How the Kinesthetic Properties of a Response Scale Affect Judgment

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We explore how physical movements used when responding can induce psychological processes used to generate the response. Across four experiments, we find that responding on a sliding scale elicits the momentary consideration of each value the cursor passes, yielding responses that are closer to the scale endpoint and reducing confidence.

[to cite]:

[url]:
http://www.acrwebsite.org/volumes/1024469/volumes/v45/NA-45

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Special Session Summaries

It’s Not About What You Do, But How You Do It:
The Impact of Technology-Enabled Modalities

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Paper #1: When Touch Interfaces Boost Consumer Confidence:
The Role of Instrumental Need for Touch
Johannes Hattula, Imperial College Business School, UK
Walter Herzog, WHU-Otto Beisheim School of Management, Germany
Ravi Dhar, Yale University, USA

Paper #2: How the Kinesthetic Properties of a Response Scale Affect Judgment
Melanie S. Brucks, Stanford University, USA
Jonathan Levav, Stanford University, USA

Paper #3: Understanding the Psychology of Smartphone Usage:
The Adult Pacifier Hypothesis
Shiri Melumad, Columbia University, USA
Michel T. Pham, Columbia University, USA

Paper #4: When Speech Reflects Mind: Natural Paralinguistic Cues in Voice Convey Presence of Mind
Juliana Schroeder, University of California, USA
Alicea J. Lieberman, University of California, USA

SESSION OVERVIEW

Recent advancements in hardware and software provide consumers with new forms of interaction with companies and products. People can now consume the same products and information across different electronic devices (e.g., laptop, touch-based smartphone, or text-to-speech reader), and companies can assess consumer preferences through different elicitation modes (e.g., providing either a sliding scale or a fill-in-the-blank box to indicate price preference in a search). Yet, there is little research investigating if or how these different technology-enabled modalities impact consumer behavior.

The aim of this session is to bring attention to and discuss the underlying psychological mechanisms at play when consumers use these prevalent, new modalities. We will begin our session with physical interactions afforded by technology—touch-based interface and slider scales—and examine how these factors can influence judgments and decision-making as well as metacognitive outcomes. Next, we will shift our focus to the downstream consequences of using different technology-enabled modalities, investigating the role of these modalities in emotion (as attachment objects) and communication (via paralinguistic cues).

First, Hattula, Herzog, and Dhar examine how using touch-based computer interfaces can influence a diverse set of consumer judgments and decisions. Across five studies, they demonstrate that using a touch-based interface causes less choice deferral, increased propensity to take risks, and higher perceptions of credibility due to increased confidence, especially among consumers who have high instrumental need for touch. In the second paper, Brucks and Levav propose that the kinesthetic properties of responding can induce corresponding psychological processes used to generate the response. In four experiments, they demonstrate that the sensorimotor action of dragging a cursor to an answer prompts the momentary consideration of each value passed by the cursor, leading to responses that are closer to the scale endpoint and reduced confidence. In the third paper, Melumad and Pham examine the role of smartphones as attachment objects. In two lab experiments and a large correlational study involving smoking cessation, they show that using one’s smartphone (vs. PC) can induce feelings of comfort and provide relief from stress, and that the device can serve as a substitutive source of stress relief for consumers highly susceptible to stress: people who recently quit smoking. Lastly, Schroeder and Lieberman find that communication modalities impact impressions of the communicator. Through four studies, they demonstrate that paralinguistic cues can convey the communicator’s mental capacities, and thus, modalities that contain and enhance paralinguistic cues (e.g., speech, headphones, etc.) can lead to more favorable impressions of the communicator.

By demonstrating that the way in which a consumer experiences and interacts with content has important and diverse implications, these papers suggest that the different modalities afforded by technology are not interchangeable. Drawing from a wide array of literature including haptic and sensorimotor information processing, constructed preferences, attachment theory, and linguistics, this session exposes important underlying psychological processes embedded in technology use. Given the ubiquity of technology in consumption, we believe that this session has both theoretical and practical relevance and will attract a broad audience, cultivating collaborations and innovative research.

