1.47)</td>
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<td>240.91</td>
<td>(151.69)</td>
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<td>MI Later</td>
<td>95</td>
<td>5.40 (1.25)</td>
<td></td>
<td>260.32</td>
<td>(134.60)</td>
</tr>
<tr>
<td>Virtue Accepters</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>MI First</td>
<td>32</td>
<td>5.84 (1.14)</td>
<td></td>
<td>340.59</td>
<td>(168.32)</td>
</tr>
<tr>
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<td>5.86 (1.24)</td>
<td></td>
<td>288.58</td>
<td>(98.73)</td>
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Table 7-2 Regression Table of Study 2 Results – Anticipated Taste

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<td>Restrained Eating Tendency</td>
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<td>0.052</td>
<td>1.155</td>
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<td>-2.845</td>
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<td>-5.434</td>
<td>-0.988</td>
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<td>2.866</td>
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<td>1.699</td>
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<td>MI Timing X CPO</td>
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<td>0.002</td>
<td>0.806</td>
<td>3.543</td>
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<td>Consumer Segment X CPO</td>
<td>1.478</td>
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<td>3-way Interaction</td>
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<td>0.042</td>
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<tr>
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<td>5.595</td>
<td>8.000</td>
<td>256.000</td>
<td>0.000</td>
</tr>
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<td>Coefficient</td>
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<td>t</td>
<td>p-value</td>
<td>LLCI</td>
<td>ULCI</td>
</tr>
<tr>
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</tr>
<tr>
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<td>1.956</td>
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<td>-5.449</td>
<td>1598.654</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrained Eating Tendency</td>
<td>17.726</td>
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<td>3.214</td>
<td>0.002</td>
<td>6.865</td>
<td>28.586</td>
</tr>
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<td></td>
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<tr>
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<td>-1.434</td>
<td>0.153</td>
<td>-851.314</td>
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<tr>
<td>Consumer Segment</td>
<td>-503.111</td>
<td>298.236</td>
<td>-1.687</td>
<td>0.093</td>
<td>-1090.419</td>
<td>84.198</td>
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<td>Chronic Processing Orientation (CPO)</td>
<td>-240.614</td>
<td>120.948</td>
<td>-1.989</td>
<td>0.048</td>
<td>-478.793</td>
<td>-2.434</td>
</tr>
<tr>
<td>MI Timing X Consumer Segment</td>
<td>316.397</td>
<td>180.783</td>
<td>1.750</td>
<td>0.081</td>
<td>-39.614</td>
<td>672.409</td>
</tr>
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<td>MI Timing X CPO</td>
<td>136.555</td>
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<td>1.834</td>
<td>0.068</td>
<td>-10.043</td>
<td>283.154</td>
</tr>
<tr>
<td>Consumer Segment X CPO</td>
<td>202.011</td>
<td>88.728</td>
<td>2.277</td>
<td>0.024</td>
<td>27.281</td>
<td>376.741</td>
</tr>
<tr>
<td>3-way Interaction</td>
<td>-118.564</td>
<td>54.052</td>
<td>-2.194</td>
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Consistent with the proposed hypotheses, the three way interaction effect was significant for *anticipated taste* (*β*=-1.030, *t*=-2.042, *p*-value=0.042) and *estimated calories* (*β*=-118.564, *t*=-2.194, *p*-value=0.029). As expected, among experiential processors (+ 1 SD), the interaction term of *multisensory imagery timing* and *customer segment* has significant effects on both *anticipated taste* (*β*=-1.238, *t*=-2.431, *p*-value=0.016) and *estimated calories* (*β*=-155.936, *t*=-2.859, *p*-value=0.005). Thus, H₆ and H₈ were both supported. Meanwhile, in support of H₇ and H₉, the interaction effect was attenuated among analytical processors (- 1 SD) for both *anticipated taste* (*β*=0.192, *t*=0.389, *p*-value=0.698) and *estimated calories* (*β*=8.593, *t*=0.163, *p*-value=0.871).

Regression results are displayed in Table 7-1 and Table 7-2.

Simple slope tests were conducted to facilitate interpretation and exposition of the three way interaction effect. Results of the simple slope tests are visualized in Figure 7-1 and Figure 7-2. The presence (vs. absence) of a star connotes the existence of a significant (vs. N.S.) slope coefficient.

