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If I Touch It, I will Like It! The Role of Tactile Inputs on Gustatory Perceptions of Food Items

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1. INTRODUCTION

Marketers spend a great deal on in-store sampling promotions, especially in the food domain (Kantar Media Reports 2013; Nowlis and Shiv 2005; Parmar 2003) - and for good reasons: in-store tastings can increase sales of sampled products by as much as 300% on the day of said promotion (Moses 2005; *The Atlantic* 2014). Additionally, about 92% of shoppers would rather receive free samples than financial discounts (Fitzgerald 1996). Despite the importance of in-store tastings, marketing researchers have neglected the topic (Heilman et al. 2011; Heiman et al. 2001; Peattie 1998).

Few promotions are as effective for generating consumer trials and purchases as offering free samples (Rossiter and Percy 1987). Compared with traditional advertising, in-store sampling techniques persuade customers to try products before they consider other product characteristics, such as price (Time 2011). Advertisers typically try to spark interest and boost intentions to try food items through advertising (Elder and Krishna 2010), but food sampling is particularly important as it involves direct trial and immediate evaluations of the product.

In-store sampling occurs in public settings where various environmental factors might affect consumers' experience (Heilman et al. 2011). In this context, cross-modal correspondences between different sensory modalities (i.e. touch, audition, taste, etc.) are very likely to take place and influence consumers' perceptions, judgments and decision-making (Auvray and Spence 2008; Crisinel and Spence 2010a, 2010b; Crisinel et al. 2012; Rozin 1982; Spence 2012a; see also Spence 2011a for a review). Cross-modal correspondence refers to the impact and the relationship between two or more sensorial stimuli on consumers' evaluations (Spence 2011). The sense of touch, for instance, can directly affect overall product evaluation (Barnett-Cowan 2010; Krishna and Morrin 2008; Labbe et al. 2013; Slocombe et al. 2016). As an example, Krishna and Morrin

(2008) showed that the physical properties of the container in which we serve a product misleads consumers' evaluations. In this specific case, drinking a beverage from a flimsy (vs. thick) container makes consumers to perceive the product as lower in quality. In a similar vein, Labbe and colleagues (2013) show that the roughness of a food packaging impacts people's judgements of naturalness. While the literature has demonstrated that different touch stimuli (e.g., hardness and weight) influence consumers' perception, the investigation on whether the mere act of touching (or not) a food item influences its evaluation remains limited.

This research aims to contribute to the current literature by investigating if the simple act of directly touching (vs. not touching) a food item can influence product evaluations and purchase intentions, and under which conditions this would happen. Touch, the first sense to develop in human beings (Atkinson and Braddick 1982), helps the brain to encode, process, and retrieve information (Gallace and Spence 2009). Stimulating customers' sense of touch, thus, can be an interesting outlet to influence reactions (Spence and Gallace 2011; Underhill 1999).

When dealing with touch and food experiences, it is useful to distinguish between exteroceptive (before eating) and interoceptive (when eating) perceptions. We focus on touch as influencing exteroceptive perceptions (Piqueras-Fiszman and Spence 2016). The literature on touch in retail settings provides inconclusive findings on the influence of touch on food consumption, suggesting that both encouraging and restricting touch can have positive effects. For instance, tactile experiences have been shown to enhance product evaluations (Spangenberg and Sprott 2007; Liu, Batra and Wang 2017), while restricting customer touch has been shown to drive consumers to buy greater quantities of products and more expensive products (Otterbring 2016). Nevertheless, it is unclear whether such results extend to food consumption. Recently, there has been an increase in the interest of research focusing on the influence of touch on food

experiences (e.g., Slocombe, Carmichael and Simner 2016; Nederkoorn, Jansen and Havermans 2015). In sum, the results show that specific haptic properties of food items (e.g. food texture) can change consumers' perceptions of unrelated dimensions (e.g. sourness or freshness) and even determine approach/avoidance tendencies. However, to our best knowledge, research has failed to consider whether merely touching food items impacts product evaluations and purchase intentions. Therefore, we empirically investigate (1) whether touching a sampled food item modulates consumers' evaluations and intentions toward the product and (2) in which contexts the effect of touch would be more impactful.

2. LITERATURE REVIEW

2.1 The role of consumers' touch in the consumption context

The sense of touch, ''sensations aroused through the stimulation of receptors in the skin'' (Stevens and Green 1996, p. 1), is essential to our social and emotional lives (Krishna 2011). Embedded in our skin (which is the largest human sensory organ), the tactile sense is one of our most intimate senses (Klatzky 2010), as it develops before birth and endures beyond other senses throughout life (Krishna 2011).