When Touch Interfaces Boost Consumer Confidence: The Role of Instrumental Need for Touch

EXTENDED ABSTRACT

Touch-enabled computer interfaces have become prevalent in consumers’ lives and increasingly substitute traditional interfaces such as mice and keyboards. For instance, consumers use touchscreen-based devices (e.g., smartphones, tablets) for online shopping or ordering food in restaurants. Similarly, new hybrid computer devices (e.g., Lenovo Yoga) enable consumers to easily switch from non-touch to touch-type interfaces to interact with computers. Despite growing interest in understanding how touch-based devices affect consumers’ decision processes, only few studies have empirically examined this relationship.

We add to this body of research by exploring meta-cognitive consequences of using touch-based computing devices. Specifically, we find that touch (vs. non-touch) interfaces can increase consumer confidence in multiple judgment and decision making contexts. For example, when consumers navigate on a touchscreen to shop online, they are less likely to defer purchase decisions and they tend to be more confident in product choices. Similarly, users of touch interfaces are more inclined to take risks because of the touchscreen-induced inflation in confidence.

We propose that the touchscreen-induced inflation in confidence occurs because consumers do not sufficiently distinguish between touching evaluation objects in physical contexts (e.g., products in a store) and touching screens of computing devices which merely display evaluation objects (cf. Brasel and Gips 2014; Shen, Zhang, and Krishna 2016). In physical contexts, consumers touch objects
to examine their haptic properties and thus to derive confidence in their judgments about these objects. In contrast, in a digital context, consumers touch the screen of computing devices merely to operate the devices and they do not generate relevant haptic information on the displayed evaluation object; hence, their judgmental confidence regarding the object should remain unchanged. However, as consumers do not sufficiently distinguish between physical and digital contexts, we hypothesize that the mere use of touch (vs. non-touch) interfaces may nevertheless increase their confidence level (e.g., their confidence in choosing among products online). Moreover, our rationale of a parallel between physical and digital contexts implies that the extent to which consumers develop confidence when using touchscreen devices is directly linked to the extent to which they develop confidence when touching physical evaluation objects—that is, their instrumental need for touch (INFT, Peck and Childers 2003). Hence, we hypothesize that high INFT consumers are more likely to show the touchscreen-induced confidence inflation than low INFT consumers. We test this prediction in four different decision making contexts to show the robustness of the hypothesized effect.

In Study 1, we use the likelihood of making (vs. deferring) a choice as a confidence measure (Dhar 1997). N=243 US-based MTurk consumers used either touch or non-touch interface devices when completing a choice task. They were provided with two pen alternatives and as in normal purchase situations, they had the option of choosing a pen (high confidence) or not choosing either of the two alternatives (low confidence). Supporting our theorizing, a positive interaction between type of interface and INFT on participants’ likelihood of choosing a pen emerged (β=.45, z=2.10, p<.04). Spotlight analysis at one standard deviation unit above (high INFT) and below (low INFT) the mean of INFT revealed no significant difference between touch and non-touch interface when INFT is low (non-touch: 70%; touch: 61%; p>.35). However, when INFT is high, the likelihood of making a choice increased significantly from 65% for non-touch interface users to 81% for touchscreen users (p<.05).

In Study 2, we experimentally assigned consumers to touchscreen-based and non-touch interface conditions to enhance the causal validity of our findings. Applying a forced choice setting, participants (N=188) made a choice between two video game consoles and indicated their confidence in their choice. In support of our theorizing, a significant interaction effect between interface type and INFT emerged (β=.49, t=1.91, p<.06), such that high INFT consumers reported more confidence in their choice when using a touchscreen (vs. non-touch) interface (M_highINFT_touch=.50, M_highINFT_non-touch=.54; β=.92, t=2.30, p<.02). No such difference was found for low INFT (M_lowINFT_touch=.54, M_lowINFT_non-touch=.51; β=.16, t=.41, p>.69).

