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ADDING VOICE TO THE OMNICHANNEL AND HOW THAT AFFECTS BRAND TRUST

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ABSTRACT

Consumers can use alternative methods to interact with or access a brand through their mobile devices. They can type a response using a touchscreen keyboard (touch interaction) or use voice response while holding a mobile device (combined voice and touch interaction). In this study, we look at the impact of these different types of interaction on personal engagement and the effect on brand trust as relevant concerns to managers in the digital, mediated context. Using a framework based on sensory marketing and Dual Coding Theory, we conducted two one-way between-subjects experiments with a two-level interface interaction considering a hedonic product (Experiment 1) and utilitarian product (Experiment 2). Findings confirm a three-way interaction such that the impact of privacy concern on the relationship between personal engagement and trust depends on the nature of the platform interaction; touch vs. combined touch and voice. We also find that adding voice to the platform interface has the counterintuitive effect of reducing engagement with that platform. All in all, our results provide novel insights into the role of touch and voice in the online context when it comes to consumers' decision-making.

Keywords

Touch, voice, personal engagement, privacy concern, brand trust

INTRODUCTION

In a few short years, the dominant paradigm for computer-mediated, firm-customer interaction has moved from the keyboard to touching a smart mobile device (Shankar et al. 2010). Now, technological progress, exemplified by Amazon's breakout hit Alexa or Google's Home Assistant, threatens to upend firm-customer interaction once again. While keyboards and touchscreens will not disappear any time soon, with the emergence of robots and AI enabled interfaces it is likely that an increasing share of customer interaction will be executed via voice-based virtual assistants. The addition of a new consumer response format—using entirely different physiological response mechanisms—raises inevitable questions as to whether key e-commerce outcomes such as brand trust will manifest the same way as with earlier technology or whether the relationship between trust antecedents and brand trust will be moderated in some way by the nature of the response format. This paper begins the discovery process as to how the addition of voice may change the way digital marketing is done.

Long before the existence of mass digital markets, marketers in different product categories had been building expertise in constructs rooted in human physiology, reaching out to consumers through the senses (Dauce and Rieunier 2002; Krishna 2012; Lindstrom 2005). Studies of sensory experience in offline environments have looked at interpersonal touch and compliance (Hornik 1992; Patterson et al. 1986), product evaluation (Krishna and Morrin 2008), perceived ownership (Peck et al. 2013), touch avoidance and contamination (Argo et al. 2006), trust (Orth et al. 2013) and a variety of related topics.

Recent research has begun to untangle the influence of tactile experience in a mediated, digital context through touch interfaces (Brasel and Gips 2014; Racat and Capelli 2017; Shen et al. 2016). These studies explored the tactile stimulation provided by interfaces, demonstrating that the more an interface provides a “direct-touch” interaction (i.e., touchscreen compared to a mouse or pad), the more it influences consumer attitudes and behavior. Similarly, previous studies conducted in offline environments have shown that tactile interaction during consumption or purchasing stages modifies consumers’ evaluations of a brand; specifically, touch increases brand trust (Crusco and Wetzel 1984; Morhenn, Park, and Piper 2008; Orth et al. 2013).

Because trust, by definition (Castaldo, Premazzi and Zerbini 2010), involves exposure to risk, and risk is, essentially, a “feeling” (Loewenstein et al. 2001), our view is that brand trust is the perfect place to look for physiological effects. Furthermore, trust in general, and brand trust in particular are key concerns to managers in any digital, mediated context, in which consumers lack the reassurance provided by tangible bricks and mortar. In our study, we look at the complex relationships between a physiological platform interface variable and brand trust in a consumer products brand. In our context, the platform interface variable, whether voice is added to the interface or not, comes into play as subjects perform information search about the brand.

Surprisingly, no studies have investigated the effects of different response production formats on brand trust or the ways these formats impact privacy concerns in the online or mobile environment.

We believe that basic physiological variables require a theory that is basic to biology, for example, evolution (Saad 2017). We also believe that the response format impacts

marketing outcomes through the mechanism of personal engagement (Calder and Malthouse 2009) with the mediating platform. The goals of the current work then are to (1) understand how physiological response format moderates critical e-commerce relationships and (2) show that physiological response format moderates the effect of personal engagement with the platform on downstream brand outcomes.

First, we present a review of the literature relevant to sensory and experiential marketing that we believe supports our conceptual framework. Next, we propose hypotheses, detail our methodology, and present our findings. Finally, we engage in a general discussion of our results as they relate to previous literature and conclude with the academic and managerial implications of our study.

THEORETICAL BACKGROUND

Our study lies at the intersection of two topics: the physiology of the senses and experiential engagement.

Touch and Voice

Holbrook and Hirschman first introduced the influential idea that consumer behavior has an experiential dimension (Hirschman and Holbrook 1982; Holbrook and Hirschman 1982), postulating experience as an alternative to a purely cognitive information processing view. Since then, there has been increasing recognition among academics (Holbrook and Hirschman 1982; Hulten et al. 2009; Krishna 2010; Schmitt 1999) and practitioners (Lindström 2005, 2008; Underhill 2009) of the importance of subjective experiences, and among them sensory experiences (Schmitt 1999; Pine and Gilmore 1999, 2002). In line with this, Krishna (2012) has defined sensory marketing as being “marketing that engages the consumers’ senses and affects their perception, judgment,

and behavior". Yet, by definition, consumers' experience derives from stimulation through the senses, on which they rely on for understanding the environment (Ackerman 1991).

Following birth, the experience of the external world begins to arrive by touch, followed by the other senses (Montagu 1951). Important categories of touch can include touch related to an object or the environment, or touch related to social interaction (i.e. interpersonal touch) (Nuszbaum et al. 2014; Erceau and Guéguen 2007). Both types of touch have a communicative function since any action resulting in contact between the skin and an object or another person, or which results from active, haptic manipulation allows the consumer to obtain emotional, hedonic or utilitarian information (Herterstein et al. 2006; Lederman et al. 2007; Peck and Childers 2003). For instance, previous studies have demonstrated that tactile sensations modify the visual perception of a product (Krishna and Morrin 2008). Perception can be modified in either a positive direction, as Guéguen and Jacob (2006) demonstrated by showing that tipping amount increased when a waiter entered into contact with a customer, or in a negative direction, as Martin (2012) showed through a mere and accidental touch from a male stranger in a shopping context. In an online context, there is also touch related to an object (the interface or device) and touch that is more directly brand related (swiping brand images, engaging with brand-owned media). For instance, specific interface modality used for shopping implies different feedback to the senses that modifies consumers' product and environmental perceptions, which in turn modifies consumers ownership feeling and preference products (Brasel and Gips 2014, 2015; Shen et al. 2016).

Switching senses now, a spokesperson's voice influences how discourse is interpreted and evaluated (Garretson and Burton 2005; Scherer 1986, 2003) or how a person is perceived in terms of credibility, reliability, and other personality factors (Nass et al. 1997; Till and Busler 1998). We also note that there is a stream of research that studies the naturalness of synthesized voices and the impact this has on emotional response (Ilves and Surakka 2012; Nass and Brave 2005; Nass et al. 1997). In line with this stream of research, the theory of media naturalness (Kock 2004, 2005) maintains that the "naturalness" of a communications medium, which is to say, the degree it resembles historic and pre-historic human communication, is a key antecedent for a large variety of outcomes. The reason for this should be clear: our psychological, as well as physiological evolutionary endowment, is optimized for such "natural" situations.. Accordingly, Ilves and Surakka (2012) demonstrated that the more a synthesized voice sounds like a human-voice the more the consumers experience an emotional state when the affective words are pronounced.

Dual Coding Theory, as proposed by Paivio (1971), can also be useful in our context as the theory posits two distinct brain subsystems, one specialized for the representation and processing of nonverbal objects or events (i.e., imagery), and the other specialized for dealing with language. Dual Coding theory identifies three types of processing: (1) representational, the direct activation of verbal or non-verbal representations, (2) referential, the activation of the verbal system by the nonverbal system or vice-versa, and (3) associative processing, the activation of representations within the same verbal or nonverbal system. A given task may require any or all of the three kinds of processing but referential processing in particular suggests that the

presence of additional senses could lead to higher cognitive engagement and a concomitant higher cognitive work load.

