Affect-Gating

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Neurobiological theories of affective processing suggest that different affective states can make people more sensitive to the stimulation impinging on different sensory channels. Five experiments show that consumers in a negative affective state experience enhanced sensitivity to the tactile benefits of products, whereas consumers in a positive affective state experience enhanced sensitivity to the visual benefits of products. Affect-based sensory sensitivity is a consequence of adaptations that induce mammals to seek social support when in a negative affective state and explore the environment when in a positive affective state. In humans, these adaptations are part of an innate system that influences preferences for products with tactile or visual benefits.

One of the most robust findings in the affective literature is mood-congruent processing (Bower 1981; Cohen, Pham, and Andrade 2008; Forgas 1995; Gardner 1985). Mood-congruent processing is the tendency to make judgments that are consistent with one's current affective state. For example, Axelrod (1963) found that inducing a negative mood encouraged consumers to evaluate products more negatively. Similarly, mood has been shown to exert an assimilative influence on evaluations of brand extensions (Barone, Miniard, and Romeo 2000), judgments about life satisfaction (Schwarz and Clore 1983), and decisions about future consumption (Pham 1998). Mood-congruent processing has been attributed to two processes: the increased accessibility of mood-congruent information in memory (Isen et al. 1978) and the information value of the mood itself (i.e., "How do I feel about it?"; Pham 1998; Schwarz and Clore 1983).

Research that focuses on the assimilative influence of moods has adopted a cognitive orientation that emphasizes the diagnosticity of valenced information for a given judgment. A more elementary analysis of mood effects suggests that affective states may not always exert an assimilative effect on judgments. Neurobiological models of affective processing show that mammals in a negative affective state experience enhanced sensitivity to the tactile benefits of their environment (Hofer 1987; Martel et al. 1993), whereas mammals in a positive affective state experience enhanced sensitivity to the visual benefits of their environment (Masson, Mestre, and Blin 1993; Panksepp 1998). We propose that an affect-based selection of sensory information, a process we call *affect-gating*, may also influence human judgment. Given that the affect-gating process is quite elemental, its influence on judgment should be most pronounced when higher order cognitive processing is limited.

In this article, we show how consumer judgments can be influenced by the neural circuitry that has evolved to induce mammals to perform adaptive behaviors in certain affective states. We argue that an animal's increased sensitivity to affiliative tactile stimulation in a negative affective state can be observed in human responses to tactile information while in the same state. Similarly, an animal's increased sensitivity to visual stimulation in a positive affective state can be observed in human responses to visual information while in the same state. The influence of affective states on the sensitivity to sensory information should be selective in that specific types of behaviors supported the survival of mammals and, hence, resulted in adaptations that induced the performance of these behaviors.

AFFECT-GATING

Gating processes occur when the organism's visceral state changes the selection and experience of incoming sensory inputs (Melzack and Wall 1965). Affect-gating is a process in which an organism's affective state changes the kind of sensory input that is privileged to enter perception (Martel

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et al. 1993; Vitay and Hamker 2007). Affect-gating appears to be an evolutionary adaptation that has contributed to the survival and proliferation of mammals. Evolutionary adaptations are innate, preprogrammed processes that increase the probability of behaviors that are supportive of survival (Edelman 1987). To illustrate, consider the consequences of affective states for juvenile mammals. Juvenile mammals in a negative affective state are vulnerable, because this state is typically activated when the animal has physical injury, infection, heat loss (during winter), or illness (Panksepp, Nelson, and Bekkedal 1997). To the extent that neural circuitry could induce a juvenile in a negative affective state to attach to its source of warmth and protection, its chances of survival would increase. In contrast, juvenile mammals in a positive affective state are organismically sufficient. To the extent that neural circuitry could induce a juvenile in a positive affective state to explore its environment (i.e., mitigate future risks or seek diversified sources of rewards), its chances of survival would increase. Over generations, the neural circuitry that induces survival-enhancing behaviors should become more pronounced (Edelman 1987). In the following sections, we describe how neural circuitry has been shaped by negative and positive affective states and, in turn, how these adaptations can influence a mammal's sensitivity to tactile and visual information.