In Studies 3 and 4, we propose that the touchscreen-induced confidence inflation also gets manifest in a higher propensity for risk-taking. This proposition builds on research showing that confidence-inducing (vs. unconfidence-inducing) emotions increase individuals’ risk-taking preference (Lerner and Keltner 2001) and that overconfidence induces (vs. unconfidence-induces) emotions increase individuals’ risk-taking preference (Lerner and Keltner 2001) and that overconfidence induces (vs. unconfidence-induces) emotions increase individuals’ risk-taking preference (Lerner and Keltner 2001). In Study 3, 150 participants were free to use a touchscreen-based or non-touch interface device to complete a financial investment task. They were asked to invest in one of two possible stock portfolios with the same expected utility but asymmetrical risk (safe option: 90% chance of returning £18,000, 10% chance of losing £37,000; risky option: 50% chance of returning £50,000, 50% chance of losing £25,000). Again, a significant interaction between the type of interface and INFT (β=.89, t=2.04, p<.04) emerged. High INFT consumers were more likely to invest in the risky option when they used a touchscreen-based (vs. non-touch) device (non-touch: 78%; touch: 95%; p<.02) to complete the task. We find no significant difference for low INFT (non-touch: 79%; touch: 70%; p>.44).

Overall, our research provides further support that consumers do not sufficiently distinguish between touching objects in physical contexts and touching digital representations on computer screens. We extend recent work to meta-cognitive experiences and show that using touch-based interface devices can boost consumers’ confidence level in multiple contexts. This effect is particularly pronounced among high INFT consumers who derive confidence from touching physical objects and (mistakenly) apply the touch-confidence relationship to a digital context.

How the Kinesthetic Properties of a Response Scale Affect Judgment

**EXTENDED ABSTRACT**

The physical ways in which consumers can respond to a question or indicate a preference have multiplied with the growth of new technologies (e.g., swiping on Tinder, scanning a fingerprint with Apple Pay, or sliding on a scale in a consumer satisfaction survey). The present research investigates how these kinesthetic properties of responding can induce different psychological processes used to generate the response and thus, change the response itself.

We rely on a long tradition of literature (Prinz 1987) that suggests that how people process information is grounded in physical experiences (Barsalou 2008). We often use our bodies to guide and orient processing, like counting with our fingers (Wilson 2002) and using gestures (Kita, Alibali, and Chu 2017). Because of this connection between sensorimotor function and cognition, research demonstrates that physical actions can influence processing (e.g., Labroo and Nielson 2010; Wells and Petty 1980). In line with these findings and drawing on work showing that preferences and judgments are partially determined by tasks that influence the information attended to when responding (Fischhoff 1991; Payne and Bettman 1992), we hypothesize that the physical motion of responding can impact how information is processed, changing the judgment or decision made.

Specifically, we embark on this investigation in the context of radio button and slider multiple choice scales, which differ in the kinesthetic nature of their responses. For radio buttons, the respondent must click the cursor directly on the desired response; for a slider, the respondent must hold the cursor down and drag past other possible selection options. By restricting the slider to the exact same discrete responses as the radio buttons, the only difference between these two scales is the movement required to provide a response. Importantly, these two scale types are used ubiquitously (and oftentimes interchangeably) in research, and thus constitute a meaningful context to begin our empirical exploration into the impact of response kinesthesia.

We propose that the sensorimotor action of dragging the cursor to an answer prompts a corresponding psychological process of se-
rial hypothesis testing (Tversky and Kahneman 1974). Specifically, we predict sliding past each value on the scale elicits the momentary consideration of that value, leading to the selection of the first response that fits within the latitude of acceptance (i.e., the first to seem suitable), which produces responses that are closer to the scale endpoint and decreases confidence.

We conducted four studies to examine the impact of physical movements on judgments using the slider and radio button scales. In Study 1, as an initial test of the effect of scale type and its generalizability, 6017 participants were randomly assigned to use a radio button or slider scale to respond to questions regarding personality, numerical estimates, moral judgments, willingness to pay, attitudes, net promoter score, consumer satisfaction and philosophical standing across three batches of data collection. Each scale had the same discrete options available and, to control for anchoring, both scales were preset on a non-option of “0” (see appendix). Merging the data across all tasks, we observe a small, robust effect of scale type on response: participants using a slider (M = 4.66) responded with significantly lower values than participants using radio buttons (M = 4.86, p < 2 x 10^-14). This effect consistently emerged for each individual task when analyzed separately.