Personal Engagement

Some scholars (Calder and Malthouse 2004, 2005; Malthouse et al. 2007; Mersey et al., 2010) have conceptualized experiential engagement as the collective experiences that readers or viewers have with an online medium, be it online, social, or mobile. In this study, we specifically look at engagement with the medium. Both qualitative and quantitative research (Calder and Malthouse 2004; Mersey et al. 2010) have revealed eight distinct experiences (stimulation and inspiration, social facilitation, temporal, self-esteem civic-mindedness, intrinsic enjoyment, utilitarian, participation and socializing, and community) representative of the experiential engagement construct domain. A medium can elicit multiple experiences, which are not mutually exclusive (Mersey et al. 2010). Hence, engagement can occur as a consequence of different experiences. These eight experiences can be further broken down in terms of their dependence on two higher order experiential engagement factors (Calder et al. 2009; Mersey et al. 2010): personal and social-interactive engagement. The former describes how users seek stimulation, inspiration, and a reflection of their own values from a medium. Further, personal engagement is reflected by the experiences people can have with offline media. For example, “This site makes me think of things in new ways” or “This site often gives me something to talk about” are typical of experiences belonging to personal engagement (Mersey et al. 2010). In this study, we specifically focus on one sub-dimension of the experiential engagement scale named personal engagement.

As we look at personal engagement *with an interface* resulting from customer experiences, the main goal of the study is to identify the impact of these experiences on the consumer brand being researched by the consumer. We conducted a literature review, summarized in Table 1, of the studies of which we are aware that consider the effects that properties of an interface have on a brand. Table 1 summarizes the type of interaction considered in these studies, the methodology adopted, and the main findings. No previous study has looked at the influence of multisensory input (touch vs. voice plus touch) in an online environment with effects on personal engagement with the platform and consumer product-related variables such as brand trust. We believe that studying the effects of sensory experiences activated by the different interaction modes on feeling dimensions such as perceived risk or brand trust may contribute to the existing literature on interactive marketing.

Insert Table 1 about here

HYPOTHESES

The online experience can be defined as a consumer's total perceptual input about a brand (Watchfire Whitepaper Series 2000) resulting from his or her exposure to a combination of virtual marketing tools that may influence buying behavior (Constantinides 2002). Calder and Malthouse (2008) were among the first to measure online experiences, describing them as reflecting an individual's digital interaction with a brand over time as a way of accomplishing personal life goals or manifesting larger values. However, compared to direct contact, in the mediated brand experience, the

relation to the brand is necessarily distant, indirect, and generally lacking in direct sensory stimulation (Citrin et al. 2003; Giebelhausen et al. 2014; Hamilton and Thompson 2007).

We certainly know from a variety of studies, reviewed above, that the physiology of the human body matters in how the brand comes to be perceived and experienced. For example, Brasel and Gips (2014) demonstrated that a more direct tactile interface transmits a higher level of psychological ownership of the product seen onscreen (i.e. the psychologically experienced phenomenon in which a consumer develops possessive feelings for the product).

It seems logical to us to assume that if the device leverages the human sensory and motor system in a natural way, including modalities possible in normal human interaction like touch and voice, that the experience should be more engaging. We mean engaging both in terms of cognition, and experiencing emotions, which should arrive more easily, and, simply put, more naturally. We would also expect that engagement in both the utilitarian and hedonic spheres should be more likely. To summarize, we hypothesize that:

H₁: *Voice plus touch-based (vs. touch-based only) consumer interaction with a digital platform will lead to higher personal engagement with that platform.*

Any communication medium that adds additional stimuli – especially stimuli that impinge upon a different physiological system – would seem to encourage if not require more cognitive processing and effort on the part of the observer. Moreover, in line with

the Dual Coding Theory (Paivio 1971) additional tasks or formats (like voice plus touch) require all three kinds of processing (representational, referential and associative) confirming a higher cognitive effort for higher stimulus input.

Previous literature has in fact underlined the need to consider sensory-motor interactions occurring among the consumer, device, and brand (Yazdanparast and Spears 2014). The format of interaction that a brand has with its customers has been found to influence their compliance and willingness to pay (Guéguen and Jacob 2006; Hornik 1982). Especially germane to the current situation, Hersteinstein et al. (2006, 2009) showed that the sense of touch transmits emotions and feelings, while Haans et al. (2014) showed that social touch via an interface can operate and be processed by consumers similar to actual physical, interpersonal touch. We have already reviewed studies (Brasel and Gips 2014) showing that touch facilitates psychological ownership. Conversely, adding another sensory modality to touch, when interacting with the brand through the interface (i.e., voice recognition) should compete with, reduce or dull psychological ownership and the mediated transmission of other signals by the brand.

Previous work (Fung So et al. 2016) has also found that brand loyalty can be strengthened not only through the consumption experience but also through engagement. Scholarly efforts have identified several key consumer-brand relationship outcomes that are potentially related to engagement (Bowden 2009; Brodie et al. 2011; Hollebeek 2011; Patterson et al. 2006; So et al. 2013; van Doorn et al. 2010; Vivek et al. 2012). These factors include customer satisfaction, brand trust, perceived value, and service quality, which are fundamental to the development of brand-loyal relationships (Cronin et al. 2000; Harris and Goode 2004).

Further, we know that trust has many established antecedents related to the way in which consumers are engaged with a platform. For example Qiu et al. (2016), who considered online recommendation agents and found that explanation capabilities significantly enhanced users' cognition-based brand trust, whereas avatar interfaces have a significant positive impact on users' affect-based brand trust. Overall we can therefore be confident that there is a connection between engagement and trust.

Combining the engagement-trust connection with the sensory arguments made just previously, we now come to **H₂**. We have parallel lines of reasoning. The addition of voice should lead to more referential processing which should be accompanied by reduced likelihood of thinking about or being aware of one's engagement, which should blunt the impact of engagement. The addition of voice should likewise blunt the sense of psychological ownership and social signaling that touch alone would afford. We therefore predict that, in the touch-plus-voice condition, the relationship between personal engagement and brand trust should be attenuated. In hypothesis format we have:

H₂: *Voice plus touch-based (vs. touch only) consumer interaction with a digital platform will lead to a lower influence of personal platform engagement on brand trust.*

Internet users' concerns about information privacy is a well noted phenomenon in the interactive marketing literature. Privacy concern is a worry or fear of negative consequences that strongly determines consumers' willingness to divulge personal information (Chellappa and Shivendu 2007; Culnan and Armstrong 1999; Earp and Payton 2006; Jensen et al. 2005; Malhotra et al. 2004; Smith et al. 1996; Stewart and Segars 2002). Of course the personal information gathered and stored by companies is

often sold to third parties and used for profiling and analysis without the knowledge or consent of the individual concerned. We would ordinarily assume that concern should reduce the impact of a trust antecedent on trust. For example, to the extent that I am concerned about privacy, the trust-inducing benefit of a third-party endorsement or seal could be reduced or weakened, i. e. privacy concern will negatively moderate the antecedent-trust relationship. Our antecedent to trust is a measured variable, namely experiential engagement with the platform. We expect privacy concern to condition the impact of this engagement, but how the moderation works should vary from the touch alone condition, to the touch plus voice condition.

We start with the touch alone condition. Recall that in **H₂** we posited that touch will not be diluted, lessened or dulled as occurs when voice is added. Thus the engagement-trust is positive, and strongly so. We would expect that concern should reduce this relationship between the trust antecedent (engagement) and trust. In other words, in the touch alone condition, the moderation of the engagement-trust relationship should be negative.

Now we consider the touch plus voice condition. In **H₂** we posited that there would be a relatively weak relationship between platform engagement and brand trust in the touch plus voice condition. This is due to a dilution of the impact of touch but also due to less thinking about engagement given the requirements of dual coding referential processing. Under those conditions, we expect that the privacy concern will not have a negative impact on the engagement-trust relationship. In other words, the cognitive load created by adding voice to touch will not just reduce the impact of engagement, but it will also reduce the impact of concern. We thus predict that in the touch and voice condition,

the moderation of the engagement-trust relationship by privacy concern will be less negative. In that case overall we hypothesize

H₃: *The use of voice alone (vs. voice plus touch) with a digital platform will lead to negative moderation by privacy concern of the relationship between personal platform engagement and brand trust, whereas voice plus touch will lead to less negative moderation by privacy concern on the engagement-brand trust relationship. We thus predict three-way moderation.*

To test our hypotheses, pictured in Figure 1, we conducted the two lab experiments reported below.