In a consumption context, the tactile sense plays both an instrumental (utilitarian) and autotelic (hedonic) role (Peck and Childers 2003a; Peck and Johnson 2011; Peck and Wiggins 2006). In the instrumental role, touch allows judgments regarding utilitarian features of a product such as texture, weight, shape, hardness, temperature (Spence et al. 2013), quality (Peck and Childers 2003b), functionality (Peck and Wiggins 2006), and taste (Krishna and Morrin 2008). In

the autotelic role, the simple act of touching products can arouse, excite, and cause joy (Peck and Wiggins 2006). As an example, autotelic-oriented consumers are very likely to avoid a purchase if they do not have the opportunity to touch the product (Peck and Childers 2003a).

Some consumers must physically interact with products and gather information through their hands before buying (Marlow and Jansson-Boyd 2011; McCabe and Nowlis 2003; Liu, Batra and Wang 2017). Thus, hands are the "principal source of input to the touch perceptual system" (Peck and Childers 2003a, p. 35). Even if haptic properties are non-diagnostic to product assessment, they influence evaluation and consumption experiences (Krishna and Morrin 2008; Spence et al. 2014). For instance, consumers assess the quality of a beverage or food as higher if the container or the cutlery used to consume it is heavier (Piqueras-Fiszman and Spence 2011; Piqueras-Fiszman, et al. 2011; Piqueras-Fiszman and Spence 2012b), harder (Krishna and Morrin 2008), or possesses a thicker texture (Tu et al. 2015). For example, consumers rate a beverage as better when drinking from a firm rather flimsy cup (Krishna and Morrin 2008). In addition, consumers' quality and liking judgments of food items tend to be higher when the product is tasted with a stainless steel spoon compared to a metallic plastic one (Piqueras-Fiszman and Spence 2011). Hence, the sensory information extracted from touch directly affects consumers' attitudes and behaviors toward products (Krishna and Morrin 2008).

Retailers are particularly affected by consumers' responses in reaction to touch (Hultén 2012; Grohmann et al. 2007), specifically because touching products increases customers' willingness to buy (Peck and Shu 2009), the amount they purchase (Peck and Childers 2006), and the time they spend shopping (Hornik 1992a; 1992b). However, there is a lack of research exploring the effects of directly touching food items. The few experiments that have directly manipulated consumer touch of food items did not investigate whether mere touch increases or

compromises consumers' evaluations of the product. Extant research efforts have mainly focused on how haptic properties (e.g., crispness, hardness/softness, roughness/smoothness) of foods affect consumers' perceptions. For example, handling food before consuming it can bias freshness and crispness perceptions (Barnett-Cowan 2010). Also, Biswas et al. (2014) show that consumers perceive foods with hard (vs. soft) and rough (vs. smooth) textures as less caloric.

Therefore, it is still unclear whether merely touching food items (keeping constant its' properties) would affect consumer responses toward the food. Initial evidence indicates that consumers might enjoy touching food with their hands (Crumpacker 2006), which is congruent with the findings suggesting that tactile experience enhance product evaluation (Spangenberg and Sprott 2007), increase psychological ownership, and willingness to pay for products (Peck and Shu 2009). Finally, as consumers like to touch products to gather information and to improve their confidence about their decisions to buy (McCabe and Nowlis 2003), we can predict that:

H1a: Consumers will evaluate a food item as better when touching it directly with their hands rather than with a toothpick.

H1b: Consumers will have higher intentions to purchase a food item when touching it directly with their hands rather than with a toothpick

2.2 Sensory load: increasing sensorial competition

Human perception is fundamentally multisensory (Krishna, 2012). Because humans experience the world through different sensory modalities (e.g., touch, audition, taste; Krishna and

Schwarz 2014; Spence et al. 2014), marketers must understand how multiple environmental cues ultimately impact consumer perceptions and behaviors (Baker et al. 2002).

To face increasing marketplace competition, managers have shifted from a product focus to an experience-based focus to please consumers (Puccinelli et al. 2009). In recent years, many firms have created multisensory environments that deliver unique consumer experiences (Pine and Gilmore 1998). Although enriched multisensory ambiances may increase consumers' experiences and evaluations, managers must avoid exceedingly high levels of consumer stimulation (Malhotra 1984).