We predict that using a slider lowers the response because participants select the lowest value that falls within their range of plausible responses. If this is the case, the slider effect should be reversed if participants begin at the highest value of the scale and drag the cursor past lower values. To test this, in Study 2, participants entered a 2 (slider vs. radio button) x 2 (side: left vs. right) design where they made numerical estimates. All participants selected a value from 1-8, but participants assigned to the left (right) side had the non-option of “0” (“9”) preselected as a holding place. We observe a significant interaction of scale type and side (p < .0001), such that participants assigned the left side replicated Study 1 (p <.001) but participants assigned the right observed a flip: responding via slider yielded higher values than responding via radio buttons (p < .001).

Study 3 extends the generalizability of the effect to an incentive-compatible context and tests process in a new way. Specifically, serial hypothesis testing stipulates that participants will select the response at the edge of their latitude of acceptance. If this is the case, participants that have more knowledge about the question context (i.e., a narrower latitude of acceptance), should exhibit an attenuated slider effect. To test this, in Study 3, 2016 participants watched a trailer for the movie “Office Christmas Party,” estimated how much money the movie would make during its opening weekend using either the slider or radio buttons, and then indicated self-reported knowledge of movie box office revenue. Estimates closest to the actual value earned them an extra 50 cents. We replicate the scale effect: participants responding via slider reported a lower estimate than participants using radio buttons (p = .003). Importantly, this effect was moderated by knowledge (p < .10), such that the effect of scale type was significant among people with low knowledge (1SD below), but not among participants who were knowledgeable (1SD above).

If the slider scale induces serial hypothesis testing, then participants using this scale should feel less confident in their response as they satisfied by stopping at the boundary of their latitude of acceptance rather than generating the number that is most reflective of the latent value in their head. To test this, in Study 4, we had 2014 participants estimate numerical values and after each estimate, we asked them about their confidence in the estimate. As expected, not only were the estimates on average lower in the slider condition compared to the radio button (p <.001), but participants were also less confident in their responses (p = .001).

These findings provide initial evidence for the hypothesis that the kinesthetic properties of a response scale can impact people’s judgments.

Understanding the Psychology of Smartphone Usage: The Adult Pacifier Hypothesis

EXTENDED ABSTRACT

Consumers are officially spending more time on their smartphones than on any of their other electronic devices, and in 2015 the amount of time spent on the device increased by 35% from 2014 alone (Yahoo! Insights 2015). While not clinically recognized as a behavioral dependence (American Psychiatric Association 2013), the term “smartphone addiction” has been commonly used to describe consumers’ seemingly nonstop use of their device (e.g., The Guardian 2016). Although common wisdom largely assumes that this apparent addiction is driven by the functionalities offered on the device (e.g., email, web browsing) (e.g., Aoki and Downes 2003), in reality the features available on smartphones are available across many other electronic devices. Yet, we continue hear about consumers’ apparent “addiction” not to their laptops or tablets, but to their smartphones in particular.

What might account for many consumers’ persistent increase in smartphone use? While the marketing implications of mobile platforms are receiving emerging attention in the marketing modeling literature (e.g., Danaher et al. 2015; Ghose et al. 2013), still very little is known about the consumer psychology of smartphone usage. The purpose of this research is to investigate why consumers often have such as strong drive to engage with their smartphones. We advance the hypothesis that this phenomenon is driven in part by a general and developmentally primitive psychological mechanism: namely, that smartphones can often fulfill the role of an “attachment object” or “adult pacifier” for many consumers—which we refer to as the Adult Pacifier Hypothesis. Specifically, we propose that insight into the psychology of smartphone usage can be found in the developmental literature on attachment theory, which describes how children form strong emotional attachments to certain objects that come to represent a source of security and comfort for them (e.g., Winnicott 1953). These “attachment objects” tend to contain two key physical properties: they are often tactile in nature, and small or lightweight enough to be carried around for use across different contexts (e.g., Lehman et al. 1992). In addition to these characteristics physical properties, attachment objects involve a set of defining behavioral patterns (e.g., Litt 1986). In this research we report results from three studies, including two controlled lab experiments and one large correlational study, showing that smartphones can exhibit at least two of the defining behavioral patterns associated with attachment objects.