Insert Figure 1 about here

In Experiment 1, we used the hedonic product category of perfume, a category with only a modest level of brand trust required for purchase; in the second experiment, we utilized frozen food, a somewhat more utilitarian category, less luxurious, but being ingested, likely requiring a higher level of brand trust. Hedonic goods provide experiential consumption (Dhar and Wertenbroch 2000), fun, pleasure, and excitement (designer clothes, sports cars, luxury watches, etc.), whereas utilitarian goods are primarily instrumental and functional (microwaves, minivans, personal computers, and so on; Hirschman and Holbrook 1982; Strahilevitz and Myers 1998). Using two different products and brands extends the external validity of our results.

It is important to emphasize that in both studies, we combined constructs that

measure a personal tendency (privacy concerns), a situational state involving the interface (personal engagement with the app or platform), and a brand outcome (trust in the perfume or frozen food brand).

EXPERIMENT 1

To assess the mediating effect of personal engagement, we set up a one-way between-subjects experiment with a two-level interface interaction: touch-based interaction only vs. voice plus touch-based interaction. More precisely, in the first condition, participants used their hands to type and select information (i.e., clicking, typing requests, etc.), whereas in the second condition, participants used the voice recognition system for making requests and their hands for selection.

Material and stimuli. We selected the cosmetic sector for the hedonic characteristics of the products. We then controlled for the product *touchability* (Brasel and Gips 2014) to prevent touch interaction between the product and interface tactile cues (Brasel and Gips 2014; Racat and Capelli 2017). Thus, we searched for a low-touch product, meaning a product that does not require to be touched or “played with” to understand it, according to Peck and Childers (2003), which is needed for touch autotelic and instrumental profiles. Consequently, we chose a perfume, which typically is smelled but can still be purchased online without tactile sensory barriers. Concerning the interface, we needed one that includes either a tactile or voice control to navigate online. Also, we needed to select a familiar interface with which participants would interact with no learning efforts. For these reasons, we selected the smartphone category with a tactile screen only and the option to use a voice control such as Siri or OK Google. Participants were filtered using these criteria to take part in the study.

Sample. Ninety-five undergraduate students from a large business school in France participated in this experiment on a voluntary basis. The choice of a student sample is relevant in this experiment because this population is commonly equipped with the latest phone versions and frequently uses the phone for all types of interactions: social, purchasing, booking, etc. We included both male and female participants (48% females; $M_{age} = 20$; $SD = 4.39$). Of the sample, 83% had already used the voice control through the smartphone, and of those, 29% indicated very frequent use. Participants were told that the study purpose was to investigate brand customer services and would require that participants call a retailer during the experiment. Those who declined were automatically dismissed before starting. The remaining participants completed an online survey, which began with an informed consent. Once they had read and signed it, a research assistant randomly assigned them to the touch-based interaction ($N = 45$) or the voice-plus-touch interaction condition ($N = 50$).

Procedure. Instructions were given through an online questionnaire that participants accessed with a computer. The procedure had three steps: (1) Participants read general information about the brand and a promotional offer, (2) participants searched for the price of a specific perfume and reported it, and (3) participants were given instructions provided through a scenario format to call a brand retailer and ask specific questions. In this case, we chose Sephora cosmetics, brand, and retailer, and the scenario was as follows: *Participants were told to imagine they had lost their Sephora loyalty card and, in relation with the promotional offer they had read, want to know whether they can still benefit from it without the card. The questions were: (1) "I have lost my loyalty card, and I would like to know whether I will lose my advantages"; (2)*

“Can you tell me if the 20% off on the perfume is still available and what I should do to benefit from it?”; and (3) “Can I benefit from this offer if I purchase through your website instead of coming to your store?” This procedure ensured that participants were familiar enough with the brand and product category, as well as interacted enough with the smartphone and brand retailer. The brand and the name of the perfume were pre-tested to make sure both Siri and OK Google voice recognition system would understand it correctly. Once all three tasks were done, participants turned off their phone and put it away for the rest of the experiment. After a manipulation check to ensure they were not using it anymore (*Did you turn off your phone and put it away?*), participants completed the online questionnaire.

Measurement. We used existing and validated scales from the literature in our study measured with 7-point Likert answer categories anchored by *strongly disagree* (1) to *strongly agree* (7). The endogenous variables in our model are personal engagement (developed as a sub-dimension by Calder and Malthouse 2004) and brand trust (Chaudhuri and Holbrook 2001). We operationalized the antecedent, privacy concerns, using the scale in Krasnova et al. (2009).

RESULTS

Measurement Model Evaluation

We followed the first step of the Gerbing and Anderson’s (1988) two-step procedure by assessing the measurement model with respect to personal engagement, brand trust, and privacy concerns. With reference to the second-order construct Personal Engagement, we tested the measurement model with partial least squares (PLS) to study the psychometric properties of our six first-order experience constructs.

Internal consistency. We used three measures to evaluate the internal consistency of the constructs. Coefficient Cronbach Alpha (α) and Composite Reliability are measures of reliability (Fornell and Larcker 1981). The average variance extracted (AVE) estimates the amount of variance captured by a construct's measure relative to the random measurement error. Estimates of α greater than .6 (Hair et al., 2010) and AVE greater than .5 are usually considered to support internal consistency (Bagozzi and Yi 1988). Construct reliability measures support internal consistency. As Table 2 shows, all values of Cronbach Alpha and Composite Reliability are significantly greater than these stipulated criteria and therefore are indicative of high internal consistency. All the factor loadings (except one item from the construct Intrinsic Enjoyment, which was deleted from the analysis) are higher than the cut-off (Stevens, 2002) and appropriate for interpretative purposes.

Discriminant validity. We evaluated the discriminant validity of the model constructs using two different approaches. We built a confirmatory factor analysis (CFA) model with 9 latent constructs and a total of 40 items. The results show that the model fits the data well. The Φ (correlations between constructs) appears in Table 3a. As the first test of discriminant validity, we checked whether the correlations among the latent constructs were significantly less than one. Because none of the confidence intervals of the Φ values (\pm two standard errors) included the value of one (Bagozzi and Yi 1988), this test provides evidence of discriminant validity. In addition, for each pair of latent constructs, we compared the chi-square value for a measurement model and constrained the correlation to equal one to a baseline model without these constraints. We performed a chi-square difference test for each pair of factors and every case resulted in a significant

difference, again suggesting that all the constructs in the measurement model achieve discriminant validity. We also assessed discriminant validity (Fornell and Larcker 1981) by comparing the squared correlations (between the constructs) and the AVE for a construct. All squared correlations were lower than the AVE values (Tables 3a and 3b). Thus, all constructs demonstrated discriminant validity. To take the common method variance (CMV) into account, we followed the approach suggested by Lindell and Whitney (2001) and added a scale (Openness to experience, Goldberg, 1993) that is theoretically unrelated to at least one other scale in the questionnaire so there is an a priori justification for predicting a zero correlation. This theoretically unrelated variable provides discriminant validity to the design. We also tested the regression effect of this scale on brand trust (voice plus touch $\beta=.46$; touch $\beta=.24$) and found no significant effect for both studies in the two sensory conditions.

Insert Table 2 about here

Insert Table 3 (a and b) about here

Convergent validity. We considered only items with standardized factor loadings above .50 and squared multiple correlations above .50 (Hair et al., 2010). Therefore, the constructs demonstrated convergent validity and were correlated with the measures they were theoretically predicted to be correlated with.

External validity. We further tested the relationship between Attitude and brand trust and found a significant effect of Attitude on brand trust (whole sample $\beta=.33^{***}$; voice

plus touch $\beta=.46^{***}$; touch $\beta=.12$) and Brand Self-connection on brand trust (whole sample $\beta=.25^{**}$: voice plus touch $\beta=.15$; touch $\beta=.36^{**}$).