Research in human perception has shown the existence of sensorial interference effects when people experience sensory load. For instance, engaging participants' vision impairs the representation of visually related concepts (Mayer and Moreno 1998; Mousavi, Low and Sweller 1995). For instance, Mayer and Moreno (1998) showed that participants had a better comprehension of the concept 'lightning' while listening (an auditory task) to a description of the phenomenon compared to when they were reading the same description (a visual task). In a similar vein, Vermeulen et al. (2013) found that engaging in concurrent visual tasks impairs the recall of visual images, as well as performing a competitive auditory task impairs the ability to recall auditory images. In sum, a growing number of evidence corroborates with the idea that sensory load causes interferences (e.g., inhibition) in humans' sensory systems as they perform conceptual tasks in parallel multitasking designs.

Although marketers are increasingly using multisensory elements in the marketplace, researchers are still unclear about the consequences of sensory overload (Krishna 2012), as research mainly focus on the effects of single sensorial activation (Spence et al. 2014). However, there is an increasing number of evidence showing that the congruence (vs. incongruence)

between different sensorial activation improves consumer judgments (e.g., smell and sound: Mattila and Wirtz 2001; smell and vision: Krishna et al. 2014; sound and smell: Spangenberg et al. 2005; sound and perceived taste: Yorkston and Menon 2004; Spence and Gallace 2011; Crisinel and Spence 2012; vision and touch: Krishna 2006; touch and taste: Krishna and Morrin 2008; vision and taste: Hoegg and Alba 2007; Lick et al. 2017; and smell and haptics: Krishna et al. 2010).

When store environments contain many sensory cues, sensory touch points increase, along with risks of sensory overload (Krishna 2012; Spence et al. 2014). When consumers are exposed to three different sensorial stimuli, even if congruent, their experience tend to be negative (Homburg et al. 2012). That is, a moderate level of sensory stimulation is better than too much: overloaded sensory experiences can be overwhelming and diminish the positive side of the experience (Krishna 2012). Consequently, we hypothesize:

H2: Sensory load will moderate the impact of touch on food sampling: high sensory load (vs. control) will mitigate the positive impact of touch on product evaluation.

3. METHOD

3.1 Study 1

In Study 1, we manipulated participants' ability to touch by providing them a food item (i.e., baby carrots) either with or without a toothpick in a food-sampling procedure. We were

particularly interested in the effects of direct touch on product evaluations and purchase intentions.

3.1.1 Design, Participants and Procedure

Seventy-eight business school undergraduate students volunteered to participate (43.6% men; M_{age} = 20.6 years old; SD = 1.28) in scheduled lab sessions, with a maximum group size of 6 students. Each participant stayed in an individual isolated booth and we randomly assigned them to one of the two touch conditions (touch: 39 participants vs. non-touch: 39 participants) in a between-subjects experimental design. Next, participants read the following scenario:

A new brand of baby carrots is being tested across the country. You will have the opportunity to try them today. Please eat as much as you want of the sample in front of you.

We served the food sample on a disposable paper plate of white color and without the packaging to control for any possible branding effects (González-Benito, Martos-Partal, and San Martín, 2015). Participants received a sample of 30g, an average of two baby carrots, for eating either with their fingers or with a toothpick (provided by the experimenter). After eating, participants answered a questionnaire reporting their opinions about the tested product.

3.1.2 Measures

We measured participants' purchase intentions and product evaluation as dependent variables. To measure product evaluation, we used a three-item scale as prior research (Elder and Krishna 2010; Overall quality, where 1 = very poor quality and 7 = very good quality); Overall taste, where 1 = very poor taste and 7 = very good taste; and how delicious the product was, and 1 = Not at all delicious and 7 = very delicious; we collapsed the three items into a product evaluation index, $\alpha = .85$). To measure purchase intentions, we used a single-item scale also from previous research (i.e., "What is the probability that you would buy this product in the future?", where 1 = Very unlikely and 7 = Very likely; Morrison 1979). At the end, we also measured overall preference for baby carrots as a potential covariate.

3.1.3 Results

A one-way ANCOVA using participants' preference for baby carrots as a covariate showed a significant effect of touch on product evaluation (F (1,75) = 5.95; $p < .05$) and purchase intentions (F (1,75) = 7.83; $p < .01$). As Figure 1 shows, participants who directly touched the carrots rated the product as better ($M_{touch} = 4.55$) compared with participants who did not touch the carrots ($M_{non\text{-}touch} = 3.92$). Moreover, as Figure 2 shows, touching led to higher purchase intentions toward the sampled product ($M_{touch} = 4.41$ vs. $M_{non\text{-}touch} = 3.46$).