Negative Affect

Negative affect emerges diffusely from brain-stem-based circuits that respond to physical or social-psychological pain, indicating the loss of physical health or social support (Eisenberger, Lieberman, and Williams 2003; Panksepp 1998, 2003). This visceral "loss" signal induces a mammal to seek stimuli that will restore physical or social resources. One class of restorative stimuli is reliably predicted by "affiliative touch" (McGlone et al. 2007; Panksepp 1998; Vallbo, Olausson, and Wessberg 1999). In mammals, affiliative touch indicates contact with a protective agent, such as a mother or another member of the clan. Affiliative touch is encoded using slow-conducting receptors found primarily on the back of the torso and hairy parts of the arms (McGlone et al. 2007). These slow-conducting receptors are unrelated to the fast-conducting sensory pathways (e.g., found on the palm of the hands, pads of fingers) that support discriminative touch (McGlone et al. 2007).

Mammalian neural circuitry has evolved to induce the seeking of affiliative touch when the organism is in a negative affective state. It does this by making some forms of sensory stimulation more pleasurable than others. When a mammal is in a negative affective state, a certain type of brain receptor (μ-receptors) becomes disproportionately available (Zubieta et al. 2003); μ-receptors have a molecular structure that is opened only by β-endorphins, the primary opioid released during affiliative touch. When β-endorphins bond to μ-receptors, there is an alleviation of the negative affective state and a subsequent experience of hedonic pleasure (Panksepp 1998). In effect, evolution has resulted in an adaptation that generates more pleasure from affiliative touch when in a negative affective state, as opposed to a neutral or positive affective state, thus encouraging behaviors that result in affiliative touch.

There is evidence that negative affective states induce the seeking of affiliative touch. Martel et al. (1993) showed that prolonging a negative affective state increases the motivation of rhesus monkeys to receive tactile stimulation. In addition, the administration of morphine, which removes the negative affective state, significantly reduces the ability of tactile stimulation to generate hedonic pleasure (Martel et al. 1993; Panksepp, Najam, and Soares 1979). Thus, negative affective states actually increase the intensity of positive, hedonic responses to affiliative touch and, by extension, any consumption activity that simulates affiliative touch.

Positive Affect

Positive affect emerges from limbic circuits that induce the nonspecific searching for rewards (Burgdorf and Panksepp 2006; Panksepp 1998). In mammals, food and sexual rewards are spatially located and identified using the olfactory system (among lower mammals) or the visual system (among higher mammals, including humans). The visual system helps the mammal search for food, for example, by identifying colorful berries against a backdrop of foliage (i.e., visuo-spatial resolution) and by identifying prey movement against a background (i.e., visual motion detection and visual-temporal resolution). In addition, the visual system helps the mammal safely engage in "seeking" behavior, one of the universal behavioral responses among mammals in a positive affective state (the "search for nuts and knowledge" hypothesis; Panksepp 1998).

The neural circuitry of higher order mammals has evolved to induce visual exploration when in a positive affective state (Masson, Messtre, and Blin 1993; Mora-Ferrer and Gangluff 2000; Rolls 2005). Positive affect indicates that the organism is not vulnerable and should search its environment for rewards and reward precursors. As a result, visual intake is enhanced through autonomic and nonautonomic processes. A positive affective state increases visual orientation (Parr and Hopkins 2000), causes pupil dilation and an enlargement of the visual field (Partala and Surakka 2003), increases visual-spatial breadth (Rowe, Hirsh, and Anderson 2007), modulates visual-temporal resolution (Mora-Ferrer and Gangluff 2002), and aids in visual motion detection (Mora-Ferrer and Gangluff 2000). Taken together, these results are consistent with the idea that higher order mammals in a positive affective state are hardwired to search and explore, and this exploration mode is induced by a greater sensitivity to visual sensory input.