Other issues. We also conducted a multi-group analysis using PLS comparing males vs females, since the product category, perfume, seemed potentially more suited to females. No significant modeling differences across the genders were found.

Second-order Confirmatory Factor Analysis

Once we assessed the validity of the first-order construct model, we performed a second-order confirmatory factor analysis (CFA) for the engagement model to test how the six users' experiences taken into consideration for this study relate to the second-order factor Personal Engagement. All the relationships were found to be highly significant ($p<.001$).

Hypothesis Testing

The main effect hypothesis H_1 was tested using a t-test on summed scores. Recall that H_1 posited that the voice-plus-touch condition would lead to a higher level of Personal Engagement with the platform (Table 4a). Contrary to our hypothesis, we found a significantly lower level of engagement ($t=-3.12$, $p<.001$) in the case of the voice-plus-touch condition compared to the touch-only condition. The experiences that significantly differ in the two conditions are: stimulation and inspiration ($t=-3.84$, $p=.001$), temporal experience ($t=-3.32$, $p=.001$), utilitarian perception ($t=-2.03$, $p<.05$), and social

facilitation ($t=-3.84$, $p<.000$). These results show that the manipulation of adding voice reduces personal engagement.

Insert Table 4 (a and b) about here

To test **H₂** and **H₃**, we ran a multi-group analysis broken down by our two conditions: the touch interface (N=45) and voice-plus-touch interface (N=50). We ran the model and tested the hypotheses using estimated SEM path coefficients and a multi-group analysis to test the differences between the two groups (Table 5).

Insert Table 5 (a and b) about here

Concerning **H₂**, we found that personal engagement has a significant and positive effect only on brand trust ($\beta=.40$, $p<.001$) overall across both interface groups. This overall effect must be qualified by experimental condition: personal engagement is positively and significantly related to brand trust ($\beta=.51$, $p<.001$) only for the touch condition. No relationship was found for personal engagement on brand trust with the voice-plus touch-condition ($\beta=.11$, $p>.05$). R square is .382. This conforms to the effect predicted in **H₂**.

Insert Figure 2 about here

Concerning the three-way interaction implied by **H₃** (the moderation of the engagement-brand trust relationship by privacy concern will, in turn, be moderated by the experimental condition), we applied a two-stage approach in which we captured the PLS

latent variable scores from each treatment group (touch alone vs. voice and touch) and followed up, determining whether the two-way moderation amongst these scores differed across those groups. The relevant curves are shown in Figure 2. In the Figure there is strong evidence for a different two-way interaction across the two interface modalities as the sign of that moderation is positive in the voice and touch condition (Figure 2(b), $\beta=.18$, $p>.05$) but negative in the touch-only group (Figure 2(a), $\beta= -.17$). The formal test of three-way interaction is not quite statistically significant, however ($\beta=.34$, $p>.05$) however. This apparently contradictory result between the nonsignificant p-value in the three-way interaction effect but notably different slopes across the groups may be explained by the fact that we have a Type II error (insufficient power) that is a function of sample size. Our confidence that this difference across the two groups is real is enhanced by a very similar result in Experiment 2, as we shall see shortly.

EXPERIMENT 2

In the second experiment, we considered a different product (frozen food), which is less hedonic and likewise more utilitarian. For this type of product, which is more functional (Hirschman and Holbrook 1982; Strahilevitz and Myers, 1998), the customer needs greater trust in the brand and the quality proposed. The design is similar to the first experiment. We support in this second experiment the assumption that the product conditioning implies the consumer needs to trust the brand more than for a hedonic product.

Material and stimuli. Considering the same issues as previously for touch, we ran this second experiment in the food sector with the brand Picard, a frozen food

products manufacturer and retailer. In this case, products do not need to be manipulated to be understood. We used the same approach as Experiment 1. We asked participants to use their personal phone and checked for the tactile screen and the option to use a voice recognition system (Siri or OK Google).

Sample. Ninety-two undergraduate students from the same business school in France and a large university in Italy participated in this experiment on a voluntary basis. We had both male and female participants (59% females; $M_{age} = 26$; $SD = 7.01$). Of the sample, 74% had already used a voice recognition system and, of those, 28% frequently used voice functionalities. As in the first experiment, participants were told that the research purpose was to investigate brand customer services and would require that participants call a retailer during the experiment. Those who declined were automatically dismissed before starting. Remaining participants completed an online survey that began with an informed consent. Once participants read and signed it, a research assistant assigned them to the touch interaction (N=43) or the voice-plus-touch interaction condition (N=49).

Procedure. The procedure was similar to Experiment 1. All instructions were given through an online questionnaire. First, we asked participants to search with their phone, according to the search condition assigned, for a recipe of their choice and report the name of the website where they found the recipe. Second, participants were asked to read a short presentation about the brand Picard, the retailer they would be calling. Finally, and similar to Experiment 1, we proposed the following scenario: Participants were to call one of the Picard retail locations in France or Italy and ask three questions related to the product. The questions were: (1) “*I have dinner with my friends tonight,*

and I need ideas—do you have recipes on your website? ”; (2) “Can you tell me if you sell pizza and approximately the price? ”; and (3) “Is there any offer at the moment for purchasing pizzas? ” These tasks ensured that participants interacted fully with the interface as well as with the brand retailer. Once the tasks were done, participants turned off their phone and put it away for the rest of the experiment. After a manipulation check to ensure they were not using it anymore, participants completed the online questionnaire.

Measurement. We used the same variables as in the first experiment. All measurements were also done with 7-point Likert scales anchored by *strongly disagree* (1) to *strongly agree* (7). We also checked internal consistency and discriminant validity. As in Experiment 1, to take the CMV into account, we followed the approach suggested by Lindell and Whitney (2001) and added a scale (Openness) that is theoretically unrelated to at least one other scale in the questionnaire so there is an a priori justification for predicting a zero correlation. This theoretically unrelated variable provides discriminant validity to the design. We also tested the regression effect of this scale on brand trust (voice plus touch $\beta=-.41$; touch $\beta=.25$) and found no significant effect in the two sensory conditions.

RESULTS

Measurement Model Assessment

As in Experiment 1, we followed the first step of the Gerbing and Anderson’s (1988) two-step procedure by assessing the measurement model with respect to personal engagement, brand trust, and privacy concerns. With reference to the second-order construct Personal Engagement, we first performed a CFA using the maximum likelihood

estimation to study the psychometric properties of our experience measures (first-order constructs); second, we developed second-order engagement factors to the six experiences fitting a second-order CFA model.

Following the same methodology adopted in Experiment 1, we checked internal validity and discriminant validity (Table 3b).

Hypothesis Testing

We tested **H₁** (Table 4b) and, as previously, in this second experiment, this hypothesis was not confirmed. The level of personal engagement with the platform is higher (even if not statistically significant) in the touch condition compared to the voice-plus-touch condition ($t=-161$, $p>.05$). Furthermore, temporal experience (a sub-dimension of personal engagement) significantly differs in the two conditions ($t=-6.95$, $p<.000$). This experience is lower in the touch and voice condition as compared to the touch-only condition.

As for **H₂**, we confirmed once again that personal engagement has a positive and significant relationship on brand trust ($\beta=.36$, $p<.05$) only for the touch condition (Table 6). No significant relationship was found for personal engagement on brand trust with the voice-plus-touch condition ($\beta=.00$, $p>.05$).

Finally, with respect to **H₃**, we once again compared the moderation by privacy concern on the engagement-> trust relationship in the voice plus touch condition and in the touch-alone condition. The two conditions are shown in Figure 3. As can be seen in the figure, the nature of the moderation varies across the two treatment conditions. Specifically, the sign of the moderation is positive in voice plus touch ($\beta=.23$) but

negative in touch only ($\beta=-.12$). Unlike Experiment 1, in addition to the visual evidence, in this experiment there is a statistically significant difference between the two groups ($\beta=.03, p<.05$), i. e. there is a three-way interaction as predicted by **H₃**.