In terms of *anticipated taste*, among experiential processors, while vice lovers’ reported levels of *anticipated taste* were significantly higher when the ad introduces multisensory imagery after (vs. before) the product pair information (*β*=1.333, *t*=5.062, *p*-value=0.000; H₄ₐ supported), virtue accepters exhibited no significant timing-based difference (*β*=0.095, *t*=0.218, *p*-value=0.827; H₄₉ supported). Meanwhile, among analytical processors, the slope coefficients were attenuated in both the vice lover segment (*β*=-0.256, *t*=-0.944, *p*-value=0.346) and the virtue accepter segment (*β*=-0.064, *t*=-0.155, *p*-value=0.877). Thus, H₅ was supported.
Figure 7-1 Results of Simple Slope Tests – Anticipated Taste

Figure 7-2 Results of Simple Slope Tests - Estimated Calories
As for *estimated calories*, while virtue accepters’ reported levels of *estimated calories* were significantly higher when the ad introduces multisensory imagery after (vs. before) the product pair information ($\beta=-126.590$, $t=-2.712$, p-value=0.007; $H_{6a}$ supported), vice lovers exhibited no significant timing-based difference ($\beta=29.347$, $t=1.040$, p-value=0.299; $H_{6b}$ supported). Meanwhile, among analytical processors, the slope coefficients were attenuated in both the vice lover segment ($\beta=4.381$, $t=0.151$, p-value=0.880) and the virtue accepter segment ($\beta=12.974$, $t=0.293$, p-value=0.769). Therefore, $H_7$ was supported as well.

**Purchase Intention**

To explore how anticipated taste and estimated calories influence consumers’ purchase intentions, a hierarchical regression analysis was conducted to examine the relationship among anticipated taste, estimated calories and purchase intentions beyond the effects of three independent variables (i.e., customer segment, MI sequence, and chronic processing orientation) and the covariate variable (i.e., retrained eating tendency). Overall, anticipated taste and estimated calories accounted for a significant increase in $R^2$ (change in $R^2 = 0.431$, $F_{(2,258)} = 102.04$, $p < 0.001$). While anticipated taste had a significant positive impact on customer’s purchase intentions (Std. $\beta = 0.685$, $p < 0.001$), estimated calories failed to influence purchase intentions (Std. $\beta = 0.002$, $p = 0.974$). The same pattern of results hold for both vice lovers and virtue accepters.
Discussion

In the food consumption context, this study examines how two different consumer segments, the vice lovers vs. the virtue accepters, would respond to a targeted ad that incorporates multisensory imagery either before or after product pair information. Consistent with the theoretical predictions, results of study 2 demonstrated that the timing to incorporate multisensory imagery in a targeted ad does matter and the timing factor can significantly influence the vice lovers’ anticipated taste and the virtue accepters’ estimated calories for the advertised product.

Introducing multisensory imagery after the product pair information fosters an assimilation process in which consumers’ perceptions of the base product would influence their anticipations for the advertised target product. Contrarily, as mapping and transfer points are not yet accessible at the time, introducing multisensory imagery before the product pair information restrains one’s cognitive resources and impede the assimilation processes. In support of this theoretical prediction, vice lovers, who prioritize tastiness goals over healthiness goals, anticipated the targeted product as more tasty when multisensory imagery was introduced after vs. before the product pair information. On the other hand, the virtue accepters, who prioritize healthiness goals over tastiness goals, estimated the targeted product as to contain more calories when multisensory imagery was introduced after vs. before the product pair information.
CHAPTER 8

CONCLUSION

This dissertation demonstrates that effectively incorporating multisensory sensory information in online hospitality ads can have significant impact on consumers’ pre-purchase evaluations. With specific relevance to targeted advertising, the findings of this dissertation have important theoretical contributions and managerial implications for both the hospitality literature and hospitality marketing practices.