Specifically, one defining pattern of attachment objects is that owners feel heightened comfort as a result of engaging with the possession (e.g., Bowlby 1982). The purpose of Study 1 was to examine whether using one’s smartphone increases felt comfort to a greater extent than using a comparable device: one’s personal computer. To test this, participants were randomly assigned to browse content on either their smartphone or their laptop, and were asked to indicate their situational feelings—including their feeling of comfort—at two points in the study: Prior to using their assigned device, and after using their device.

The results of Study 1 show that, holding the content consumed across devices constant, participants assigned to use their smartphones reported a greater increase in felt comfort relative to participants assigned to use their laptop. Moreover, participants did not
differ along any of the other situational feelings measured. In other words, the results show that smartphone use distinctly impacts feelings of comfort in particular, which is central to the argument that the device can serve as an attachment object.

Another primary characteristic of attachment objects is that they are comforting enough to provide relief from a stressful situation (e.g., Mikulincer and Shaver 2007). Building off of this, in Study 2 we tested the hypothesis that, holding everything else constant, using one’s smartphone provides a faster recovery from stress than using one’s PC. Participants in Study 2 first underwent a stress induction, and were then randomly assigned to browse the same content either on their smartphone or on their laptop. Participants’ felt comfort was measured at three points throughout the study: (1) prior to the stress induction, (2) after the stress induction before device usage, and (3) after using their assigned devices.

The results of Study 2 reveal that, after undergoing stress, participants showed a greater increase in their felt comfort after smartphone usage than after PC usage, such that participants who used their smartphone (vs. PC) felt significantly greater comfort immediately after use of the device. Further, whereas participants who used their PC recovered to their baseline level of comfort upon arrival to the study, participants assigned to use their smartphone reported greater comfort than when they did when they first arrived to the study. Again, none of the other situational feelings differed across conditions as a function of time. The results of Study 2 therefore confirm that engaging with one’s smartphone can be comforting enough to provide relief from stress, which is another defining characteristic of attachment objects.

Study 3 builds on the findings of Study 2 to test a corollary real world prediction that using one’s smartphone will be particularly appealing to consumers who are particularly vulnerable to anxiety or stress – for example, people who have recently quit smoking cigarettes. Research has shown that cigarettes can serve as a source of stress and tension relief for smokers and that, soon after they quit smoking, people crave a substitutive means through which to relieve feelings of anxiety (e.g., Burr 1984). If the recent cessation of smoking is a source of stress and anxiety, people who have recently quit smoking smoking may more intensely engage with their smartphone as a substitutive source of comfort. Study 3 therefore compared smartphone usage patterns among participants who either recently quit smoking cigarettes or who were still smoking at the time. The results show that the drive to use one’s smartphone becomes especially pronounced among consumers who have recently quit smoking relative to consumers who are still currently smoking, which provides further evidence suggesting that smartphones contain tension-relieving properties.

Taken together these findings provide insight into the psychology underlying smartphone usage, supporting the proposition that smartphones can often serve as an attachment object for many consumers.

When Speech Reflects Mind: Natural Paralinguistic Cues in Voice Convey Presence of Mind

EXTENDED ABSTRACT

Language is used as a tool to communicate one’s mind and can be expressed via voice or text (Pinker & Bloom, 1990). Beyond the semantic content of such communication, the voice itself contains natural paralinguistic cues that convey emotion and intention (McAleer, Todorov, & Belin, 2014; Scherer, Banse, & Wallbot, 2001). As such, hearing someone’s thoughts via speech (versus text) provides greater insight into their mental states (Kruger et al., 2005) and, at least under certain circumstances, makes the communicator seem more mentally capable because the paralinguistic cues signal mindfulness (Schroeder & Epley, 2015, 2016). These prior findings suggest that systematically removing natural paralinguistic cues in voice could reduce impressions of a communicator. To test this, we ran four experiments in which we removed or distorted natural paralinguistic cues in voice and measured impressions of communicators. To manipulate paralinguistic cues we either removed them entirely (i.e., via text, Study 1), reduced them using actors’ voices (Studies 2 and 4), or subtly distorted them by changing the medium by which they were observed (headphones vs. speakers, Studies 3 and 4).