Insert Table 6 (a and b) about here

Insert Figure 3 about here

GENERAL DISCUSSION

The first important result emerging from the two experiments is that, in the touch only condition, the customer experiences a higher level of personal engagement as compared to a situation in which voice is included. This unexpected result was confirmed in both studies and contradicted **H₁**. We explain this by arguing as follows. First recall that our goal was to see how platform interface variables, like the use of voice, and engagement with the platform, impacted the brands being shopped for or researched with that platform. Of course in that case our engagement measure was engagement with the platform. Now the touch plus voice condition represents a more natural – if somewhat more demanding - state of communication than touch alone. More natural interfaces tend to induce a lack of awareness that the user is using an interface at all (Ilves and Sukarra 2012). In effect, a sufficiently natural interface will disappear since it is not noticed as a change or aberration from the usual and natural state of affairs. Thus the consumer does not perceive that there is an interface to engage with! We must leave to future research to determine what the impact of voice is on brand engagement, i. e. on the brand that the

consumer wishes to find or learn about using their voice. Since the use of voice on mobile devices is still quite new, it is also possible that our results were impacted by some effect of novelty. The novelty could have contributed to the cognitive load imposed on the voice plus touch condition.

Our results also show that different modes of digital interface with the brand impact the influence of personal engagement on brand trust (**H₂**). In both studies, there was a significant positive relationship between personal engagement and brand trust *in the touch-only condition* (both for the hedonic and utilitarian product), meaning that the control of the device through touch implies better control of the online information (Jiang and Bensabat, 2005), which makes the customer more confident about the brand. Thus, pure touch undiluted by voice boosts the impact on trust during online information search tasks like learning about a brand or collecting information (price, retailer availability) during the customer decision journey. In contrast, the use of hybrid voice plus touch-based interaction with the device extinguishes or at least weakens the relationship between engagement and brand trust. While adding voice may be more natural, the digital interaction becomes more complex. Of course, consumers seek easy ways of searching and interacting with the interface and the brand (i.e., consumers are cognitive misers). Thus, using both sensory modalities for information search tasks or collecting information might be redundant and demanding for the consumer. Indeed, interacting with only one sensory modality might allow the consumer to focus his or her attention to tasks unrelated to the online one; i.e., keeping both hands and voice busy with the device reduces consumers' efficiency (e.g. while ordering food with her voice the consumer can still use her hands for taking notes on a computer). Thus, while our results apply to hand

held mobile devices, we suspect they will not generalize to stand-alone digital assistants like Alexa.

This result remains a paradox however because the addition of natural and face-to-face-like communication should make the consumer more comfortable in his or her relation to the brand (Kock 2004; Mollen and Wilson 2010). Two potential explanations might be put forward here: First, touch naturally induces more confidence, as supported by previous studies on consumers' compliance to trust a sales brand representative when he or she uses touch during an interaction (Guéguen and Jacob 2006). Second, as in **H₁**, the lack of familiarity with voice interfaces may have washed out the downstream engagement-trust relationship; sucked all the cognitive oxygen out of the room as it were (Jiang and Benbasat 2007; Nasco et al. 2008). We might conclude that adding voice to touch remains problematic for managers in that it lowers the impact of the consumer-brand interaction.

With respect to **H₃**, we found evidence that there is a difference in the moderating effect of privacy concern on the relationship between personal engagement and brand trust when different sensory modalities are used (touch only and voice +touch). We can see in both studies the same pattern – the moderation of the engagement-trust path by privacy concern is less negative when voice is added to touch. In fact, in both studies the voice plus touch conditions seemed to yield positive moderation by privacy concern on the engagement-trust relationship. It might be that with the cognitive load imposed by adding voice that consumers are more likely to use a heuristic for trust. In other words, a consumer might think that if she is engaged, she must therefore trust the company.

FUTURE RESEARCH

Our results offer important managerial implications on the importance of voice, touch, and in general those senses that come into play during firm-customer interaction. Google, Apple, Microsoft, and Amazon have famously added voice recognition to their products. In addition to speaking, consumers find themselves clicking, tapping, swiping and typing. Their devices respond to these inputs with on-screen messages, haptic feedback, video, and voice. Digital interaction has simultaneously become more natural but more complex. Given this new richer, multisensory world, we discuss some possible future research directions and some potentially interesting questions.

With this study, we have just scratched the surface with touch. Recent studies (Shi and Kalyanam 2018) confirm that the simple act of touching a product on the screen ups the level of perceived product tangibility. It is well known that tangibility; or the lack thereof; has important consequences for the marketing of services including effects on perceived risk, uncertainty, loss salience and more (Laroche, Yang, McDougall and Bergeron 2005). At the same time touch interfaces are increasing in complexity and now include a substantial user repertoire of single and multiple finger behaviors such as swiping, tapping, holding, typing, squeezing, separating and other behaviors. A very large area of the brain is dedicated to processing stimuli experienced by the hand, the hand being that most human of all appendages. We believe that there is an interesting intersection here between services and intangible digital products on the one hand, and the various ways that touch comes into play in digital interfaces on the other.

Of course, voice represents another very promising area of investigation. Use of the voice is quite possibly the most natural human communication modality. In addition, the

voice is a very rich communication modality (for a recent look at the importance of richness see Jin 2009), capable of expressing emotional nuance in ways missing from text on a screen. There are numerous potentially interesting variables here, both from the point of view of voice as produced by a digital device, and voice as a consumer response. A partial list of variables might include frequency (high or low), intensity (soft or loud), resonance (nose, mouth), rhythm (staccato, smooth), timbre (breathy, shrill), stress (which syllables or words), pronunciation (regional accent), paralinguistics (non-word utterances), or emotional modulation (anger, fear, sadness, etc.). It is likely that voice-mining will take its place alongside of image and text mining.

Another great future research area would take a multisensory perspective (Spence and Gallace 2011) and look at the interactive impact of several senses or modalities on marketing outcomes like attitude, intent, purchase, trust, or engagement. We strongly suspect that a pure vocal interaction, as occurs with standalone devices like Google Assistant or the Amazon Echo, will produce different results as compared to adding voice to touch; this is clearly an important future research topic. In general our results suggest that multisensory research will lead to unexpected outcomes, with additional complexity not always predictable from extant theory.

One important future research area would be sensory congruity and incongruity. For example, if the device communicates to the customer with voice and the customer replies with voice, that would be a congruous communication. Conversely, Google Assistant will present text on a screen in response to a voice request by a customer, a cross-modality communication. We know that specific presentation formats can have very different

effects on different choice-related tasks (Bettman and Zins 1979). It would be surprising if the senses and sensory modality did not have important marketing effects as well.

The evolution of AI and smarter interfaces, in general, suggests numerous potential design variables based on how those interfaces interact with customers. Distributed intelligence will power objects like smart mirrors, and will enable augmented and virtual reality marketing. AI and AI-like platforms will be capable of transforming inanimate artifacts and spaces in a variety of ways. Many design choices – sensory, aesthetic, cognitive, emotional - will no doubt help determine the persuasive impact of marketing communication, customer trust, as well as the customer's level of experiential engagement (Calder and Malthouse 2004) with the interface and with the focal brand. What also remains to be seen is how marketing outcomes might differ for the platform companies that produce these interfaces, like Google and Amazon, as compared to the service and goods companies that must necessarily use those interfaces to reach their customers.

CONCLUSION

It is ironic that the digital world, once touted as removing friction or intermediation, often requires that consumer brands are presented by third parties. A hypothetical manager of perfume or a frozen food brand is subject to a variety of platform effects. In our case, when Apple, Google, or Amazon add voice options, this creates threats and opportunities for the perfume or food marketer. This study is among the first to explore the effects of new voice-based interface modes on marketing relationships. If technology multiplies the ways to interact with the customer, it is critical for managers to understand how to increase personal engagement and brand trust. This

study suggests that basic sensory and input conditions change the levels of naturalness but also the level of cognitive effort, impacting personal engagement and brand trust and their connection.

One limitation of our study is the current lack of familiarity with the voice interface that may cause higher cognitive effort than what we might expect within a decade. A second limitation is that we did not directly investigate whether voice plus touch was perceived as more natural than touch alone, or whether voice plus touch was objectively or subjectively more complex and difficult to use than touch alone. There is clearly a future research need to dig into and test the psychological processes underpinning our results. With the current Pre-Cambrian explosion of new devices and interaction modes, an explosion that potentially impacts all phases of the customer purchase journey, we foresee a wide variety of hypotheses in many new contexts that will keep researchers busy for years to come.

