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Hand movement speed in advertising elicits gender stereotypes and consumer responses

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Abstract

Merely observing the hand movement speed with an advertised product can affect consumer perception. Five studies show that hand movement speed when observed (e.g., watching or even reading the description of slow vs. fast hand interaction with a product) elicits distinct associations in the consumer's mind and affects their responses. We suggest that people implicitly associate speedy movements with a more masculine (than feminine) behavior and use hand movement speed as an input to form evaluations of a touched product. Additionally, we demonstrate that consumers elicit higher product preference when their associations from observed hand movement speed match their own social identity. Thus, female (than male) consumers would prefer an advertised product that is depicted with a gentle (instead of speedy) hand movement—as such observed movement makes, both, the product, and the action-performer be perceived as more feminine. We find support for these effects across different product and advertising contexts. Our findings provide novel evidence on the effect of observed and described hand movements as a signal of gender identity and have significant implications for advertising.

KEYWORDS

advertising, implicit associations, gender stereotypes, hand movement speed, observed hapticexperiences, online marketing, social identity theory

1 | INTRODUCTION

Hand movements serve as one of our "*windows to the world*"—they help activate either innate or learned associations, facilitate the representation of an object's property in the memory, and influence our thought confidence (Barsalou, 1999, 2008; Lederman & Klatzky, 1987; Peck & Childers, 2008). In everyday life, we not only perform but also observe hand movements—for example, watching a delicate *floreo* (or "to flower") handwork in flamenco dance, gentle brushing of teeth in a toothpaste advertisement, or frantic movement of steering wheels in "*The Fast and The Furious*" action thriller. Through repeated observation of different hand movements, people might develop associations about the speed of a motoric act and the characteristics of an individual performing the movement. In the consumption context, consumers may utilize these associations to form judgments about a touched product. The question then is: How do *observed* hand movements, when varied on *speed*, influence the consumer responses?

This study has direct relevance for marketers as hand interaction with products is often depicted in advertisements (e.g., observing a protagonist applying L'Oreal face cream, washing hands with Palmolive liquid hand wash, or using a Philips vacuum cleaner). From

a practical standpoint, it is critical to study whether the consumer perception varies when an advertised product is shown with a fast (instead of slow) hand movement. The findings from this article provide insights to marketers utilizing any non-touch or remote mediums (e.g., print, and outdoor advertisements, email texts, social media posts, display ads, etc.). In these non-touch contexts, consumers perceive the product attributes through descriptions and the product's visual representation rather than through physical touch. Our research suggests that advertisers and online marketers could simply alter the speed of the observed or described sensorimotor experience with a featured product to vary the consumer responses. Thus, advertising videos and textual descriptions portraying a slow (vs. fast) sensorimotor interaction with a product can influence consumer perceptions and behaviors across product categories. Our research also implies that marketers of strongly gendered products (e.g., perfumes, shoes, glasses; Van Tilburg et al., 2015) should avoid pairing slow (vs. fast) motoric movements with masculine (vs. feminine) product in their advertisements and online content. This is because an incongruent speed-gender identity pairing can reduce the impact of their targeted marketing efforts.

Prior research has shown that sensorimotor experiences (including hand movements) can affect attitudes by activating heuristics (e.g., Labroo & Nielsen, 2010), visual fluency (Streicher & Estes, 2016), positive affect, and engagement (Chung et al., 2018), emotional attachment (Hadi & Valenzuela, 2014), and feeling-based dispositions (Kwon & Adaval, 2017). This study stream, although rich in empirical evidence, has studied the effect of self-experienced hand movements and different touch interfaces. Furthermore, extant literature has examined the effect of direction (and not speed) of hand movements. Our paper addresses this conceptual void by showing that observed hand movements, when varied on speed, can affect consumer responses. We posit that observing a slow (vs. fast) hand movement can activate distinct gender-identity associations in the consumers' minds. These are learned associations based on customers' recurrent experiences (Kwon & Adaval, 2017) and observations of others' hand movements. For example, in advertisements, consumers might observe a female protagonist performing a gentle hand interaction with a product and a male character doing a relatively speedier hand action. We propose that repeated exposure to such sensorimotor experiences can lead consumers to develop implicit associations of slow (vs. fast) hand movements with a more feminine (vs. masculine) identity. These learned associations might also shape product evaluations. We show that a match between the observed hand movement speed and the consumer's gender identity heightens product preferences. Specifically, female (vs. male) consumers evince higher preference upon observing a slow (vs. fast) hand interaction with a product—as such movement would automatically activate feminine (vs. masculine) associations.

This study makes important theoretical contributions. First, we explore the novel effect of *speed* of *observed* hand movements on consumer perceptions and product preferences. Prior literature has focused on haptic perception through one's own hands (e.g., Peck & Johnson, 2011), and no empirical research, to our knowledge, has explored the effect of speed of bodily movements on consumer responses. Second, our research shows that people draw inferences about social identity not only through possessions (Berger & Heath, 2007) but also observed hand movements, thereby bridging the literature on social identity maintenance and bodily movements. We notably demonstrate that hand movement speed may be used as a signal of gender identity. Lastly, we demonstrate how learned associations between speedy movement with *masculinity* and *femininity* (held across genders) affect product perception and advertising responses. These findings contribute to the literature on gender-consumption perceptions (e.g., Borau et al., 2021; Pinna, 2020; Van Tilburg et al., 2015), social identity theory (Kleine et al., 1993), and sensory marketing (e.g., Krishna et al., 2010). We next present the literature review that leads to our hypotheses.

2 | CONCEPTUAL BACKGROUND

2.1 | Effect of hand movements on behavior

Prior research suggests that bodily states, movements, and sensations spontaneously activate past experiences and influence attitudes (Barsalou, 1999, 2008). Prior work has delved with personal and vividly simulated experiences and manipulated the direction of the motoric action (e.g., Cacioppo et al., 1993; Hadi & Valenzuela, 2014; Kwon & Adaval, 2017; Streicher & Estes, 2016). For example, Kwon and Adaval (2017) showed that the motoric act of moving one's hand against the flow (e.g., stroking a fur from right-to-left) increased the preference for normatively less preferred products. In one experiment, the authors contrasted personally experienced (vs. observed) hand movement and found null effects for the latter. Kwon and Adaval (2017) noted that observed hand movements differ from personal or vividly simulated experiences as they are less visceral and involve a shift in visual perspective. Specifically, observed experiences are likely to be driven by the activation of semantic concepts.

Extending this literature, our research shows that observed hand movements, when varied on speed, affect consumer evaluations. We posit that this effect is driven by activation of associations between *speedy movement* and *masculine (than feminine) behavior* and leads to certain inferences, which serve as an input to form perceptions of a featured product. Next, we elaborate on why consumers form these associations upon observing a hand movement varying on speed.