Evidence for Affect-Gating

Our review of affective-state-induced adaptations of neural circuitry suggests that mammals have evolved to be sensitive to affiliative tactile stimulation when in a negative affective state and visual stimulation when in a positive affective state. Although there have been no formal tests of the affective-gating hypothesis, there is mammalian evidence that is consistent with the hypothesis. Harlow (1958) demonstrated that a rhesus monkey will attach itself to a tactilely soft and fuzzy terry-cloth apparatus when it is in a negative affective state, despite the terry-cloth apparatus's absence of food (and the presence of food in a steel-wire mother in an alternate location). With the benefit of neurobiological hindsight, we can infer that Harlow's results illustrated the privileged access of tactile channel information in a negative affective state. Chicks in a negative affective state (as measured by the number and intensity of separation distress calls) stop their separation distress calls and exhibit hedonic eye closure when caressed by human hands (Panksepp 1998). Even nonspecific tactile stimulation from a flat strip of synthetic fur on the floor (that bears no structural resemblance to a mother) reduces distress vocalizations among rats in a negative affective state (Hofer 1987). The fact that tactile stimulation from human hands (as opposed to the rat's mother) or a flat strip of synthetic fur was able to quell the animal's negative affective state is consistent with the idea that nonspecific (i.e., unconditioned) tactile stimulation can alleviate a negative affective state (i.e., visual or olfactory recognition of a mother as the source of the tactile stimulation is not required).

Lewis's (2000) dynamic systems model of affective development provides insight into how affect-gating might develop. We argue that the hedonic response to affiliative tactile stimulation in a negative affective state is an adaptation that promotes social bonding and cohesion, whereas the lack of a hedonic response (or aversion) to affiliative tactile stimulation in a positive affective state is an adaptation that promotes environmental exploration. Without the alternating increase and decrease of hedonic experience from tactile stimulation, the opposing objectives of social support and nutritive exploration could not be optimized to advance organismic survival. The organism needs to feel pleasure from affiliative contact some of the time, and not feel pleasure from affiliative contact at other times, in order to achieve both the social attachment and exploration that promote well-rounded development and survival. In other words, mammals need to be sensitive to different sensory channels at different, and appropriate, times.

Hypotheses

If the affect-gating hypothesis is true, then the hedonic experience of tactile stimulation should not simply be a function of the objective quality of the physical stimulus (e.g., velvet is experienced as more pleasant than wood; Rolls et al. 2003), but should also be a function of the current affective state. A consumer in a negative affective state should be more sensitive to beneficial tactile stimulation. Moreover, these consumers should, paradoxically, experience a greater hedonic response from beneficial tactile stimulation as compared to consumers in a positive or neutral affective state. Finally, the pleasurable hedonic experience should induce the consumer to impute higher perceived quality to the source of the tactile stimulation.

H1: Consumers in a negative affective state (as compared to consumers in a neutral or positive affective state) will:

- **a)** experience a product in a more tactile way.
- **b)** rate tactile product benefits more positively.
- **c)** be more sensitive to changes in tactile product benefits.
- **d)** experience an increased hedonic response to affiliative tactile stimulation.

In contrast, a consumer in a positive affective state should be more sensitive to visual product benefits. Because autonomic increases in visual sensory intake occur during positive affect states, the consumer should be more sensitive to visual product attributes (generally positive in valence for most products) and will thus rate beneficial visual product attributes more positively. Yet, visual stimulation in a positive affective state should not result in an increased hedonic response because visual channel stimulation does not release brain opioids. Instead, the increased positive evaluation of visual product attributes should result from greater appreciation of the visual product benefits.

H2: Consumers in a positive affective state (as compared to consumers in a neutral or negative affective state) will:

- **a)** experience a product in a more visual way.
- **b)** rate visual product benefits more positively.
- **c)** be more sensitive to changes in visual product benefits.

To the extent that negative and positive affective states induce a consumer to be more sensitive to the tactile or visual benefits of a product, the consumer should value the product more. When a consumer is in a negative affective state, this increased valuation of the product should be driven by the hedonic response that results from the increased appreciation for the tactile product benefits, as long as they are present. When a consumer is in a positive affective state, this increased valuation of the product should be driven by the increased appreciation for the visual product benefits, as long as they are present.