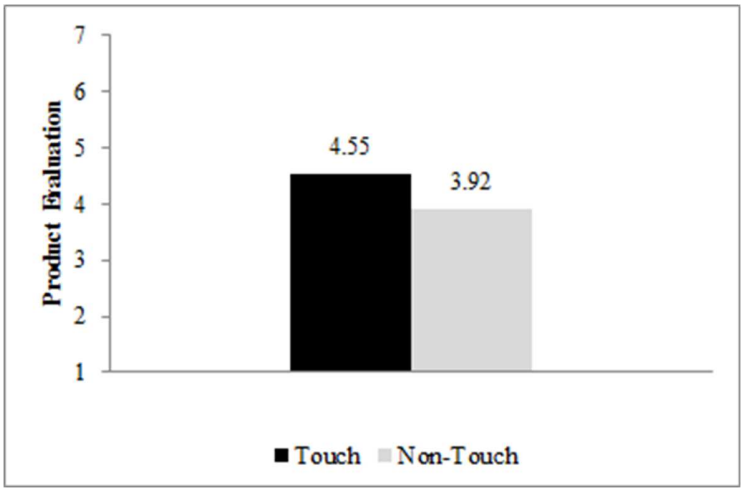

Figure 1: Product Evaluation across Touch and Non-Touch Conditions (Baby Carrots)

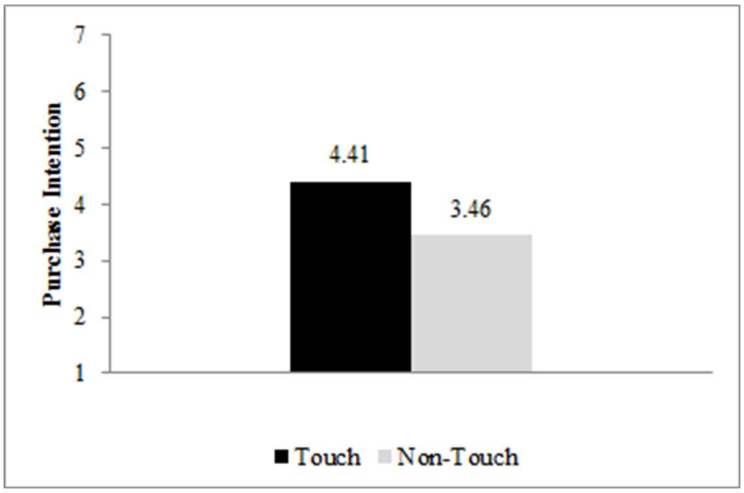

Figure 2: Purchase Intentions for Touch and Non-Touch Conditions (Baby Carrots)

3.1.4 Discussion

Study 1 shows that encouraging consumers to touch a food sample increases their purchase intentions and product evaluation. Compared with participants who held the carrots on toothpicks, participants who held the carrots with their fingers evaluated the carrot as better and declared higher intentions to buy them.

These results show that consumers use the sense of touch as an additional source of relevant information when evaluating a food item (McCabe and Nowlis 2003). The results contribute to our knowledge, showing that consumers use touch as an input for forming attitudes and behaviors (Hultén 2012; Peck and Wiggins 2006). However, Study 1 has two major limitations: (1) the food stimulus was limited to a healthy food product and (2) it is unclear whether our results are explained by the simple arousal and excitement that touching objects can bring (autotelic need for touch; Peck and Wiggins 2006). First, humans have a tendency to categorize food items as either good or bad based on their perceived nutritional quality (Oakes and Slotterback, 2001a; 2001b; Oakes 2003; Oakes and Slotterback 2004). In addition, people also judge others positively or negatively based on whether they eat "good" or "bad" food (e.g. people who eat unhealthy food tend to be judged as less moral compared to their counterparts who have healthier diets; Steim and Nemeroff 1995). Therefore, we have reasons to believe in possible differential effects when comparing healthy and unhealthy foods, as touching "good" (healthy) food might generate positive responses, but touching "bad" (unhealthy) food might be negative. Second, touching can be an end in itself (Peck and Johnson 2011). That is, people who are high in autotelic touch tend to enjoy touching things just by the pleasure of the task (Peck and Wiggins 2006). Moreover, high autotelics have a compulsive need to engage in exploratory activities via touch and exhibit a positive affective response to hedonic touch, even when there is no purchase goal salient (Peck and Wiggins 2006). Therefore, we decided to rule out those potential explanations in a second study. Study 2 addresses those limitations by (1) using a nougat bar (unhealthful food item) to extend our results to a different product category and rule out the hypothesis that the results are explained by positive reactions emerging after touching "good food" and (2) testing if autotelic need for touch is a boundary condition for the proposed effect.