2.2 | Associations with the speed of movement

Extant research shows that people develop gender associations through social learning (Becker et al., 2007). These associations get engrained as people are repetitively exposed to the behaviors representing different gender roles (e.g., what it is to be feminine or masculine?) through books, films, advertisements, and press coverage (Holt & Thompson, 2004). For example, traditional dance forms such as Kathakali (17th-century Indian art-form) and Flamenco

(18th-century Spanish dance) portray femininity through subtle hand gestures and masculinity with vigorous movements (Cabrera et al., 2008; Ganapathi, 2011). Likewise, representations in films and theaters have occasionally shown men to engage in vigorous hand movements and women to depict graceful and softer actions (Azmi et al., 2016). In the advertising context, commercials of personal care and cleaning products often depict women engaging in slow hand movements—to convey the product's nurturance, gentleness, and care (i.e., stereotypical feminine characteristics; Rudman et al., 2001). Contrarily, advertisements depicting male protagonists frequently portray fast hand movements—to reflect forcefulness, power, and dominance (i.e., stereotypical masculine attributes). Thus, as consumers more frequently observe a male (vs. female) protagonist performing vigorous sensorimotor actions, they may relate *speedy movements* with *masculinity*. Relatedly, we expect people to associate *gentle or slow movements* with more *feminine* identity. These associations may manifest in the form of mental schemas of femininity (vs. masculinity) upon observing a slow (vs. fast) hand movement.

H1 – *Observing a slow (vs. fast) hand movement will elicit feminine (vs. masculine) associations in the consumer's mind.*

2.3 | Speed of observed hand movement as a perceptual input

The associations elicited from the speed of observed hand movement can help form attribute judgments of a touched product. Prior research suggests that consumers may form judgments based on their touch-related inferences. For example, Krishna and Morrin (2008) examined the influence of a flimsy (vs. firm) quality of a cup, a non-diagnostic haptic cue, on the evaluation of mineral water. They found that consumers, especially those with a low autotelic need for touch (NFT), tend to misattribute the quality of cup to form judgments of the mineral water it contained. Another research showed that the tactile aspects of a surface (e.g., soft carpet vs. a hard vinyl-tile floor) can alter the consumer's sensation of comfort and thus evaluations of a target product (e.g., vase; Meyers-Levy et al., 2010). Yet another study found that packaging texture (soft vs. hard) of snacks (e.g., potato chips) can influence the product's quality perception—with chips in difficult to open packaging perceived as crispier, tastier, and fresher (McDaniel & Baker, 1977).

Moreover, prior research has shown that sensorimotor experiences can activate associations and feelings and, subsequently, lead people to ascribe the activated concept to a target stimulus. For example, enacting certain hand gestures (e.g., upward extension of the thumb) while reading a story alters the liking for a target character (Chandler & Schwarz, 2009). Tom et al. (1991) further demonstrate that head nodding up-and-down (vs. shaking side-to-side) while evaluating a target pen generates positive thoughts (e.g., agreement) and preference for the product. We infer from these studies that consumers utilize their associations from sensorimotor experiences as perceptual input to form product evaluations. Specifically, we expect that observing slow (vs. fast) hand movement would evoke feminine (vs. masculine) associations (H_1), which would be reflected in the perception of product attributes.

H2 – *Observing a slow (vs. fast) hand movement will affect the perceived femininity (vs. masculinity) of a touched product.*

2.4 | Effect on consumption outcomes

Consumers may utilize speed-related associations to signal identity and form product preferences. Building on the social identity theory, we propose that female (vs. male) consumers would evince a higher evaluation upon observing or reading a description of a slow (vs. fast) hand interaction with a product—as, in this case, the product is perceived more feminine (than masculine). The social identity theory suggests that individuals partly derive their self-concept from group membership and are motivated to signal their affiliation to a group (Kleine et al., 1993), through their possessions and consumption behaviors (Berger & Heath, 2007). For example, Brough et al. (2016) demonstrate that consumers hold a green-feminine association, which explains the lower likelihood of males (than females) embracing eco-friendly products. Likewise, Gal and Wilkie (2010) show that consumers prefer product choices that are gender-congruent based on cues such as colors, shapes, and forms. Accordingly, we expect females to evoke a more positive preference for products shown with a slow hand movement. Contrarily, male consumers would evince more positive responses for products depicted with a fast hand movement.

H3 – *Perceived product gender will mediate the effect of slow (vs. fast) observed hand movement on product preferences.*

We test these hypotheses across five experimental studies. In studies 1A and 1B, we examine whether people implicitly hold distinct speed-related associations and elicit mental schemas upon observing a slow (vs. fast) hand movement (H_1) across different countries. In Study 2, we explore whether these associations with observed hand movement speed are used to shape the perception of product attributes (H_2)—in the context of a masculine product. Study 3A and 3B replicate the findings of Study 2 for a gender-neutral hand movement and show that a slow (vs. fast) hand interaction with a product can alter the perceived product gender (H_2) and product preferences (H_3). Across these studies, we use a mix of video and scenario-based stimuli. In the video-based stimuli, we paired the gender perception of different hand movements (i.e., feminine and masculine) with the hand portraying the movement (i.e., female and male). Such pairing was likely to conform with the participant's expectations and facilitate information processing (Krishna et al., 2010). Additionally, this pairing allowed us to show that participants elicit a more feminine (vs. masculine) schema upon observing different hand movement speed—even for motoric actions that have a prior gender-role association in the consumer's mind. For

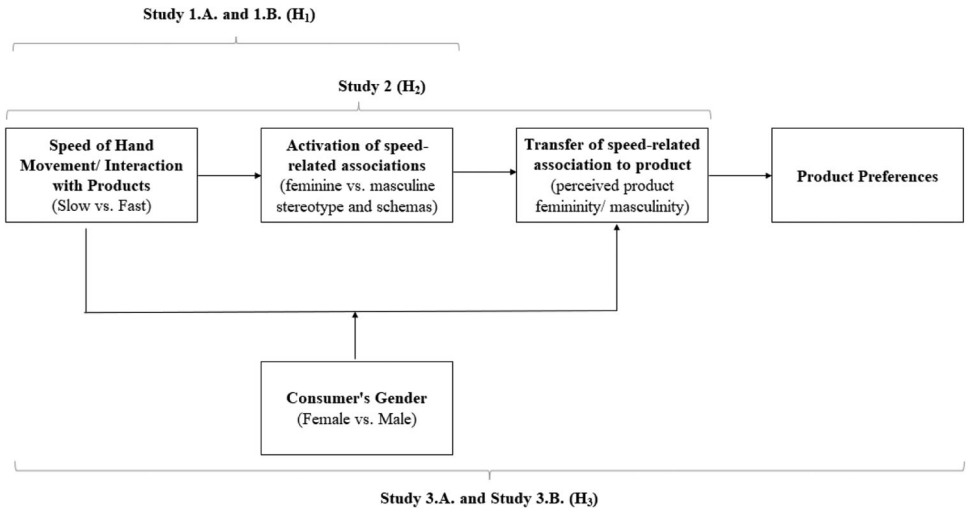


FIGURE 1 Conceptual framework: Effect of hand movement speed on product preferences

gender-neutral hand movement, we used a scenario-based manipulation to demonstrate that the schematic associations are driven by the hand movement speed—and not confounded by the gender of the person performing the action. The conceptual framework for the proposed effects is summarized in Figure 1.