H3: Consumers in a negative affective state (as compared to consumers in a neutral affective state) will pay more for a product that has benefits that can be experienced tactilely. The increased product valuation will:

- **a)** be mediated by an increased appreciation for the tactile benefits.
- **b)** be mediated by an increased hedonic response to the tactile benefits.
- **c)** be moderated by the tactile quality of the product.

H4: Consumers in a positive affective state (as compared to consumers in a neutral affective state) will pay more for a product that has benefits that can be experienced visually. The increased product valuation will:

a) be mediated by an increased appreciation for the visual benefits.
b) be moderated by the visual quality of the lotion.

EXPERIMENT 1

Experiment 1 tested the hypothesis that consumers' affective states can influence their sensitivity to information from competing sensory channels (hypotheses 1a and 2a). Participants were asked to experience a product (skin lotion) while in a negative, neutral, or positive affective state. Afterward, participants were asked to describe the product experience in their own words. It was expected that participants in a negative affective state would be more sensitive to the tactile product experience, whereas participants in a positive affective state would be more sensitive to the visual product experience.

Design and Procedure

Design. Forty-eight undergraduate students participated in the study for course credit. The study used a between-subject manipulation of the affective state (negative, neutral, positive). Participants were induced into an affective state, performed an unrelated filler task, tried a product (hand lotion) in an ostensibly separate experiment, and recorded their perceptions of the product.

Procedure. Participants were induced into a negative, neutral, or positive affective state using the Velten (1968) affect-induction procedure. The Velten procedure involves reading a series of statements that get progressively more negative (negative affect condition), progressively more positive (positive affect condition), or remain consistently neutral (control condition). Participants were told to read the statements and to take their time imagining how each statement applied to their lives. For example, the negative affective state manipulation starts with mildly negative statements such as "I feel a little bit low today" and ends with strongly negative statements such as "All of the unhappiness of my past life is taking possession of me." The positive affective state manipulation starts with mildly positive statements such as "I feel lighthearted" and ends with strongly positive statements such as "God, I feel great!" The neutral affective state manipulation starts with affectively neutral statements such as "Oklahoma City is the largest city in the world in area, with 631.166 square miles" and ends with affectively neutral statements such as "At low tide the hulk of the old ship could be seen." This Velten procedure has been found to reliably induce psychological and physiological changes corresponding to positive and negative affect (Brown et al. 1993; Gadea et al. 2005).

After the affective state induction and an unrelated filler task, subjects were asked to try a hand lotion in an ostensibly separate experiment. The lotion was Crystal Waters. The lotion was light blue in color and had a tropical lily scent. It was placed in an 8-ounce, clear plastic bottle with a pump top. Each participant had a bottle of lotion in his or her personal cubicle. After trying the lotion, participants were asked to describe the product using any of the five senses.

Product Description Coding. The product descriptions were coded by two judges who were blind to experimental condition, with disagreements resolved through negotiation. Judges coded perceptions in reference to tactile, visual, and olfactory dimensions. Perceptions related to the tactile dimension included "feels smooth and silky," "moisturizing," and "cool to the touch." Perceptions related to the visual dimension included "has a nice blue color," "looks calming," and "looks like the ocean." Perceptions related to the olfactory dimension included "smells good," "floral scented," and "smells sweet."

Velten Procedure Manipulation Check. In a separate test, the effectiveness of the Velten (1968) procedure was confirmed using the Positive-Affect-Negative-Affect Scale (PANAS; Watson, Clark, and Tellegen 1988). Eighty-three participants were induced into a negative, neutral, or positive affective state using the Velten procedure. Participants then used 11-point scales (0 = not at all, 10 = extremely) to report how unhappy, disappointed, depressed, bad, unfavorable, dissatisfied, happy, elated, upbeat, good, favorable, and satisfied they felt in real time. The six negative affect items were combined to form the negative affect index (Cronbach's $\alpha = .97$), and the six positive affect items were combined to form the positive affect index (Cronbach's $\alpha = .98$). The affective state manipulation had a significant main effect on both negative affect ($F(2, 80) = 41.64$, $p < .01$) and positive affect ($F(2, 80) = 35.71$, $p < .01$) indices. Participants in the negative affect condition felt more negative ($M = 5.57$) than the participants in the neutral ($M = 2.60$; $F(1, 80) = 30.92$, $p < .01$) or positive ($M = 1.13$; $F(1, 80) = 67.72$, $p < .01$) affect conditions. Participants in the positive affect condition felt more positive ($M = 7.54$) than the participants in the neutral ($M = 3.96$; $F(1, 80) = 39.41$, $p < .01$) or negative ($M = 2.58$; $F(1, 80) = 79.69$, $p < .01$) affect conditions.