In an initial experiment, we test whether listeners perceive the mental capacities of a communicator differently if they listen to a message with paralinguistic cues (speech) versus the same message without paralinguistic cues (text). Critically, the actual words were the same in both conditions. We taped communicators (n=20) talking about an experience that involved decision-making. Participants (n=231) then listened (audio condition) or read (text condition) one of these speeches and rated the communicator on a battery of items measuring perceptions of the communicator’s mental capacities. As predicted, participants believed communicators were more capable thinkers—more competent, thoughtful, and more uniquely human—when they listened to the speeches than when they read them, t(227)=3.29, p<.01. Participants also reported higher impressions of communicators they heard (M=2.84, SD=1.17) than those they read, (M=2.32, SD=1.25), t(227)=2.66, p<.01. In this experiment, we provide initial evidence that removing paralinguistic cues in voice (i.e., via text) can reduce impressions of a communicator. However, this manipulation presents confounds: the act of reading is different from the act of listening in many ways.

In a second experiment, we used a different manipulation to reduce paralinguistic cues; we asked professional actors to read a written statement “as if the words had no meaning” (mindless voice condition) and to read the same statement naturally, “imbuing the words with the thoughts and feelings of the writer” (mindful voice condition). In this way, speeches from the mindless voice condition lacked natural paralinguistic cues. Analyses of the paralinguistic cues in each of these voices revealed meaningful differences; the mindful voices had higher average pitch and amplitude, and greater variance in pitch and amplitude (p<.01). We then asked a separate sample of evaluators (n=359) to either listen to a mindful voice, listen to a mindless voice, or read the original text, and then evaluate the communicator. As predicted, participants who listened to a mindless voice perceived the communicator as significantly less intelligent (M=3.97, SD=1.24) than participants who listened to a mindful voice (M=4.70, SD=0.97), t(512, p<.001), and than participants who read the text (M=4.39, SD=1.07), t=2.91, p<.001. We also conceptually replicated the finding in Study 1 such that participants who listened to mindful voices believed communicators were more intelligent than those who read text, t=2.23, p=.027.

In a third experiment we test a more subtle manipulation by making it slightly harder for listeners to hear the paralinguistic cues in the voice. Headphones deliver noise directly into the ear, allowing the listener to pick up on nuances in the voice, while speakers provide reflections of sound, masking some of its subtle detail. By dampening the listener’s ability to detect the paralinguistic cues, we predicted that listening to someone’s voice through speakers will make the communicator seem less thoughtful and competent than when heard through headphones. Participants (n=1132) listened to a clip using either headphones or speakers of a mother and daughter telling their true story of being homeless. Participants then rated the communicators on 10-items rating their warmth and competence,
which we combined into a single scale measuring communicator impression ($\tau$=84). Consistent with our hypothesis, participants who listened to the message via speakers reported a less positive impression of the communicators ($M_{\text{speaker}}=5.13$, $SD=0.87$) than those who listened via headphones ($M_{\text{headphone}}=5.23$, $SD=0.84$), $\beta = -.10$, $t(1130)=1.99$, $p=.047$, although this effect was smaller than effects observed in prior studies.

In a final experiment, we demonstrate that listening to a communicator via headphones versus speakers only affects impressions of the communicator when there are natural paralinguistic cues to observe. Participants ($n=1,001$) again listened to a clip either via headphones or via speakers. Half of the participants heard the same clip of the mother and daughter from the previous experiment, while the other half heard a recreation of the clip that contained the same semantic content but was read mindlessly by two actors. Consistent with the results from Study 3, participants who listened to the original (mindful) clip via speakers perceived the communicators as less warm and competent ($M_{\text{speaker}}=5.21$, $SD=0.78$) than those who listened via headphones ($M_{\text{headphone}}=5.43$, $SD=0.91$), $\beta = -.22$, $t(512)=2.91$, $p=.004$. Conversely, participants who heard the mindless clip reported no difference in impression when heard via speakers versus headphones ($p=.795$).

These findings make a significant contribution to understanding the power of the voice on interpersonal perceptions and how these judgments can be influenced by the media in which speech is consumed. Our results provide novel insights into the psychological consequences of auditory media consumption and perceptions, applicable to communicators and consumers alike.

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