3 | STUDY 1 A: ASSOCIATIONS WITH SPEED OF MOVEMENT

In Study 1A, we used the Implicit Association Test (IAT; Greenwald et al., 1998) to explore the ease with which people pair characteristics of femininity and masculinity with attributes related to the speed of movement. We expected that people would take a lower response time in categorizing speedy movement with a more masculine (than feminine) behavior.

3.1 | Sample, design, and procedure

Participants were recruited from the United States ($N = 160$ MTurk workers; $M_{age} = 36.73$; 45.28% female), Spain ($N = 76$ students; $M_{age} = 23.29$; 38.67% female), and India ($N = 124$ students; $M_{age} = 22.43$; 37.90% female) to complete the IAT procedure through IATGen platform (Carpenter et al., 2019). The IAT required participants to sort words between two binary pairs: (1) masculinity/femininity attributes; (2) words implying fast/slow movement (refer Appendix A for stimuli words). The attributes of femininity (vs. masculinity) were selected from prior research (Hoffman & Borders, 2001). The participants were then asked about their explicit belief on the association between the speed of movement and feminine/masculine attributes via two randomly presented questions: "*to what extent do you believe that slow hand movements (or hand actions) are associated with femininity?*" and "*to what extent do you believe that fast hand movements (or hand actions) are associated with masculinity?*" anchored on 1 (not at all) to 7 (to great extent). Finally, the participants reported their age and gender.

3.2 | Results

The findings revealed a positive significant association for fast (vs. slow) movement with masculinity relative to femininity across the three samples (all $D_{score's} > 0.59$.; refer, Table 1 for the findings). The speed-related association holds across the genders—implying that both men and women implicitly relate slow movements with feminine and fast movements with masculine identity (H_1).

Furthermore, across samples, we found that the associations with the speed of movement reflect a more implicit than explicit attitude. Thus, participants did not explicitly allude to "fast movement = masculine" ($p's > 0.22$) and "slow movement = feminine" association ($p's > 0.10$; Figure 2).

The results of Study 1A suggested that both men and women associate speedy movements with a more masculine (than feminine) behavior. Interestingly, the implicit association does not translate to explicitly acknowledged attitude – that is, people revise their responses when overtly asked.

4 | STUDY 1B: MENTAL SCHEMAS TRIGGERED BY SPEED OF OBSERVED HAND MOVEMENTS

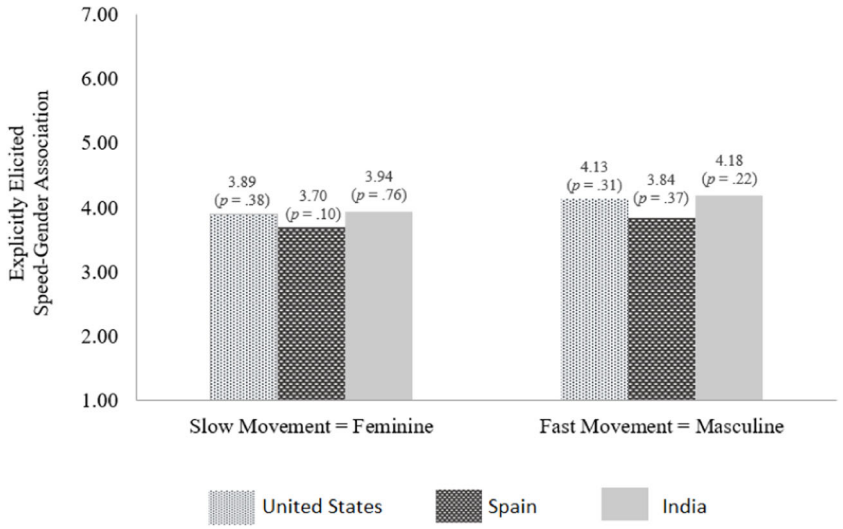
This study examined whether observing a slow (vs. fast) motoric action manifests in the feminine (vs. masculine) mental schemas. We tested the effect across three feminine hand movement contexts (i.e., ironing, vacuuming, and spray-cleaning; selected through a pretest[1]),

TABLE 1 Results of IAT studies

Parameters	United States	Spain	India
D-score mean	0.67	0.60	0.59
D-score *SD*	0.41	0.27	0.35
t-test	20.71	19.22	18.93
p value	<0.01	<0.01	<0.01
Degrees of freedom (*df*)	159	74	123
95% CI	(0.61–0.73)	(0.53–0.66)	(0.53–0.65)
Cohen's *d*	1.64	2.21	1.70
Reliability	0.89	0.75	0.80
Difference by participant gender	D_{male} = 0.70 versus D_{female} = 0.63; p = 0.23	D_{male} = 0.62 versus D_{female} = 0.57; p = 0.43	D_{male} = 0.62 versus D_{female} = 0.52; p = 0.10

Abbreviations: CI, confidence interval; IAT, Implicit Association Test; *SD*, standard deviation.

FIGURE 2 Explicit Associations with speed of movement



in which a female hand was observed performing either a slow (or fast) hand movement (refer to Appendix A for snapshots). We proposed that observing a slow (vs. fast) hand movement would activate a more feminine (than masculine) schema due to the learned associations with the speed of motoric act – even when such hand movements have a distinct feminine gender association.

4.1 | Sample, design, and procedure

Mturk participants (N = 259; 41.70% female; M_{age} = 35.58) were randomly assigned to a 2 × 3 mixed-design experiment, with speed (slow vs. fast) as the between-subject and hand movement contexts as the within-subject factor. Each participant evaluated three videos (12 s.) depicting either a slow (1×) or fast (4×) hand movement and shared their associations for the action performer "*how much do you think the person ironing/vacuuming/spray-cleaning has the following personal traits?*" on a scale ranging from 1 (not at all) to 7 (very much). They provided ratings on six randomly ordered traits—feminine (i.e., gentle, nurturing, and caring) and masculine (i.e., dominant, aggressive, and forceful). These traits are shown in prior research (Brough et al., 2016; Hoffman & Borders, 2001; Holt & Thompson, 2004) to highly correlate with feminine (vs. masculine) identity. We included traits that did not explicitly refer to the gender identities (Bem, 1981) as such overt reference could trigger self-presentation considerations (Rudman et al., 2001) and, potentially, make participants revise their responses (Study 1A). As a manipulation check, we measured the participant's perception of speed by asking "*how would you rate the speed depicted in the video?*" anchored by 1 (very slow) and 7 (very fast). Additionally, the participants rated

[1]We conducted a pretest of 25 hand movements (N = 72) to test their gender-role associations (1 = very feminine, 4 = neither feminine nor masculine, and 7 = very masculine). The results of one-sample *t*-test found that ironing (M = 3.37, SD = 1.19; p < 0.01), vacuuming (M = 3.52, SD = 1.19; p < 0.01), and scrubbing and cleaning (M = 3.33, SD = 1.10; p < 0.01) are perceived as feminine actions.

the stimuli on characteristics of video quality such as light intensity ("*how would you rate the intensity of light in this video?*"), picture sharpness ("*how sharp is the picture quality of this video?*"), and smoothness of motion ("*how smooth is the motion of the video?*") rated from 1 (not at all) to 7 (very much). We included video quality as a control variable as it can affect the trustworthiness of an advertisement (Hautz et al., 2014). Finally, the participants reported their age and gender, both of which were included as control variables.