Results

The data were analyzed using a repeated-measure ANOVA with the number of tactile and visual product descriptions as the repeated measure and affective state as the between-subjects factor. The affective state by sensory channel perceptions interaction was significant ($F(2, 45) = 14.30$, $p < .01$). The number of tactile perceptions ($F(2, 45) = 6.43$, $p < .01$) and visual perceptions ($F(2, 45) = 12.57$, $p < .01$) varied by affective condition. Participants experiencing a negative affective state generated more tactile perceptions ($M = 2.07$) than participants experiencing a neutral ($M =$

TABLE 1

THE INFLUENCE OF AFFECTIVE STATES ON THE EVALUATION OF SKIN LOTION (EXPERIMENT 2)

	Dependent measure				
Affective state	Tactile appeal	Visual appeal	Olfactory appeal	Hedonic response	Willingness to pay
Negative	7.00[a]	5.81[b]	7.22	6.78[a]	$4.57[a]
Neutral	5.35[b]	5.51[b]	7.43	5.06[b]	$3.21[b]
Positive	5.76[b]	7.40[a]	7.76	5.27[b]	$4.82[a]

NOTE.—Column means with different superscripts are different at $p < .05$.

1.19; $F(1, 45) = 10.19$, $p < .01$) or positive ($M = 1.24$; $F(1, 45) = 9.93$, $p < .01$) affective state. Participants experiencing a positive affective state generated more visual perceptions ($M = 1.06$) than participants experiencing a neutral ($M = .31$; $F(1, 45) = 16.17$, $p < .01$) or negative ($M = .20$; $F(1, 45) = 20.70$, $p < .01$) affective state. A supplemental analysis showed that olfactory perceptions did not vary by affective condition ($M_{neg} = 1.07$, $M_{neut} = 1.31$, $M_{pos} = 1.29$; $F(2, 45) = .82$, $p > .1$).

Discussion

Experiment 1 demonstrated that participants in a negative (positive) affective state generated more tactile (visual) perceptions. The affective-state-specific response patterns provide support for hypotheses 1a and 2a. The competing pattern of results on the tactile and visual measures, and the null effect on the olfactory measure, suggest that the results are not a consequence of participants being more motivated to process information in certain affective states.

EXPERIMENT 2

Experiment 2 tested the hypothesis that consumers' affective states can influence their hedonic response to sensory information. Participants were asked to experience a product (skin lotion) while in a negative, neutral, or positive affective state. Afterward, participants were asked to rate the tactile, visual, and olfactory appeal of the product, the hedonic experience of using the product, and the amount they would pay for the product. It was expected that participants in a negative (positive) affective state would rate the tactile (visual) appeal of the product more favorably (hypotheses 1b and 2b). In addition, it was expected that participants in a negative affective state should be willing to pay more for the product because of an increased appreciation for the tactile benefits of the product, which generates a more intense hedonic experience (hypothesis 3). Participants in a positive affective state should be willing to pay more for the product because of an increased appreciation for the visual benefits of the product (hypothesis 4).

Design and Procedure

One hundred and thirty-seven undergraduate students participated in the study for course credit. The study used a between-subject manipulation of affective state (negative, neutral, positive). The procedure was identical to the procedure used in experiment 1 except for the dependent measures. First, participants indicated their experienced hedonic affective response by indicating how pleasurable it was to use the product using an 11-point scale (0 = does not feel pleasurable at all, 10 = feels very pleasurable). Then, participants rated the tactile ("silky feel"), visual ("visually appealing"), and olfactory ("sweet smelling") appeal of the product using an 11-point scale (0 = "not silky," "not visually appealing," "not sweet smelling"; 10 = "very silky," "very visually appealing," "very sweet smelling"). Finally, participants stated the dollar amount they would be willing to pay for a 10-ounce bottle of the lotion.