With the findings from one pilot study and two main studies, this dissertation demonstrated that the effectiveness of targeted advertising can be fostered by prompting consumers to engage in multisensory imagery. I propose that multisensory imagery could help generate an assimilation effect in which consumers’ sensory, affective and cognitive pre-purchase evaluations of an advertised product are transferred to those of a favorite baseline product. Further, the current research highlights several important boundary factors for the proposed effects: timing to introduce multisensory imagery and consumers’ chronic processing orientation. Across two experiments, results demonstrated that the assimilation effects were significant only when multisensory imagery is introduced after the product pair information and only among participants who chronically adopt an experiential style of processing.
Theoretical Contributions

The current research contributes to the extant body of literature in several ways. First of all, this dissertation contributes to the multisensory literature with a new theoretical perspective: mental imagery. Relying mostly on affective or cognitive-based processes, previous multisensory research examined the cross-modal facilitation (e.g., Shen & Sengupta, 2014) and interference (e.g., Hoegg & Alba, 2007) effects in consumers’ information processing. The extant body of literature on mental imagery only demonstrated unisensory-based imagery processes such as smelling a scent without an actual olfactory stimulus (Krishna, et al., 2014). The phenomenon of multisensory imagery (i.e., imagining a multisensory consumption experience without actually engaging in it) has largely been neglected by the scholarly literature. To bridge the gap in the literature, the current research focuses on the impact of multisensory imagery on consumers’ prepurchase evaluations. Specifically, this research revealed that multisensory imagery can both facilitate and interfere with consumers’ information processing: (1) multisensory imagery can enhance the alignability between paired products and (2) can also strain individuals’ cognitive resources. Based on such qualities, this research further confirmed introduction timing as the crucial factor that determines if multisensory imagery fosters or impedes the transfer process underlying targeted advertising.

The current research also provides insights on how sensory information interplay with higher-order cognitive constructs such as existing product knowledge to influence consumers’ prepurchase evaluations. Findings from the two main studies lent convergent
support to the existence of both a competing process and a facilitating process in which multisensory information and existing product knowledge jointly influence consumers’ prepurchase evaluations. That is, the impact of existing product knowledge on consumers’ prepurchase evaluations for an extended product can be both strengthened and attenuated by multisensory information. Following an imagery approach, when multisensory information is introduced before the product pair information, the impact of multisensory information overrides the impact of existing product knowledge on consumers’ prepurchase evaluations. Conversely, when multisensory information is introduced after the product pair information, multisensory information actually fosters the transfer process in which consumers’ existing product knowledge influences their prepurchase evaluations of a new product.

This dissertation also contributes to the hospitality advertising literature with new insights on targeted advertising. Previous research identified intangibility as a key challenge in hospitality advertising. According to Laroche, et al.’s (2001) framework, the intangibility of services in hospitality advertising manifests as a lack of: (a) physical tangibility and sensory information, (b) specificity in the framing of benefits, and (c) mental tangibility. Extending this stream of research, the findings of this dissertation demonstrated that prompting customers to engage in multisensory imagery can enhance the effectiveness of hospitality advertising. The results from this dissertation suggests that, in the case of targeted advertising, consumers may rely on their previous preferences (i.e., evaluations of favorite baseline products/services) to anticipate future consumption experiences. While introducing multisensory imagery after product pair information can
foster this process, introducing multisensory imagery first will strain one’s cognitive resources and impede this mechanism.

**Managerial Implications**

The findings of this research also have important managerial implications for the hospitality industry. The results of this research suggest that targeted advertising is an effective way to promote hospitality services, especially when targeted ads incorporate consumers’ previous preferences as a comparative anchor. If so, it would be highly advisable for hospitality marketers to integrate relationship management practices with online advertising. Not only should hospitality firms track consumers’ preferences and past purchase behaviors, they should also utilize such information to advertise new services in a targeted manner.

The findings also suggest that the effectiveness of such targeted advertising could be further enhanced by engaging consumers in multisensory imagery after presenting the product pair information. In addition to enhancing the perceived vividness of future service experiences, multisensory imagery also helps consumers link a future service with an existing favorite baseline experience, resulting in more positive pre-purchase evaluations for the advertised service. In addition, the results of this research suggest that such an advertising approach would be particularly effective among consumers who chronically adopt an experiential processing style. I thus recommend hospitality firms to adopt this advertising practice, particularly when targeting consumers from interdependent cultures, as previous research suggests that this group of customers
typically follows an experiential or holistic processing style (Markus & Kitayama, 1991). To assess consumers’ information processing style, firms can have front-line service personnel ask a few diagnostic questions adapted from the chronic processing orientation scale. This shall be an effective way for service firms to separate experiential processors from analytical processors (Cranage, 2009).