4.2 | Results

4.2.1 | Manipulation checks

Consistent with our experimental manipulation, participants perceived the stimuli to vary on speed for the hand movements, that is, ironing ($M_{slow} = 4.28$, $M_{fast} = 5.20$, $F_{(1,254)} = 45.42$, $p < 0.01$, $\eta_p^2 = 0.15$), vacuuming ($M_{slow} = 4.14$, $M_{fast} = 5.32$, $F_{(1,254)} = 67.76$, $p < 0.01$, $\eta_p^2 = 0.21$), and spray-cleaning ($M_{slow} = 3.39$, $M_{fast} = 5.38$, $F_{(1,254)} = 135.30$, $p < 0.01$, $\eta_p^2 = 0.35$). The participants perceived the slow (vs. fast) conditions to be similar on light intensity ($p's > 0.40$) and picture sharpness ($p's > 0.45$) but not motion smoothness ($p's < 0.01$). Therefore, in the following studies, we included video quality as an additional covariate and reported all results with and without the control variables.

4.2.2 | Results: Main study

To investigate our prediction that observing a slow (vs. fast) hand movement would elicit distinct schematic associations, we developed a femininity-index ($\alpha's > 0.87$) and masculinity index ($\alpha's > 0.90$) by averaging the ratings on the feminine and masculine traits (Brough et al., 2016). Additional factor analysis supported our argument that the tested traits captured the schematic associations of femininity and masculinity.

We conducted a repeated-measures analysis of covariance (ANCOVA) with speed (slow vs. fast) as the between-subjects factor, observed hand movement context (ironing, vacuuming, and spray-cleaning) as within-subjects factor, and feminine schematic associations as the continuous measured factor. The analysis on femininity-index found a significant between-subject effect of speed ($F_{(1,\ 252)} = 15.48$, $p < 0.01$, $\eta_p^2 = 0.06$)—with slow (vs. fast) hand movement triggering a more feminine schema ($M_{slow} = 4.91$ vs. $M_{fast} = 4.35$). This effect indicated the average (or generalized) influence of hand movement speed across the tested contexts. Additionally, the analysis revealed a significant speed × observed hand movement context within-subjects effect ($F_{(1,\ 252)} = 7.07$, $p < 0.01$, $\eta_p^2 = 0.03$), which suggested that participants evoked a higher feminine schema upon observing a slow (vs. fast) hand movement in each context. Specifically, we found that a slow hand movement activated a higher feminine schema for the ironing ($M_{slow} = 4.94$, $M_{fast} = 4.67$; $p = 0.06$), vacuuming ($M_{slow} = 4.84$, $M_{fast} = 4.03$; $p < 0.01$), and spray-cleaning actions ($M_{slow} = 4.96$, $M_{fast} = 4.32$; $p < 0.01$). Gender was not a significant between-subjects covariate ($p = 0.56$), implying that similar schematic associations were evoked by both female and male participants. Video quality had a significant between-subjects effect for two contexts ($p's < 0.05$) but its interaction with observed speed was not significant ($p > 0.60$). The effect of speed of observed hand movement remained significant without control variables ($p < 0.01$).

We conducted another repeated-measures ANCOVA to test the relationship between hand movement speed and masculine schema and found a significant between-subjects effect of speed ($M_{slow} = 3.30$ vs. $M_{fast} = 4.06$; $F_{(1,\ 252)} = 18.87$, $p < 0.01$, $\eta_p^2 = 0.07$) and a significant effect of speed and hand movement contexts interaction ($F_{(1,\ 252)} = 12.77$, $p < 0.01$, $\eta_p^2 = 0.05$). Specifically, observing fast speed elicited a higher masculine association for each hand movement, that is, ironing ($M_{slow} = 3.25$, $M_{fast} = 3.62$; $p = 0.01$), vacuuming ($M_{slow} = 3.45$, $M_{fast} = 4.46$; $p < 0.01$), and spray-cleaning ($M_{slow} = 3.20$, $M_{fast} = 4.09$; $p < 0.01$). Gender was not a significant covariate ($p = 0.11$). Though characteristics of video quality for one of the three-hand movement contexts (i.e., cleaning) was significant ($p < 0.01$), this factor did not interact with speed ($p = 0.42$) and the model remained significant without the control variables ($p < 0.01$).

Together, the findings of studies 1A (IAT) and 1B (mental schemas) provide evidence that people associate speedy movements with more masculine behavior and slow movements with more feminine behavior (H_1). Additionally, these studies suggest that female and male consumers exhibit a similar pattern of speed-related associations.

5 | STUDY 2: USING SPEED OF OBSERVED HAND MOVEMENT TO FORM PRODUCT PERCEPTION

This study examined whether the schematic associations, elicited upon observing a slow (vs. fast) hand movement, affect the consumers' product inferences (H_2). Our research proposes that speed-related associations from an observed sensorimotor experience may be used to form inferences of a product, thereby shaping the preferences of consumers.

5.1 | Sample, design, and procedure

Mturk participants ($N = 254$, 50.0% female, $M_{age} = 36.58$) were assigned to one of the two between-subject conditions (i.e., slow vs. fast-hand movement). The scenario read that Stripes Corporation, a manufacturer of personal care and grooming products, was launching a range of male shaving foam products in the United States. The participants were informed that they would watch a promotional video of Stripes Shaving Foam. The stimulus video (15 s) depicted a male protagonist applying shaving foam (refer to Appendix A for stimuli snapshot) either at slow or fast speed. Immediately after watching this video, participants were asked to choose the shaving

foam they believed the protagonist was using (i.e., "Ultra-sensitive" or "Bold;" pre-tested and chosen among five options as "low masculinity" and "high masculinity" products respectively; refer Appendix).

Thereafter, participants rated the attributes they ascribed to the individual applying the shaving foam, tha is, randomly presented masculine ($\alpha = 0.87$) and feminine traits ($\alpha = 0.90$), their perception of hand movement speed (manipulation check), and video-quality attributes ($\alpha = 0.69$). We used the same measures as Study 1B to gauge the schematic associations and video quality. In addition, we tested whether the speed of observed hand movement altered the participants' self-reported task involvement and attention. To measure this construct, we asked participants "*how involved were you in completing this questionnaire task?*" rated from 1 (not at all involved) to 7 (very involved) and "*how attentive were you to the task?*" anchored from 1 (paid a little attention) to 7 (paid a lot of attention; $\alpha = 0.81$; Hung & Labroo, 2011). Finally, participants reported their age, gender, and handedness ("*which of your two hands do you most often use for holding objects?*;" binary choice measure of left-hand and right-hand). Handedness was included as an additional control variable because observing a hand action oriented towards the participant's dominant hand may trigger mental simulation and make the experience more fluent (e.g., Elder & Krishna, 2011).