Results

Primary Analysis. The mean responses are presented in table 1. The data were initially analyzed using a repeated-measure ANOVA with the tactile and visual product ratings as repeated measures and affective state as the between-subjects factor. The affective state by product-rating interaction was significant ($F(2, 34) = 14.12$, $p < .01$). The tactile appeal ratings ($F(1, 134) = 7.80$, $p < .01$) and visual appeal ratings ($F(1, 134) = 8.83$, $p < .01$) varied by affective condition. Participants in a negative affective state rated the tactile appeal of the lotion more favorably ($M = 7.00$) than participants in the neutral affective state ($M = 5.35$; $F(1, 134) = 14.81$, $p < .01$) and positive affective state ($M = 5.76$; $F(1, 134) = 7.98$, $p < .01$). Participants in a positive affective state ($M = 5.76$) did not rate the tactile appeal of the lotion more favorably than participants in a neutral affective state ($M = 5.35$; $F(1, 134) = .93$, $p > .1$). Participants in a positive affective state rated the visual appeal of the lotion more favorably ($M = 7.40$) than participants in a neutral affective state ($M = 5.51$; $F(1, 134) = 15.81$, $p < .01$) and negative affective state ($M = 5.81$; $F(1, 134) = 10.10$, $p < .01$). Olfactory appeal ratings did not vary by affective state ($M_{neg} = 7.22$, $M_{neut} = 7.43$, $M_{pos} = 7.76$; $F(2, 134) = .66$, $p > .1$).

The next analysis focused on the participant's experienced hedonic response to the lotion and the amount the participant was willing to pay for the lotion. The hedonic response ($F(1, 134) = 8.46$, $p < .01$) and willingness to pay ($F(1, 134) = 5.63$, $p < .05$) varied by the affective state condition. Participants in a negative affective state indicated that the lotion made them feel better ($M = 6.78$) relative to participants in the neutral affective state ($M = 5.06$; $F(1, 134) = 14.83$,

$p < .01$) and positive affective state ($M = 5.27$; $F(1, 134) = 10.82$, $p < .01$). Participants in a negative affective state ($M =$ \$4.57) and a positive affective state ($M =$ \$4.82) were willing to pay more for the lotion than participants in a neutral affective state ($M =$ \$3.21; $F(1, 134) = 6.51$, $p < .05$; $F(1, 134) = 9.63$, $p < .01$).

Mediation Analysis for Negative Affective State Participants. We followed the Preacher and Hayes (2008) guidelines to assess whether the tactile appeal and hedonic response mediated the influence of the negative affective state on the participants' willingness to pay for the lotion (see hypothesis 3). The analysis used participants in the negative and neutral affective states. First, affective state was a significant predictor of the willingness to pay ($\beta = -1.36$; SE $= .41$, $t(90) = -3.29$, $p < .01$). Second, affective state was a significant predictor of the tactile appeal ($\beta = -1.65$; SE $= .40$, $t(45) = -4.13$, $p < .01$) and the hedonic response ($\beta = -1.72$, SE $= .46$, $t(90) = -3.74$, $p < .01$). Third, when the willingness-to-pay measure was regressed on affective state and tactile appeal, the affective state coefficient became nonsignificant ($\beta = -.61$; SE $= .41$, $t(89) = -1.50$, $p = .14$) and the tactile appeal coefficient remained significant ($\beta = .45$; SE $= .10$, $t(89) = 4.62$, $p < .01$). A bootstrap analysis using the INDIRECT SPSS macro (Preacher and Hayes 2008) confirmed a significant mediating pathway from affective state to willingness to pay through tactile appeal (95% CI: -1.39, $-.31$). Likewise, when the willingness-to-pay measure was regressed on the affective state and hedonic response, the affective state coefficient became nonsignificant ($\beta = -.48$; SE $= .37$, $t(89) = -1.32$, $p = .19$) and the hedonic response coefficient remained significant ($\beta = .51$; SE $= .08$, $t(89) = 6.51$, $p < .01$). A bootstrap analysis using the INDIRECT SPSS macro (Preacher and Hayes 2008) confirmed a significant mediating pathway from affective state to willingness to pay through hedonic response (95% CI: -1.56, $-.40$). A model testing for the dual mediation of tactile appeal and hedonic response, using the Hayes, Preacher, and Meyers (2010) MEDTHREE macro, was significant (95% CI: -1.62, $-.43$).