Consumers are becoming more and more health-conscious in everyday food consumptions, and an increasing number of restaurant companies are adding healthy alternatives to their menu items. Yet, as consumers perceive healthy food items as having low taste quality, companies are also looking for ways to enhance the tastiness of pure virtue menu items. Against this backdrop sets the emergence of a new group of food products: the vice-virtue hybrids. Although such hybrid food items are as healthy as how tasty they are, there are reasons to believe that they may not receive favorable responses from consumers. This research focuses on two consumer segments (i.e., the vice lovers and the virtue accepters) and argues that marketers should target their advertising efforts according to the different preferences of these two consumer segments. As vice lovers’ and virtue accepters’ favor different types of food products, the targeted ad should associate the hybrid food item with different base products. In addition, adding multisensory imagery to the ad at the right timing (i.e., after the product pair information) can help consumers to transfer their positive perceptions (e.g., tastiness and healthiness) of a base product to an advertised target product. Therefore, hospitality companies are recommended to add multisensory imagery information in their target ad, preferably after the product pair information.
Limitations and Future Research

As with any research, the current study has several limitations that warrant future investigation. First, the current study did not directly test if the significant results in the multisensory imagery later conditions were driven by the underlying mechanism of mental imagery process. Additional studies will be needed to test the moderated mediation effects. Second, results of study 2 were limited to tastiness anticipation and calories estimation. A future study is needed to demonstrate the impact of multisensory imagery and targeted advertising on consumers’ actual purchase behavior, attitude towards the ad and attitude towards the company. Last but not the least, as multisensory imagery consists of more complicated thought process than unisensory imagery, it could bring other negative influences on a consumers’ prepurchase evaluations. Future research is needed to further explore this possibility.
APPENDIX A – Ad Scenario Used in Pilot Study and Study 1

1. Product Pair Screen

If you like our Almond Cappuccino, you will fall in love with our new Hazelnut Cappuccino as well...

2. Multisensory Imagery Screen

Take a deep breath...
And just imagine the enticing aroma, the foamy kiss, and the luscious mixture of steamed milk and darkly roasted espresso...
APPENDIX B – Ad Scenario Used in Study 2

1. Multisensory Imagery Screen

   Take a deep breath…
   And just imagine the fresh aroma,
   the enticing color,
   and the delicious, smooth taste…

2. Product Pair Screen (Vice Lovers)
3. Product Pair Screen (Virtue Accepters)

We know you love our Creamy Mango Smoothie.

So yes,

you will fall in love with our

new Non-fat Creamy Mango Smoothie as well.

We know you love our Non-fat Mango Smoothie.

So yes,

you will fall in love with our

new Non-fat Creamy Mango Smoothie as well.
APPENDIX C – Consumer Segment Identification Stimuli Used in Study 2

The display sequence of the vice and the virtue side dishes was completely randomized.

1. Virtue Side Dish Rating

Please rate the following side-dish item in terms of:

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<th>900</th>
<th>1000</th>
</tr>
</thead>
</table>

Tastiness: This side dish is...

Not at all tasty | Very tasty

Calories: How much calories does this side dish contain?
2. Vice Side Dish Rating

Please rate the following side-dish item in terms of:

Tastiness: This side dish is...

    Not at all tasty | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | Very tasty

Calories: How much calories does this side dish contain?
3. Choice Task

Now, please imagine getting lunch from your workplace cafeteria.

Which one of the two side options would you choose?
REFERENCES


VITA

Luorong (Laurie) Wu

Luorong (Laurie) Wu was born and raised in Hangzhou, China. She received a Bachelor of Management degree from Department of Tourism Management, Fudan University, China, in 2009. With tremendous interest in scholarly research, Laurie came to the United States to pursue for her Master and Ph.D. degrees in Hospitality Management at the Pennsylvania State University under the guidance of Dr. Anna S. Mattila. As a hospitality marketing researcher, Laurie is particularly interested in application of consumer behavior, cognitive psychology and social psychology theories to examine the impact of sensory cues on consumers’ moods, attitudes, emotions, cognitions and decision-making processes in various hospitality and service contexts.

In Fall 2014, Laurie will start her academic career at Temple University, where she accepted an Assistant Professor position in School of Tourism and Hospitality Management with a secondary appointment in Department of Marketing & Supply Chain Management, Fox School of Business.