5.2 | Results

5.2.1 | Manipulation checks

An ANCOVA showed that participants perceived the stimulus depicting a slow (vs. fast) hand movement (i.e., action of applying the shaving foam) to be slower ($M_{slow} = 3.52$, $M_{fast} = 4.74$; $F_{(1,248)} = 54.80$, $p < 0.01$, $\eta_p^2 = 0.18$). Age and gender were significant covariates but did not interact with the predictor variable (i.e., speed of observed hand movement; $p > 0.15$). Additionally, the speed conditions did not vary on characteristics of video quality ($p = 0.97$), task involvement ($p = 0.64$), and handedness ($p = 0.26$).

5.2.2 | Main study: Results

We conducted a logistic regression to test whether slow (vs. fast) hand movement influenced the participants' choice about which shaving foam (low vs. high masculine) they thought the protagonist used. The main effect of speed was significant (Wald $\chi^2 = 3.75$, $p = 0.05$; H_2) with no significant covariates ($p > 0.35$). Gender did not have a significant effect ($p = 0.86$). This analysis showed that participants' choices matched with the associations evoked by the speed of observed hand movement. Specifically, participants expected the protagonist to be using the more masculine product (i.e., Stripes Shaving Form Bold) upon observing a fast (vs. slow) hand movement ($p_{slow} = 48.80\%$ vs. $p_{fast} = 60.60\%$; $\chi^2 = 3.58$, $p = 0.059$; Figure 3).

Next, we conducted a MANCOVA on the schematic associations [femininity and masculinity indices] for the male protagonist. The analysis showed that slow (vs. fast) observed speed activated a significant feminine schematic association ($M_{slow} = 4.53$, $M_{fast} = 3.79$; $F_{(1,248)} = 15.85$, $p < 0.01$, $\eta_p^2 = 0.06$) but did not alter the masculine associations ($M_{slow} = 3.59$, $M_{fast} = 3.54$; $F_{(1,248)} = 0.07$, $p = 0.79$, $\eta_p^2 < 0.01$) for the individual applying the shaving foam. Gender and video quality had a significant effect ($p < 0.01$) but did not interact with speed to influence the schematic associations. Our findings suggest that the speed conditions did not vary on the masculine schema but significantly differed on the feminine schematic associations. This may be because face-shaving is a distinctly masculine activity and, thus, there might have been a ceiling effect on the masculine schematic associations across the speed conditions. Second, this analysis shows that slow (vs. fast) speed activated similar schematic associations for the protagonist across genders. Finally, consistent with the notion of gender androgyny (Bem, 1981) and our findings, we infer that a combination of feminine and masculine schematic associations (and not stand-alone gender schemas) might affect the consumer inferences. We formally examine this proposition through mediation analysis.

We ran a mediation analysis using PROCESS Macro Model 4 (Hayes, 2012) with observed speed (coded slow: −1 and fast: 1) as the predictor, schematic associations (feminine and masculine indices) as parallel mediators, product-choice (low vs. high masculinity foam) as a binary-outcome variable and gender, age, handedness, and video quality as the covariates. The mediation analysis found that fast speed led to a decline in feminine associations ($\beta = -0.37$, $SE = 0.09$, $p < 0.01$) but did not alter the masculine associations ($\beta = -0.03$, $SE = 0.09$, $p = 0.79$). Furthermore, the schematic associations significantly influenced the choice of shaving foam (feminine: $\beta = -0.53$, $SE = 0.11$, $p < 0.01$, and masculine: $\beta = 0.30$, $SE = 0.10$, $p < 0.01$). The direct path from slow (vs. fast) hand movement to product-choice became nonsignificant after including the mediators ($\beta = 0.10$, $SE = 0.14$, $p = 0.47$). The relative indirect effect of speed on product choice

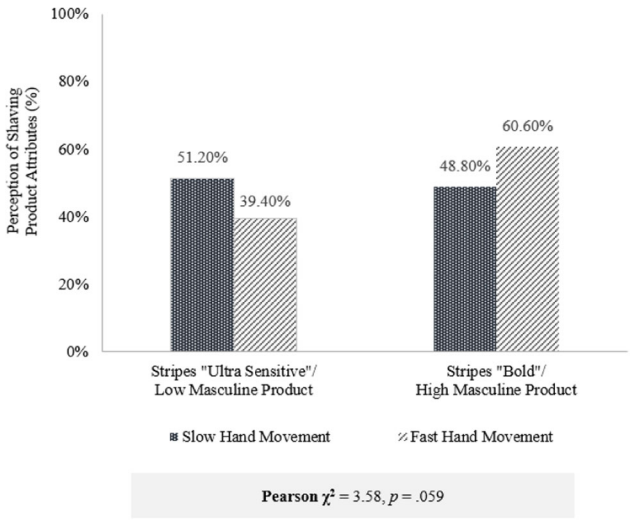


FIGURE 3 Effect of hand movement speed on product perception

was significant only through the feminine schematic associations (indirect effect = 0.20, 95% confidence interval [CI]: [0.08–0.35]) and not the masculine associations (indirect effect = −0.01, 95% CI: [−0.08 to 0.05]).

This mediation analysis alludes to the co-occurrence of schematic associations, which may serve as an input to form evaluations of a product (H_2). Specifically, we found that slow (vs. fast) shaving movement heightened the feminine schematic associations and, thus, led to the choice of a low masculine product. On the contrary, a fast-shaving hand movement led participants to select the more masculine product. These findings imply that consumers use their inferences from the observed hand movement speed to form perceptions of an advertised product. Next, we test the robustness of the effect and its consumption implications (H_3) for a gender-neutral hand movement and a scenario-based (instead of video) manipulation. These changes enable us to address the potential concern that the portrayed hand had a confounding effect on the product perceptions.

6 | STUDY 3A: SPEED OF GENDER-NEUTRAL HAND MOVEMENT ON ACTION PERFORMER AND PRODUCT INFERENCES

This study provides evidence on the effect of speed of observed hand movement on inferences about the action performer and the advertised product (H_2)—in the context of a gender-neutral sensorimotor experience (i.e., handwashing; pre-tested among 25 daily hand movements).