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TABLES

TABLE 1

Variables	Method	Findings	References
Incidental touch Library service quality evaluation	Experiment in which the students were touched during the book check out transaction. They had to evaluate the library service afterwards.	The touch led to a higher evaluation of the library service.	Fisher, Rytting, & Heslin (1976)
Incidental touch Tips behavior Attitude towards the server	Experiments in situ in which the server had to touch or not touch the customer during the restaurant interaction. The context was based on US habits for tipping behavior.	When customers were touched, the server tips increased significantly.	Crusco & Wetzel (1984)
Interpersonal touch Compliance behavior Evaluation	Three experiments in situ that compared two groups (one touch vs. one not touch) of consumers during a purchasing situation.	Consumers tend to comply more with a requester in a touch interaction. Touch increased positive feelings for and evaluation of the requester.	Hornik (1992)
Haptic information Need for touch Confidence in product evaluation	Experiments in which participants could either touch the product or visualize it only.	The more the product is available to touch for the high-need-for-touch consumers, the higher the consumer confidence in his/her product evaluation.	Peck & Childers (2003)
Touch of a textured piece Donation rate Persuasion	Experiments in which participants received a message via a textured piece related or not to the goal of the organization.	Hedonic aspect of touch increases affective responses and persuasion.	Peck & Wiggins (2006)
Oxytocin levels Generosity Trust	Experiment in laboratory conditions in which participants either received a tactile interaction or not before making a sacrifice decision.	Touch increased oxytocin levels, but only when it is followed by an intentional act of trust.	Morhenn, Park, & Piper, (2008)
Incidental haptic sensations Social judgments and decisions	Six experiments asked participants to evaluate other people's personality and their social ability according to three tactile inputs (weight, texture, and hardness).	Haptic sensations induce different social judgments about people whether it is an active or passive form of touch.	Ackerman, Nocera, & Bargh (2010)
Trust Product evaluation	A mix design study that examined the influence of interpersonal touch in a consumption context. During the experimental phase, consumers were touched while being served during a wine tasting.	Touch increases consumers' trust toward the salesperson and trust is transferred positively to the product evaluation.	Orth et al. (2013)
Interface mode of tactile interaction Direct-touch effect	Experimental study that modified the type of tactile experience provided from a device (mouse vs. touchscreen) to browse on a website.	The device's ability to stimulate the sense of touch modified the consumer's online behavior and choice toward either more tangible or intangible features.	Brasel & Gips (2015)
Direct-touch effect Hedonic and utilitarian product attributes	Five experiments that asked participants to choose among food and non-food products with hedonic or utilitarian attributes.	A touch interface such as a tablet (touchscreens) facilitates the choice of affect-laden food compared to a less tactile interface (mouse).	Shen et al. (2016)

TABLE 2

Question Wording, Means and Standard Deviations for Construct Measures^(*)

		Experiment 1 SEPHORA			Experiment 2 PICARD		
		Std Loading	Mean	Std deviation	Std loading	Mean	Std deviation
PERSONAL ENGAGEMENT (Calder & Malthouse, 2004) (Cronbach Alpha .92; .94) (AVE .33; .40)							
Stimulation and Inspiration (AVE .56, .58)	This app makes me think of things in new ways	.72**	4.58	1.40	.83**	4.29	1.29
	This app inspires me in my own life	.74**	3.93	1.64	.69**	3.89	1.16
	This app stimulates my thinking about lots of different topics	.88**	4.76	1.52	.81**	4.20	1.24
	This application makes me a more interesting person	.72**	3.55	1.53	.74**	3.64	1.33
	Some tips and reviews I read on this application are very insightful	.65**	4.65	1.55	.74**	4.51	1.16
Social Facilitation (AVE .71, .85)	This app often gives me something to talk about	.82**	4.26	1.59	.92**	4.22	1.40
	I bring up things I have seen or read on this app in conversations with many other people	.86**	4.87	1.52	.91**	4.32	1.39
	I use things from this application in discussions or arguments with people I know	.85**	4.72	1.59	.93**	4.35	1.37
Temporal (AVE .57, .61)	Using this app is part of my routine	.84**	5.31	1.66	.82**	4.23	1.824
	This is one of the applications I always use when I'm using my mobile phone	.81**	4.96	1.79	.84**	4.16	1.783
	I use this application largely to collect suggestions about places to visit with my friends	.70**	5.21	1.59	.81**	4.46	1.62
	Using this application and keeping in touch with my friends or collecting rewards helps me to get my day started in the morning	.66**	3.96	1.67	.62**	3.48	1.51
Self-Esteem and Civic Mindedness (AVE .58, .71)	Using this app makes a difference in my life	.63**	4.67	1.66	.75**	3.92	1.48
	Using this app makes me feel like a better citizen	.80**	2.82	1.52	.89**	3.23	1.38
	This app reflects my values	.82**	3.19	1.52	.87**	3.16	1.28
	Using this application makes me more a part of my community	.71**	3.81	1.66	.82**	3.66	1.39
	I am a better person for using this application	.84**	3.05	1.59	.86**	3.11	1.35
Intrinsic Enjoyment (AVE .54, .50)	Using this app is a treat for me	.74**	4.03	1.39	.65**	3.79	1.40
	Using this application improves my mood, makes me happier	.74**	3.68	1.53	.74**	3.76	1.51
	I like to kick back and wind down with this application	.74**	4.30	1.38	.74**	3.95	1.28
	I like to use this application when I am eating or taking a break	.64**	4.60	1.85	.66**	3.63	1.64
Utilitarian	Using this app helps me in making	.81**	4.84	1.34	.83**	4.62	1.26

(AVE .61, .56)	good decisions						
	You learn how to improve yourself from this application	.81**	4.28	1.61	.76**	3.75	1.55
	This application provides information that helps me in making decisions	.83**	5.03	1.44	.73**	4.91	1.19
	This app helps me better manage my money	.71**	3.41	1.68	.57**	3.50	1.43
	I give advice and tips to people I know based on things I see/read with this application	.76**	4.68	1.45	.83**	4.27	1.45
TRUST (Chaudhuri & Holbrook, 2001) (AVE .70; .71)							
	I trust this brand	.80**	5.17	1.27	.85**	5.17	1.16
	This brand is reliable	.92**	5.38	1.14	.92**	5.33	1.01
	The brand is honest with me	.80**	5.34	1.23	.87**	5.28	0.97
	The brand is dependable	.81**	4.96	1.18	.71**	5.03	1.15
PRIVACY (Krasnova et al., 2009) (AVE .60; .80)							
	I'm often concerned that the application could store my information for the next couple of years	.90*	5.19	1.54	.87**	4.40	1.47
	I feel anxious that the application might know too much about me	.77*	4.86	1.95	.88**	4.38	1.62
	I'm often concerned that the application could share the information I provide with other parties (marketing, HR, or government agencies)	.56	5.19	1.48	.91**	4.64	1.46
	I'm often concerned other parties could actually collect my publicly available information with the application	.73*	5.18	1.36	.90**	4.64	1.45
	I'm often concerned that my current public information may be stored by some other parties	.72*	5.25	1.38	.89**	4.55	1.38
	I'm often concerned that other parties could share information they have collected about me	.82*	5.11	1.67	.91**	4.50	1.49
	It often worries me that other parties could use the information they have collected about me from the application for commercial purposes	.86*	4.95	1.74	.90**	4.51	1.56
OPENNESS (Goldberg, 1993) (AVE .54; .65) <i>Composite Reliability (.49; .66)</i>							
	I believe in the importance of art	-.80	4.53	0.60	-.77***	5.85	.21
	I do not like art	.70	4.54	0.52	.90***	2.25	.12
	I do not enjoy going to art museums	.63	4.42	0.44	.93***	2.26	.10
	I am not interested in abstract ideas	.80	5.05	0.51	.57**	2.46	.19

(*) All measures are rated on a 7-point scale
 * p<.05, **p<.001, ***p<.0001

TABLE 3
Matrix of Latent Constructs

(a)