3.2 Study 2

The objective of Study 2 was to conceptually replicate the findings from Study 1 with an unhealthful food item. To ensure that the item would have unhealthful associations, we conducted a pretest (see pretest section) to check whether participants would perceive the nougat bar as significantly less healthful than the baby carrots used in Study 1. As in Study 1, we also manipulated touch during the food sampling procedure.

Before we undertook Study 2, we conducted a pretest to check whether participants would have different perceptions regarding the two products used as food stimuli (i.e. baby carrots and nougat bars) in terms of healthfulness. Forty-eight undergraduate students of a private business school participated in an experiment (43.6% men; M_{age} = 20.6 years old; SD = 1.28) in exchange for course credit. Participants attended scheduled sessions at a behavioral lab with a maximum group size of 10. Each participant was randomly assigned to one of the two product conditions (i.e., pictures of baby carrots or nougat bars) and rated the healthfulness of the product on a single-item scale (i.e., "How healthful is this product?", where 1 = Not at all and 7 = Very much). A t-test confirmed that participants indeed perceived the baby carrots as significantly healthier than the nougat bars ($M_{\text{Baby Carrots}}$ = 5.52 vs. M_{Nougat} = 2.44; $t(46) = 8.65$ $p < .001$).

3.2.1 *Design, Participants, and Procedure*

Eighty-one undergraduate students from a private business school participated in the study (54.4% men; M_{age} = 21.5 years old; SD = 4.78) held in scheduled sessions in a behavioral lab

with a maximum group size of 10, in exchange for course credit. We excluded two participants from the procedure because they refused to eat the product, leaving a final sample of 79 participants. Participants were placed in individual, isolated booths and were randomly assigned to one of the two touch conditions (touch: 41 participants vs. non-touch: 38 participants) in a between-subjects experimental design. Participants saw the same cover story as in Study 1. Also similar to Study 1, we served the food item on disposable paper plates of white color and without any packaging to control for possible branding effects. We manipulated touch by asking participants to use their fingers or a toothpick provided by the researcher to sample 10g of the product. While they were eating, they answered a brief questionnaire to evaluate the product.

3.2.2 *Measures*

We measured product evaluation and purchase intentions as in Study 1. For product evaluation, we used the three-item scale from Elder and Krishna (2010) (Overall quality, where 1 = very poor quality and 7 = very good quality); Overall taste, where 1 = very poor taste and 7 = very good taste; and how delicious the product was, where 1 = Not at all delicious and 7 = very delicious; $\alpha = .91$). We measured purchase intentions with one single-item (i.e., "What is the probability that you would buy this product in the future?", where 1 = Very unlikely and 7 = Very likely; Morrison 1979). Next, participants answered how much they like nougat (variable used as a potential covariate) and their autotelic need for touch (Peck and Childers 2003a; 6 items, e.g., "When walking through the stores, I can't help touching all kinds of products", "Touching products can be fun", "When browsing in stores, it is important for me to handle all kinds of products", "I like to touch products even if I have no intention of buying them", "When browsing

in stores, I like to touch lots of products", "I find myself touching all kinds of products in stores", where 1 = Strongly disagree and 7 = Strongly agree; α = .95). We included this measure to rule out haptic orientation as a potential explanation for our results.

3.2.3 Results

A one-way ANCOVA using participants' preference for nougats as a covariate showed a significant effect of touch on product evaluations (F (1,76) = 6.16; $p < .05$) and a marginally significant effect on purchase intentions (F (1,76) = 3.67; $p = .059$). As Figure 3 shows, participants who directly touched the product indicated better product evaluations ($M_{touch} = 4.93$) compared with participants who did not touch the product ($M_{non\text{-}touch} = 4.10$). Additionally, as shown in Figure 4, merely touching the product led to slightly higher purchase intentions toward the sampled product ($M_{touch} = 3.01$ vs. $M_{non\text{-}touch} = 2.25$).