6.1 | Sample, design, and procedure

Participants (N = 200, 43.0% female, M_{age} = 34.91), recruited from the Prolific Academic platform, were randomly assigned to either slow or fast hand movement between-subject conditions. The participants read a vividly described advertisement, in which they imagined watching the commercial of Stripes liquid hand soap. The scenario detailed the sensorimotor actions of a protagonist slowly (briskly) picking up the hand soap, steadily (quickly) squeezing its nozzle, gradually (speedily) rubbing the foam on both sides of the hands, and washing the hands in a slow-paced (fast-paced) way. The words reflecting the speed of movement were the same as tested in the IAT (Study 1A). Upon reading this description, the participants were asked to choose the liquid hand soap they believed the protagonist was used in the advertisement (i.e., "Delicate" or "Bold"; tested as feminine and masculine products respectively; refer Appendix A for stimuli). We used a scenario-based manipulation to avoid priming the participants on the gender of the action-performer and hand movement. Furthermore, the product façade was of green color to prevent any gender-based associations (Semin & Palma, 2014). Then, the participants were asked to rate the attributes that they believe best described the protagonist in the advertisement. We used the same attributes as earlier studies to measure the feminine (α = 0.94) and masculine (α = 0.93) traits and, in addition, tested three gender-neutral attributes (i.e., curious, adaptable, and truthful; α = 0.78; Hoffman & Borders, 2001) for the action performer. The participants shared their task involvement α = 0.80), age, gender, and handedness using the measures used in Study 2. Lastly, as a manipulation check, the participants rated how feminine or masculine they found the two liquid hand soaps on a scale from 1 (very feminine) to 7 (very masculine).

6.2 | Results

6.2.1 | Manipulation checks

The results of a one-sample t-test found that participants perceived the Stripes Delicate hand soap to be a feminine product ($M_{Delicate}$ = 2.91; $t_{(199)}$ = −11.15, p < 0.01, 95% CI = [−1.28 to −0.89]) and Stripes Bold soap a masculine product (M_{Bold} = 5.28; $t_{(199)}$ = 16.21, p < 0.01, 95% CI = [1.31–1.44]). Furthermore, the between-subjects manipulation of speed of observed hand movement was successful (M_{slow} = 2.06, M_{fast} = 6.19; $F_{(1,194)}$ = 774.12, p < 0.01, η_p^2 = 0.80) with no significant covariates.

6.2.2 | Main study: Results

A binary logistics regression revealed a significant main effect of hand movement speed on perception of a feminine (vs. masculine) product (Wald χ^2 = 72.28, p < 0.01, 95% CI = (3.58–7.70]). None of the covariates were significant (p's > 0.5)—indicating that the effect did not vary by the participant gender, age, and handedness. The analyzes confirmed that participants perceived the protagonist as using the masculine hand soap (i.e., Stripes Bold Liquid Hand Soap) when the scenario described a fast (vs. slow) hand movement (P_{slow} = 16.20% vs. P_{fast} = 83.80%; p < 0.01).

We then conducted a MANCOVA on the schematic associations (feminine, masculine, and gender-neutral) for the protagonist. The results showed that the advertisement describing the slow hand movement triggered a significant feminine schema (M_{slow} = 5.25, M_{fast} = 2.90; $F_{(1,194)}$ = 165.22, p < 0.01, η_p^2 = 0.46), and fast hand movement a significant masculine schema (M_{slow} = 1.97, M_{fast} = 5.11; $F_{(1,194)}$ = 347.66, p < 0.01, η_p^2 = 0.64) but did not vary on the gender-neutral attributes (M_{slow} = 3.71, M_{fast} = 3.48; $F_{(1,194)}$ = 1.62, p = 0.21, η_p^2 < 0.01). None of the covariates were significant (p's > 0.20).

Finally, we ran a mediation analysis using Model 4 of PROCESS Macro (Hayes, 2012) with hand movement speed (slow vs. fast) as the predictor, schema-based associations (feminine, masculine, and gender-neutral) as parallel mediators, product-type (feminine: Stripes Delicate vs. masculine: Stripes Bold) as the dichotomous outcome and including all covariates. The analyzes found that fast hand movement speed led to a significant decline in feminine schematic associations (β = −2.36, SE = 0.19, p < 0.01), increase in masculine schematic associations (β = 3.13, SE = 0.19, p < .01) and no alteration

on gender-neutral associations ($\beta = -0.23$, $SE = 0.19$, $p = 0.22$). Furthermore, only the feminine ($\beta = -0.93$, $SE = 0.25$, $p < 0.01$) and masculine ($\beta = 0.54$, $SE = 0.18$, $p < 0.01$) associations affected the choice of liquid hand soap. The gender-neutral associations did not influence the product-choice ($p = 0.14$). After including these parallel mediators, the direct path of hand movement speed to feminine (vs. masculine) soap choice became nonsignificant ($\beta = 0.59$, $SE = 0.60$, $p = 0.32$). The relative indirect effect of hand movement speed on product-choice was significant for feminine associations (effect = −0.43, 95% CI: [−0.83 to −0.17]) and masculine associations (effect = 0.35, 95% CI: [0.08–0.65]) but not for gender-neutral associations (effect = 0.001, 95% CI: [−0.003 to 0.03]).

The mediation analyzes provide evidence on the effect of schematic associations (both, feminine and masculine) from the speed of hand movement on the perception of a gender-neutral product (H_2).

7 | STUDY 3B: HAND MOVEMENT SPEED, PRODUCT GENDER, AND PREFERENCES

This study shows that slow (vs. fast) hand interaction with a product shapes the perceived product gender and, subsequently, product preferences. We test this proposition using the Directed Describing procedure (Warren & Campbell, 2021), in which the participants develop a persona based on their perceptions of gender identity. Subsequently, they share opinions on the product preference of the persona. This indirect technique is useful in our context—as participants do not acknowledge their stereotypical association between speed of movement (slow vs. fast) and gender-role perceptions (femininity vs. masculinity; Study 1A). We propose that participants who develop the persona of a feminine female (vs. masculine male) would have a significantly higher preference for a product that is advertised with a slow (vs. fast) hand movement (H_3). The effect is driven by the perceived product gender—as slow hand interaction with a product would be perceived more feminine (than masculine; H_2).

7.1 | Sample, design, and procedure

Participants ($N = 213$, 45.5% female, $M_{age} = 34.89$) were recruited from the Prolific Academic platform. They were randomly assigned to 2 (hand movement speed: slow vs. fast) × 2(gender-identity: feminine female vs. masculine male) between-subject conditions. Depending upon the assigned condition, participants were asked to choose the name of a masculine male (or feminine female). The chosen name (e.g., Emma/Brandon) was piped into the following questions: "identify three personal attributes or characteristics that best describe Emma/Brandon" and "which activity does Emma/Brandon most enjoy." Then, all participants were asked to imagine that the masculine male (vs. feminine female) is watching a prime-time TV advertisement of Stripes Liquid Hand Soap (with accompanying product picture without gender-based branding; refer to Appendix A). They read the description of a hand soap commercial depicting either a slow or fast hand movement (like Study 3A). Subsequently, the participants completed two measures of the perceived product preference for the persona: "how likely would Emma/Brandon buy/try the Stripes Liquid Hand Soap?" 1 = definitely wouldn't buy/try it, 7 = definitely would buy/try it; adapted from Brough et al., 2016). The participants were next asked about their perceived gender for the liquid hand soap (1 = very feminine soap and 7 = very masculine soap). This scale was reverse coded for the feminine condition so that a higher score reflected a higher perception of product femininity. Then, as an additional manipulation check, the participants indicated their perception of the person performing the hand movement—between the dichotomous choice of female (coded: 1) and male (coded: −1). Finally, the participants responded to the manipulation check on speed and reported their gender, age, and handedness using the measures of earlier studies.