Experiment 1

	SI	SF	TEM	CIV	IE	UT	TRUST	PRIVACY
SI	(.558)							
SF	.556	(.713)						
TEM	.325	.462	(.570)					
CIV	.422	.479	.437	(.584)				
IE	.478	.507	.515	.518	(.538)			
UT	.263	.517	.546	.630	.522	(.612)		
TRUST	.359	.220	.216	.346	.314	.211	(.695)	
PRIVACY	.194	.427	.245	.439	.084	.063	-.110	(.597)
Coefficient Alpha	.798	.799	.743	.818	.717	.840	.855	.911
Composite Reliability	.862	.882	.840	.874	.819	.887	.901	.911

(b)

Experiment 2

	SI	SF	TEM	CIV	IE	UT	TRUST	PRIVACY
SI	(.579)							
SF	.560	(.845)						
TEM	.455	.437	(.605)					
CIV	.666	.393	.522	(.705)				
IE	.600	.473	.533	.605	(.504)			
UT	.592	.517	.578	.630	.729	(.561)		
TRUST	.184	.147	-.001	.071	.253	.266	(.708)	
PRIVACY	.036	-.104	.101	.037	-.107	-.147	-.140	(.800)
Coefficient Alpha	.817	.908	.776	.894	.665	.799	.876	.959
Composite Reliability	.872	.942	.858	.922	.796	.863	.906	.965

** Significant at $\alpha = .000$, all correlations are significantly less than 1.00.

Notes: Zero order correlations below diagonal. Average variance extracted (AVE) appears on the diagonal in parentheses.

SI = Stimulation and Inspiration, SF = Social Facilitation, TEM= Temporal, CIV = Self-Esteem and Civic Mindedness, IE = Intrinsic Enjoyment, UT = Utilitarian, PRIVACY= Privacy Concerns

TABLE 4

(a)

T-test—Experiment 1

Variable	Condition	Mean	Standard Error	F	<i>t</i>	<i>p</i>
Second-order Construct						
Personal Engagement*	Voice plus touch (N=50)	3.71	.94	1.345	-3.12	.002
	Touch (N=45)	4.28	.85			
First-order Constructs						
Stimulation and Inspiration	Voice plus touch (N=50)	4.04	1.30	1.826	-3.84	.001
	Touch (N=45)	4.88	1.12			
Temporal Experience	Voice plus touch (N=50)	4.73	1.62	13.47	-3.32	.001
	Touch (N=45)	5.63	.90			
Intrinsic Enjoyment	Voice plus touch (N=50)	3.78	1.20	.638	-1.96	.053
	Touch (N=45)	4.22	1.01			
Self-Esteem and Civic Mindedness	Voice plus touch (N=50)	2.54	1.17	.051	-1.57	.120
	Touch (N=45)	2.93	1.26			
Utilitarian Perception	Voice plus touch (N=50)	4.39	1.30	1.27	-2.03	.046
	Touch (N=45)	4.88	1.04			
Social Facilitation	Voice plus touch (N=50)	4.16	1.35	2.23	-3.84	.000
	Touch (N=45)	5.14	1.10			

*Second-order construct EFA includes *Social Facilitation*, *Intrinsic Enjoyment*, *Self-Esteem and Civic Mindedness*, and *Utilitarian Experience*.

(b)

T-test—Experiment 2

Variable	Condition	Mean	Standard Error	F	<i>t</i>	<i>p</i>
Second-order Construct						
Personal Engagement*	Voice plus touch (N=49)	3.95	.82	2.782	-1.61	.111
	Touch (N=43)	4.24	.98			
First-order Constructs						
Stimulation and Inspiration	Voice plus touch (N=49)	3.98	.95	.782	-1.98	.051
	Touch (N=43)	4.39	1.04			
Temporal Experience	Voice plus touch (N=49)	3.39	1.35	.128	-6.95	.000
	Touch (N=43)	5.25	1.18			
Social Facilitation	Voice plus touch (N=49)	4.14	1.22	.620	-1.26	.213

	Touch (N=43)	4.47	1.33			
Self-Esteem and Civic Mindedness	Voice plus touch (N=49)	3.26	1.14	1.38	-.257	.797
	Touch (N=43)	3.32	1.25			
Utilitarian Perception	Voice plus touch (N=49)	4.43	1.04	1.82	-1.68	.096
	Touch (N=43)	4.81	1.16			

*Second-order construct EFA includes *Stimulation and Inspiration, Social Facilitation, Self-Esteem and Civic Mindedness, and Utilitarian Experience.*

***Intrinsic Enjoyment was not retrieved at the first-order level with EFA.*

TABLE 5
(a)
Testing Results of Main Effect Structural Equation Model (PLS) Experiment 1

	SEM Parameter Estimates			Multi-Group Analysis
	Full sample (voice plus touch and touch) (n=95)	Voice plus touch (n=50)	Touch (n=45)	Voice plus touch vs. Touch
H1 Personal Engagement	.24***	.19*	.26***	.07
Stimulation and Inspiration → Personal Engagement				
Temporal Experience → Personal Engagement	.18***	.23***	.13*	.11
Intrinsic Enjoyment → Personal Engagement	.23***	.24***	.22***	.03
Social Facilitation → Personal Engagement	.18***	.19***	.13*	.07
Self Esteem and Civic Mindedness → Personal Engagement	.27***	.25***	.33***	.09
Utilitarian Perception → Personal Engagement	.25***	.26***	.28***	.02
H2 Personal Engagement → Trust	.35***	.25	.57***	.35*
H3 Moderating Effect of Privacy Concerns (on the relationship PE → Brand Trust)	.15	.18	-.17	.34

• p<.05 **p<.001 ***p<.000

(b)

Summed Scores

	Touch (n=45)	Voice plus touch (n=50)
Personal Engagement		
Stimulation and Inspiration	24.02	19.16
Temporal Experience	20.96	18.06
Intrinsic Enjoyment	22.29	19.42
Social Facilitation	15.4	12.46
Self Esteem and Civic Mindedness	18.91	16.32
Utilitarian Perception	23.09	20.82

TABLE 6
(a)
Testing Results of Main Effect Structural Equation Model (PLS) Experiment 2

	SEM Parameter Estimates			Multi-Group Analysis
	Full sample	Voice plus touch (n=49)	Touch (n=43)	Voice plus Touch vs. Touch
H1 Personal Engagement				
Stimulation and Inspiration → Personal Engagement	.23***	.22***	.24***	.02
Temporal Experience → Personal Engagement	.14***	.19*	.11*	.08
Intrinsic Enjoyment → Personal Engagement	.16***	.19***	.18***	.01
Social Facilitation → Personal Engagement	.23***	.18***	.14**	.04
Self Esteem and Civic Mindedness → Personal Engagement	.28***	.31***	.28***	.03
Utilitarian Perception → Personal Engagement	.24***	.22***	.25***	.03
H2 Personal Engagement → Trust	.19	.10	.34*	.36*
H3 Moderating Effect of Privacy Concerns (on the relationship PE → Brand Trust)	.08	.23	-.12	0.3*

(b)

Summed Scores

	Touch (n=43)	Voice plus touch (n=49)
Personal Engagement		
Stimulation and Inspiration	21.30	19.86
Temporal Experience	18.95	14.02
Intrinsic Enjoyment	19.25	19.33
Social Facilitation	13.42	12.41
Self Esteem and Civic Mindedness	17.63	16.61
Utilitarian Perception	21.77	20.41