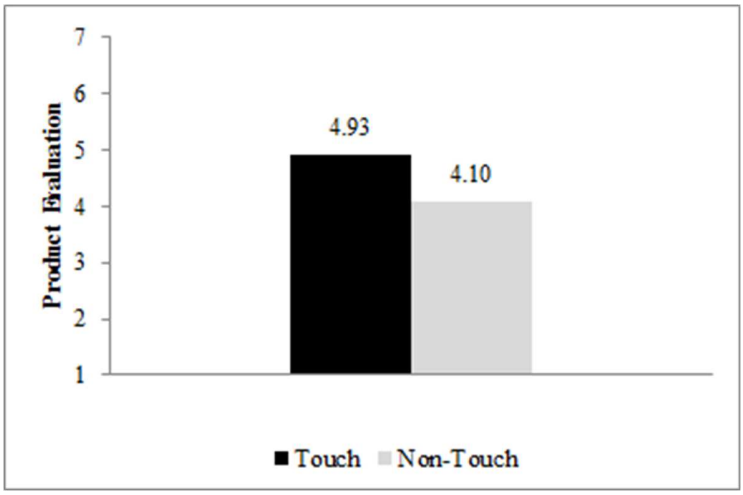

Figure 3: Product Evaluation across Touch and Non-Touch Conditions (Nougat Bars)

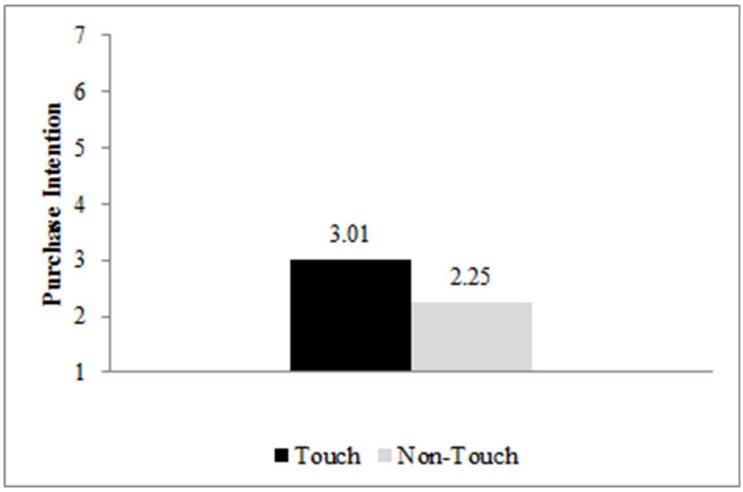

Figure 4: Purchase Intentions for Touch and Non-Touch Conditions (Nougat Bars)

To rule out the possibility that a hedonic mechanism could explain our results (that is, only participants high in autotelic need for touch would show the pattern), we performed a spotlight analysis to check whether autotelic need for touch would moderate the proposed phenomena. First, we ran a regression on product evaluation with the following independent variables: (1) autotelic need for touch, (2) a dummy variable for whether participants touched the food item, (3) the preference for nougats as a covariate, and (4) their interaction. Second, we ran another regression on purchase intentions with the same independent variables. The results showed non-significant two-way interactions between autotelic need for touch and the touch manipulation (all *p*'s > .3). More specifically, individual differences in autotelic need for touch did not change the pattern of results; that is, the touch manipulation influenced participants equally, where touching generated better results regardless of differences in need for touch.

3.2.4 *Discussion*

Study 2 confirms that consumer touch positively affects product evaluation and purchase intentions. Regardless of food type, participants who directly handled the product declared higher purchase intentions and enhanced product evaluation compared with participants who did not touch the food. These results suggest that touch can serve as an additional source of information for consumers when they are sampling food.

Considering that the sense of touch can increase consumers' evaluation of food products, we examined whether excessive sensory load during a food evaluation would affect the pattern of results. As H2 predicts, sensory load would moderate the results; that is, sensory load would dampen the positive impact of touch on food sampling.

3.3 Study 3

We had two main objectives in Study 3. First, we tested a boundary condition for the proposed positive effect of mere touch on product evaluations and purchase intentions. Second, we searched for additional evidence that consumers use touch as a source of information for evaluating products.

Similar to Studies 1 and 2, we manipulated mere touch (touch vs. non-touch). We also manipulated the sensorial load involved with exposing the respondents to a sensory-rich additional task (vs. control) during the food sampling procedure.

3.3.1 *Design, Participants, and Procedure*

Eighty-one business school undergraduate students participated in Study 3 (54.4% men; M_{age} = 21.5 years old; SD = 4.78). Students participated in scheduled sessions in a behavioral lab, with a maximum group size of 10, in exchange for course credit. Participants were placed in individual, isolated booths with individual earphones, and were randomly assigned to a 2 (touch condition: touch – 40 participants vs. non-touch – 41 participants) x 2 (sensory load – 41 participants vs. control – 41 participants) between-subjects experimental design.