7.2 | Results

7.2.1 | Manipulation checks

The ANCOVA, adjusted for covariates, confirmed our manipulation of hand movement speed ($M_{slow} = 2.35$, $M_{fast} = 5.95$; $F_{(1,195)} = 363.58$, $p < 0.01$, $\eta_p^2 = 0.65$). None of the covariates were significant. We then conducted a binary logistic regression for the participants assigned to slow and hand movement conditions. The model found a significant main effect on perceived gender of hand performing the motoric action (Wald $\chi^2 = 25.19$, $p < 0.01$, 95% CI = [0.34–0.62]). Specifically, participants perceived the hand movement to be that of a male upon reading an advertisement describing a fast product interaction ($p_{slow} = 25.2\%$ vs. $p_{fast} = 74.8\%$) and female for the description of a slow interaction ($p_{slow} = 64.3\%$ vs. $p_{fast} = 35.7\%$). The analyzes provided support to our conceptualization (H_1).

7.2.2 | Main study: Results

The analysis of covariance on product preference for the assigned persona (feminine female vs. masculine male) found a nonsignificant main effect of hand movement speed ($F_{(1,206)} < 0.01$, $p = 0.98$) and gender-identity ($F_{(1,206)} = 0.14$, $p = 0.71$) but a significant interaction effect ($F_{(1,206)} = 12.41$, $p < 0.01$, $\eta_p^2 = 0.06$). Participant gender was a significant covariate but its two-way (p's > 0.13) and three-way interactions ($p = 0.44$) with the predictors were not significant. The interaction effect remained significant without the control variables ($p < 0.01$). Pairwise comparisons showed that participants perceived the masculine male (vs. feminine female) persona to prefer the liquid hand soap described with the fast hand movement ($M_{feminine\ female\text{-}slow} = 4.21$, $M_{feminine\ female\text{-}fast} = 3.49$, $p = 0.02$; $M_{masculine\ male\text{-}slow} = 3.65$, $M_{masculine\ male\text{-}fast} = 4.38$, $p < 0.01$).

We then conducted another ANCOVA on perceived product gender. This analysis found a nonsignificant main effect of hand movement speed ($F_{(1,206)} < 0.01$, $p = 0.96$) but a significant main effect of gender-identity ($F_{(1,206)} = 12.13$, $p < 0.01$) and their interaction ($F_{(1,206)} = 29.90$, $p < 0.01$). None of the covariates were significant

(p's > 0.35) and the interaction effect remained significant without the covariates ($p < 0.01$). As hypothesized, the participants perceived the liquid hand soap described with the slow hand movement to be more feminine ($M_{slow} = 4.10$, $M_{fast} = 3.06$, $p < 0.01$) and with a fast hand movement to be more masculine ($M_{slow} = 3.78$, $M_{fast} = 4.79$, $p < 0.01$). The analyzes provided evidence that hand movement speed can alter the perceived product gender (H_2) and, consequently, product preferences (H_3).

Finally, we conducted a moderated mediation analysis (PROCESS Macro, Model 8, Hayes, 2012) on product preference with 95% CI and 5000 bootstrapped samples. The model had perceived product gender as mediator, the target gender (masculine male: −1 vs. feminine female: 1) as moderator, and all control variables. The analyzes found a significant interaction effect of speed and gender identity on perceived product gender ($\beta = -0.52$, $SE = 0.10$, $t_{(6,213)} = -5.47$, $p < 0.01$). After controlling for the main effect of hand movement speed, gender identity, and their interaction, the mediator (i.e., perceived product gender) significantly influences the product preference ($\beta = 0.64$, $SE = 0.06$, $t_{(7,213)} = 10.87$, $p < 0.01$). Most importantly, after including the mediator of product-gender, the interaction effect of hand movement speed and gender identity was nonsignificant ($\beta = -0.02$, $SE = 0.09$, $t_{(7,205)} = -0.25$, $p = 0.80$). The index of moderated mediation excluded zero (β: −0.34, 95% CIs = −0.50 to −0.21; $SE = 0.07$; Figure 4), thereby confirming that the proposed mediation of perceived product gender on product preferences is moderated by gender-identity.

The findings of this study provide robust evidence that hand movement speed can affect product preferences—such that a masculine male (vs. feminine female) would prefer products depicted with a speedy hand movement.

8 | GENERAL DISCUSSION

In five studies, this study provides replicating evidence on the effect of observed or vividly described hand movement speed on consumer responses. We demonstrate that consumers, across different product and country contexts, are likely to elicit a stereotypical feminine (vs. masculine) association for slow (vs. fast) hand movement. Furthermore, this association influences their perceptions of the action-performer, the perceived gender of a touched product, and consumer preferences. These findings have direct implications for product management, advertising, and online marketing, especially for products targeting different genders. Our results imply that marketing a masculine product (e.g., shaving foam) with a slow hand movement might prove counterproductive as the product is perceived as less masculine. Contrarily, advertisers should avoid pairing a feminine product with fast hand movement. Marketers may improve the product preferences when they match the hand movement speed with the product's gender in their social media posts, video content, and email newsletters. Our findings also provide online or catalog retailers with a novel method to alter the product perception and preference for an observed or described (i.e., not physically touched) product.

From a theoretical standpoint, prior literature has studied the effect of self-experienced hand movements that varied on the direction of the motoric act (e.g., Cacioppo et al., 1993; Kwon & Adaval, 2017). Furthermore, extant research has explored the influence of specific hand movements and gestures (e.g., isometric arm flexion/extension, approach/avoidance, etc.) on purchase intention, product evaluations, and choice. Our research provides novel evidence for the effect of *observed sensorimotor experiences* that differ on the *speed* of the hand movement.