FIGURE 1

Theoretical Model

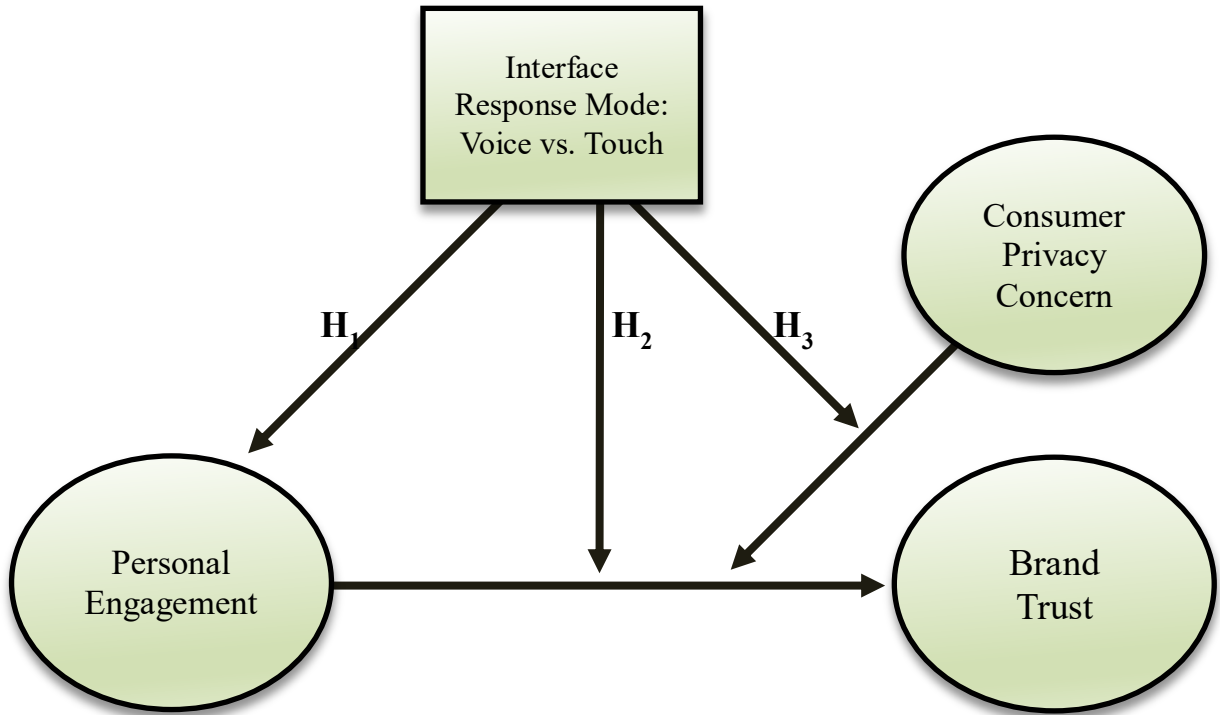
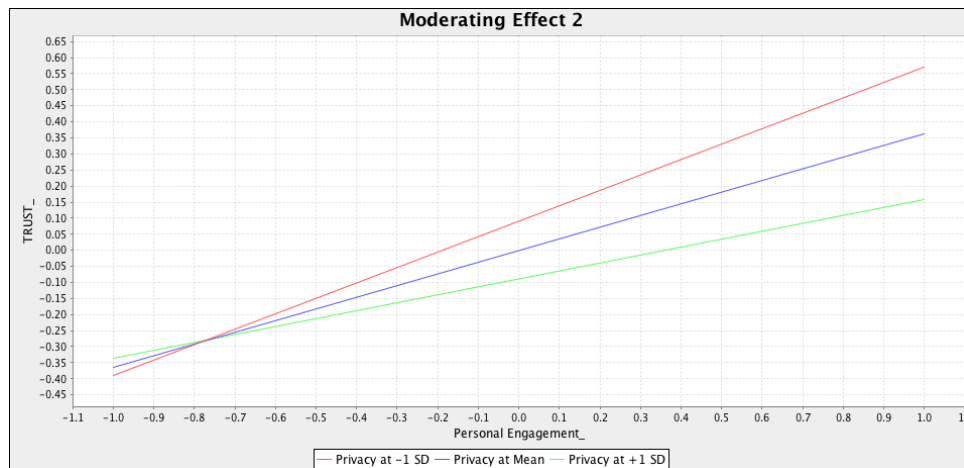


FIGURE 2

Privacy Moderating Effect—Experiment 1

(a)

Moderating Effect 2 PE → Trust (Touch)



(b)

Moderating Effect 2 PE → Trust (Voice plus touch)

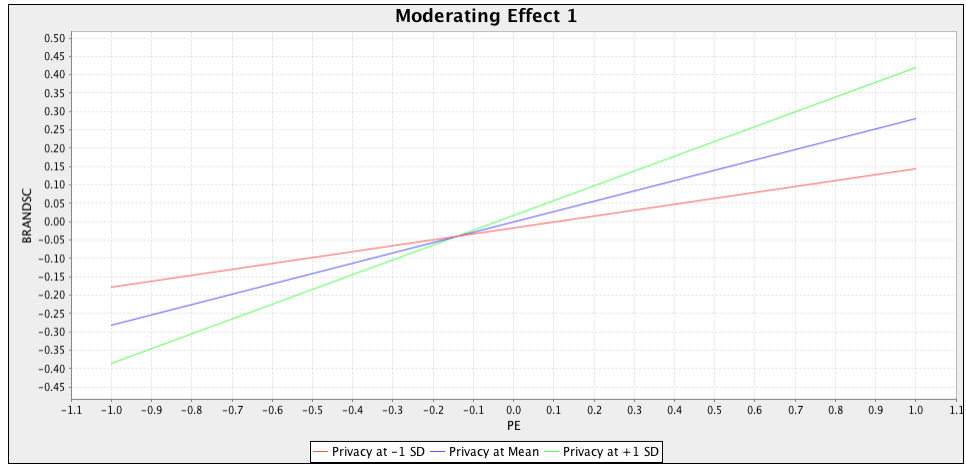
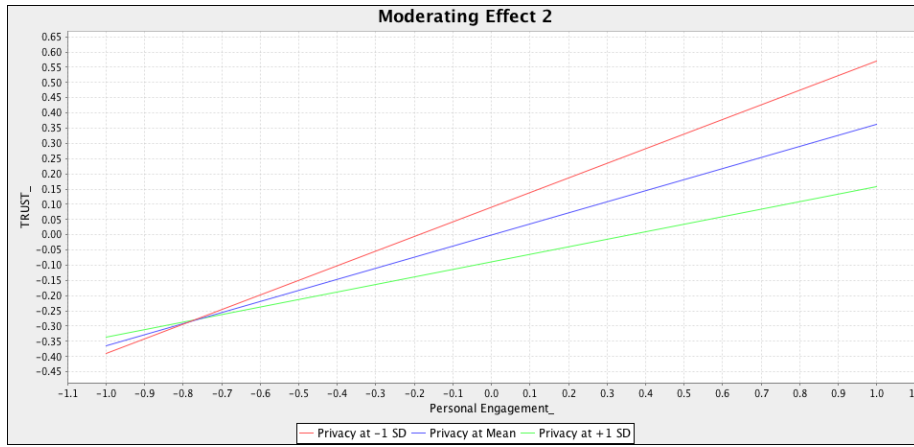


FIGURE 3

Privacy Moderating Effect—Experiment 2

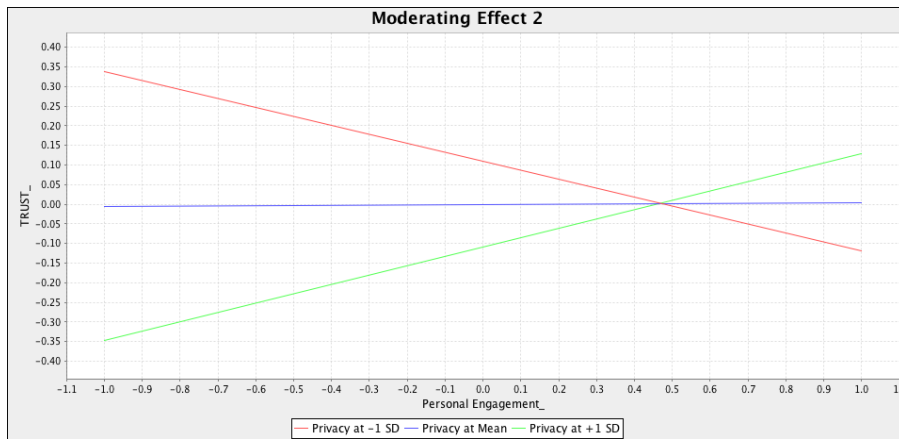
(a)

Moderating Effect 2: PE → TRUST (Touch)



(b)

Moderating Effect 2: PE → TRUST (Voice plus touch)



HIGHLIGHTS

- Personal engagement is higher with only touch condition
- Lower personal engagement with voice plus touch sensory modality
- Personal engagement mediates the relation between touch sensory mode and brand trust
- Privacy hasn't a moderating effect on personal engagement and brand trust