For generality and improved external validity, we tested a different product in this study. We informed participants that they would sample a chocolate brownie that would soon be available in the market. They were offered a 10g sample of a chocolate brownie (also served in disposable paper plates of white color) to eat using either their fingers or a toothpick provided by the researcher. For the sensory load manipulation, we ran a highly sensory-stimulating 30-sec video with background music while they were consuming the brownie. The video was full of colors and included background music to stimulate participants' visual and auditory senses in addition to touch and taste already used in the sampling process (see Appendix A for pictures of the stimulus). In the control group, participants saw a picture of white paper with a black dot in the center for 30 seconds. A pretest confirmed that the video increased sensory load. Eighty participants (MTurk - 50% men; M_{age} = 38.84 years old; SD = 10.57) took part in a brief experiment in exchange for a monetary compensation. Participants were randomly assigned to either the sensory load (30-sec sensory-stimulating video with background music) or a control condition (see a picture of white paper with a black dot in the center for 30 seconds). Results show a significant effect of the treatment condition on our sensory load manipulation check (adapted from Rajae-Joordens, 2008) (I felt that all my senses were stimulated at the same time; My experience was sensorially intense; $r = .76$, $p < .001$; where 1 = totally disagree and 7 = totally

agree) (t (1,79) = -7.09; p < .001). Participants who watched the video indicated higher levels of sensory load ($M_{\text{sensory load}}$ = 5.19) compared to participants in the control condition (M_{control} = 2.78).

3.3.2 Measures

We measured product evaluation and purchase intentions as in Studies 1 and 2 (α = .88 for product evaluation). We also measured participants' level of hunger and preference for brownies as potential covariates. Finally, we assessed the level of cognitive load in a 2-item, 7-point scale used in previous research ("My mind was very busy as I performed the task"; "It was hard to concentrate while performing the task" where 1 = not at all and 7 = extremely; r = .734, p = .000; Wentzel, Tomczak, and Herrmann, 2010) as a control variable to ensure that the manipulation of sensorial load was not reducing consumers' capacity to process the information in general by simply adding more information.

3.3.3 Results

A two-way ANCOVA, using preference for brownies and level of hunger as covariates, showed a significant interaction between touch and the sensory load manipulation on product evaluation (F(1,75) = 5.62, p < .05), supporting the proposition that sensory load moderates the effect of touching foods. When in a controlled setting, participants perceived the food as tasting better when they touched it (M_{touch} = 4.84 vs. $M_{\text{non-touch}}$ = 3.97; F(1,75) = 4.62, p < .05). However, in the sensory load condition, the difference between touching and not touching the

product was no longer significant (M_{touch} = 4.25 vs. $M_{non\text{-}touch}$ = 4.55; $F(1,75) = 0.565$, p = NS). The interaction was not significant for purchase intentions ($F(1,75) = 0.978$, p = NS).

Finally, to rule out a potential side effect of our sensory overload manipulation on cognitive load, we assessed cognitive load as a control variable. Cognitive load and sensory load are distinct constructs by default: cognitive load involves information processing and mental effort while sensory load does not imply message or information processing (Malhotra 1984), so we expected that the excess physical stimuli of our manipulation should not affect the participants' level of cognitive load. The results confirmed our expectations: participants exposed to the sensory load manipulation did not differ in their level of cognitive load when compared to participants in the control condition ($M_{sensory\ load}$ = 5.88 vs. $M_{control}$ = 5.80; $F(1,75) = 0.062$, p = NS).

3.3.4 Discussion

Study 3 reinforces the findings that consumers experience cross-modal correspondences between the tactile and gustatory senses. We further show that the positive effect of touching a food item on product evaluation is contingent on the amount of sensorial information in the surrounding environment. In particular, when increasing the sensory load, the positive effect of directly handling a food item disappeared. However, when participants were in a control condition (not sensory loaded) the act of handling the product enhanced product evaluation.

In this study, however, we did not find and interactive effect of touching and sensory load on intentions to purchase the brownie, which is perhaps a limitation of this study. We suggest a potential explanation for this: the fact that we used chocolate brownies might have contributed to

the null effect on purchase intentions. Brownies are tasty and generally highly appreciated, which might have generated similar intentions (and higher than intentions to buy the other products studied here) to buy the product regardless of touch conditions and sensory load in a sort of ceiling effect. In addition, it is also likely that our results might be product category specific due to differences in touch diagnosticity, that is, touch might be a diagnostic cue for some products but not for others, as shown in previous research (McCabe and Nowlis 2003; Krishna and Morrin 2008; Abhishek, Sinha, and Vohra 2013; Liu, Batra and Wang 2017). Therefore, future research could further explore the potential effects of touch for different products.