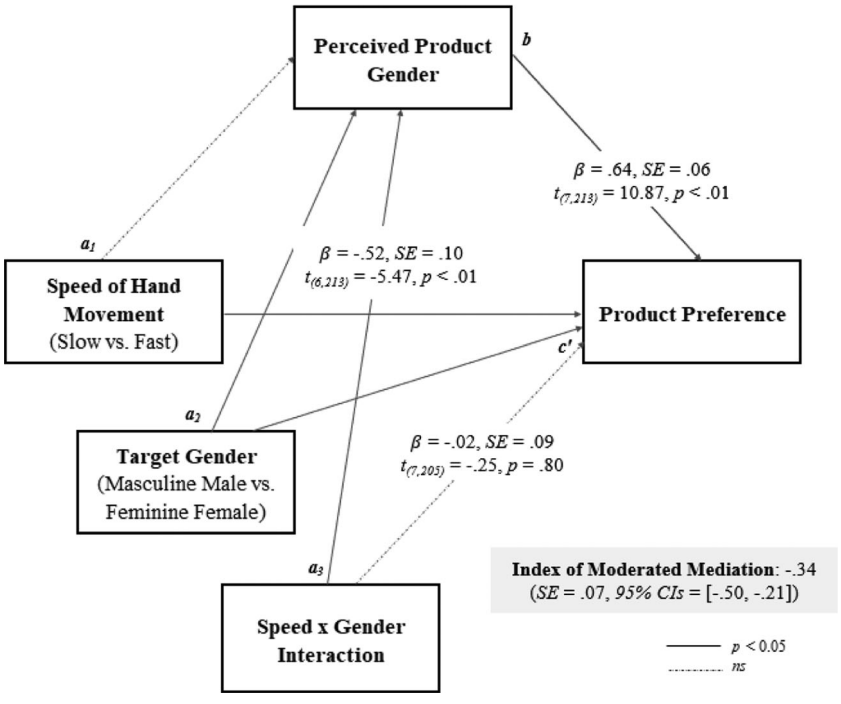


FIGURE 4 Moderated mediation of perceived product gender on preferences. *Note*: Reported findings are adjusted for covariates. CI, confidence interval; *SE*, standard error

These dimensions, to our knowledge, have not been examined in the prior literature. In addition, we provide evidence that the speed of motoric actions may signal gender identity. These findings add to the growing literature on the learned associations with different genders and their effect on product evaluations (e.g., Brough et al., 2016), social identity theory, and sensory marketing.

Nevertheless, this study has a few limitations that may open intriguing avenues for future work. First, prior literature on the effects of gestures and dynamic sensorimotor experiences may be extended to investigate the influence of speed of movement. For the sake of parsimony, our research focused on the effect of speed of a hand movement over a product and did not explore the interactive influence of *speed* and *direction*. Future research could study whether other movements (e.g., isometric arm flexion vs. extension), when varied on speed, evince an approach-avoidance motivation and preference for products (Cacioppo et al., 1993). Therefore, our research proposes "speed of motion" as a potential moderator to the effect of hand movements and opens new avenues of work on observed haptic experiences.

Second, our work may be extended to examine the effect of a match between the speed of observed hand movement with other sensory inputs on product evaluation. Prior research suggests that multi-sensory semantic congruence (e.g., fit between a feminine perfume and smooth texture of paper) evokes higher pleasantness, likeability, and texture perceptions (Krishna et al., 2010). It might be worth exploring the effect of a match between slow (vs. fast) hand movement and a touched product's haptic properties (e.g., smooth vs. rough texture) on product evaluations. Furthermore, Semin and Palma (2014) suggest that female (vs. male) consumers evince higher preferences for lighter (vs. darker) consumables. It is plausible to explore how the match between the inferences from an observed hand movement on a product and the product's color (light vs. dark) influences consumer preferences. Similarly, a match between the inferences resulting from observed hand movement speed in an advertisement with a product's esthetic dimensions of the form (i.e., proportion, shape, and lines) could influence consumers' purchase intention. It has been shown that slimness, rounded shape, and curvy lines are associated with the perceived femininity of a product (Van Tilburg et al., 2015). Our research opens opportunities to explore the influence of a fit between the speed of an observed motoric movement and product attributes such as texture, color, and form on consumer perception.

Third, follow-up research could differentiate between slow and fast motoric speed, that is, determine the threshold beyond which hand (and bodily) interaction with products is visually perceived to differ on speed. While we conducted manipulation checks for the video-based stimuli, an objective assessment of motoric speed could be a useful input for advertisers.

Fourth, the combined influence of observed hand movement speed and individual-level differences on NFT could be examined. Prior research suggests that, in the online context, high-NFT individuals evince lower attitude-confidence, which can be offset through situational nonhaptic factors (e.g., mood, price promotions, and expertise; Peck & Childers, 2003; Yazdanparast & Spears, 2013). Therefore, further research could examine whether slow hand movement speed enables high-NFT individuals to gain attitude confidence. Lastly, our research identified that people hold learned associations about the speed of movements. We delved into the consumption implications of such associations upon observing the different speeds of hand movements. Future research could examine in-depth the reasons and social effects of this perturbing stereotypical association.

We conclude this study with a belief that our study will trigger the interest of consumer psychologists to further explore the influence of speed of actions on consumer perceptions and provide tangible insights to marketers of material and gender-specific products.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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APPENDIX A

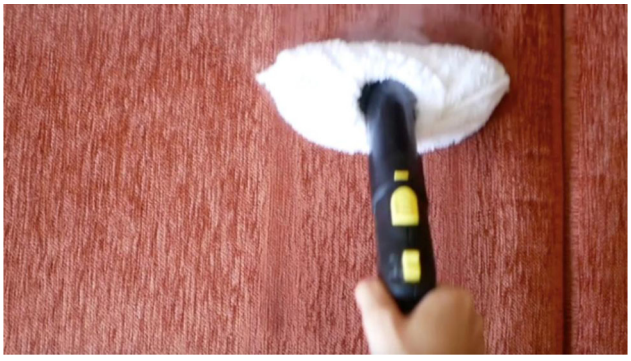
Experimental stimuli

Study 1A: IAT Stimuli Words

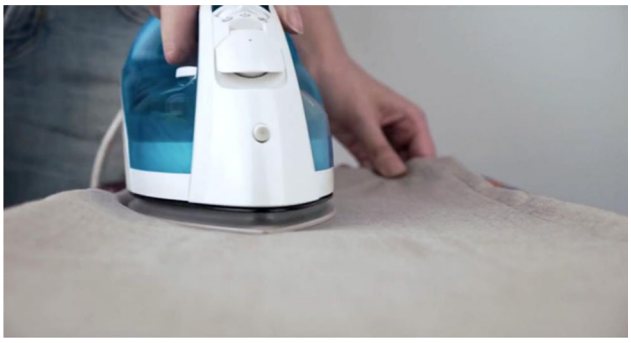
Category	Items
Fast movement	Accelerated, brisk, fast-paced, hurried, rapid, rushed, speedy, and turbo-charged
Slow movement	Conscious, easy-going, gradual, measured, slow-paced, steady, unhurried, and unrushed
Masculinity	Aggressive, assertive, dominant, forceful, macho, masculine, and risk-taking
Femininity	Caring, feminine, gentle, nurturing, sensitive, soft-spoken, and tender

Study 1B: Experimental stimuli

2. Vacuuming context



3. Ironing context



Study 2: Experimental stimulus

Snapshots of stripes shaving foam

Study 2: Experimental stimulus

Study 3A: Experimental stimulus

Snapshot of stripes liquid hand soap (feminine and masculine)

Study 3B: Experimental stimulus

Snapshot of stripes liquid hand soap (without gender-based branding)