Finally, our food sampling experiments reinforce suppositions that food sampling procedures are an effective marketing tool, especially in environments where sensory load is absent. The results also contribute to the still scarce literature showing how excessive sensorial stimulation can damage overall consumer experiences (Krishna 2012), by showing that marketers should carefully design multisensory environments to avoid customers' sensory load.

4. GENERAL DISCUSSION

In the three studies reported in this research, we show that consumers who actively manipulate food items in a food sampling procedure have favorable purchase intentions and product evaluations of both healthy and unhealthy food items. Study 1 shows that merely touching healthful baby carrots enhances product evaluation and purchase intentions. Study 2 uses an unhealthier product (i.e., nougat bar) and finds the same results.

Our post hoc analysis in Study 2 corroborates the importance of "haptic perception" in human cognition (Wolfe et al. 2006, p. 303). More specifically, individual differences in autotelic

need for touch did not change the pattern of our results. Participants with high and low levels of autotelic need for touch responded positively to our haptic manipulation, which suggests that the pleasure of touch by itself did not generate the positive effects, even for the unhealthful food.

Study 3, then, shows a boundary condition for the positive effect of touch in a food consumption context: sensorial-rich environments. Sensory load seems to reduce the prominence of touch in the evaluation task: significant differences held only when the other senses (vision and audition) were not stimulated. In sensory loaded environments, touch is less able to influence evaluations and intentions. Our research adds to the discussion on how to increase the effectiveness of managerial practices: How can we improve in-store food sampling campaigns? Should we encourage consumers to touch displayed foods? The results reported in this paper indicate that customer touch is worth exploring, especially in environments that have low sensorial stimuli.

This research contributes to sensory marketing knowledge by showing that merely touching food items influences the overall taste experience. We propose a cross-modal interaction between the sense of touch and the sense of taste. Specifically, by using two senses (touching and then tasting the product) rather than a single sense (using a toothpick to hold the product before tasting it), consumers have an additional source of information, which enhances product evaluations and purchase intentions. However, marketers should avoid overstimulating consumer senses, as sensory competition can mitigate the positive effect of touch on food evaluations.

To our best knowledge, we are the first to propose that mere touch (vs. not touching) improves product evaluation and enhances purchase intentions. Our findings differ from previous research examining correspondences between touch and taste in several ways. For instance, Slocombe et al. (2016) showed that the texture (roughness) of food items influence specific

dimensions of taste (sourness). Similarly, Barnett-Cowan (2010) show that haptic properties (i.e., hardness vs. softness) of a food item can bias consumers' ability to judge food's level of crispness and freshness. Differently from the authors mentioned above, we do not manipulate food's haptic properties. Instead, we manipulate mere touch (vs. not touching) and show that engaging haptics in a food trial process modulates food perception and purchase intentions. In addition, Labbe et al. (2013), who investigated the feel of packaging on inferences about a food item, showed that the roughness of the packaging affects food expected naturalness. Rather than focusing on packaging, our studies examine the impact of touching the food item itself. In sum, we show that merely touching the food item can enhance product evaluations and purchase intentions. Finally, we advise marketers to engage customers by appealing to their sense of touch in food sampling campaigns, whether the food is healthful or unhealthful. Encouraging consumers to feel the product may generate better evaluations and higher purchase intentions.

This research has some limitations. First, we used only solid food items, as this type of stimuli is more appropriate to test the effects of tactile manipulation. Although this choice makes sense from a managerial standpoint, some types of foods are clearly difficult to manipulate and, thus, were not tested. For example, none of the studies tested products which are sticky or leave traces on people's hands, such as jelly and soft cheeses, or beverages such as orange juice or sodas, mainly because consumers usually do not directly touch such liquid items directly with their hands. Therefore, our inferences are relevant for solid foods only and do not extend to other food items with different characteristics.

Second, we conducted our studies in a controlled laboratory setting using students, who are, of course, potential consumers. However, field studies should generalize the results to a larger

population. Future research could also explore other boundary conditions as well as suggest and test potential mediators for the effects described in this research.

APPENDIX

Four different shots of the stimulus (Sensory loaded movie clip)

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