Mediation Analysis for Positive Affective State Participants. We followed the Preacher and Hayes (2008) guidelines to establish that visual appeal, but not hedonic response, mediated the influence of the positive affective state on the participants' willingness to pay for the lotion (see hypothesis 4). The analysis used participants in the positive and neutral affective states. First, the affective state was a significant predictor of the willingness to pay ($\beta = 1.61$; SE $= .53$, $t(94) = 3.05$, $p < .01$). Second, affective state was a significant predictor of the visual appeal ($\beta = 1.89$; SE $= .47$, $t(94) = 3.98$, $p < .01$) but not of the hedonic response ($\beta = .21$; SE $= .42$, $t(94) = .49$, $p = .62$). Third, when the willingness-to-pay measure was regressed on the affective state and the visual appeal variables, the affective state coefficient ($\beta = 1.06$; SE $= .55$, $t(93) = 1.92$, $p = .06$) became nonsignificant whereas the visual appeal coefficient remained significant ($\beta = .29$; SE $= .11$, $t(93) = 2.61$, $p = .01$). A bootstrap analysis confirmed the mediating influence of visual appeal (95% CI: .17, 1.16).

Discussion

Experiment 2 provides additional evidence for the affect-gating hypothesis. Consistent with hypotheses 1b and 2b, participants in a negative (positive) affective state rated tactile (visual) sensory information more positively. Consistent with hypotheses 1d and 3, participants in the negative affective state experienced a more positive hedonic response from the enhanced tactile stimulation, which in turn resulted in a greater willingness to pay for the product. Consistent with hypothesis 4, participants in the positive affective state were willing to pay more for the product due to a greater appreciation for the visual qualities of the product. We note that the results are inconsistent with a mood-congruency hypothesis, which predicts that participants in the negative affective state should have been less, not more, favorable toward the product than participants in the neutral affective state condition.

If different affective states indeed make the consumer differentially sensitive to information from different sensory channels, and if the tactile sensory channel generates hedonic affect under negative affective states, then consumers should generate less liking for the product when the tactile quality of the product is reduced. However, for consumers in a positive affective state, a decrease in the objective tactile quality of the product should be less perceptible. These predictions were investigated in experiment 3.

EXPERIMENT 3

Experiment 3 tested the hypothesis that consumers' affective states can influence their sensitivity to marketer-induced changes in the objective tactile quality of sensory stimulation (hypothesis 1c). Participants were asked to experience a high- or low-quality skin lotion while in a negative, neutral, or positive affective state. Afterward, participants were asked to rate the tactile, visual, and olfactory appeal of the product; their hedonic experience from using the product; and the amount they would pay for the product. It was expected that participants in a negative affective state would be more sensitive to changes in the tactile quality of the lotion compared to participants in a neutral or positive affective state. The differential sensitivity to the tactile quality was also expected to be reflected in the participant's hedonic response, and willingness to pay, for the product.

Design and Procedure

Design. One hundred and eighty-eight undergraduate students participated in the study for course credit. The study used a 3 × 2 between-subjects design, in which there was a between-subject manipulation of the affective state (negative, neutral, positive) of the participant and a between-subject manipulation of the objective tactile quality (low quality, high quality) of the product.

Procedure. The procedure was identical to that used in experiment 2. The high-quality lotion was the lotion used in the previous two experiments. The low-quality lotion was created by mixing 8 milliliters of water into every 100 milliliters of the high-quality lotion. Each bottle of lotion (in both quality conditions) was shaken for 20 seconds before the start of each experimental session to ensure product consistency.

Results

Primary Analysis. The mean responses are presented in table 2. The key predictions involved the tactile appeal, hedonic response, and willingness-to-pay dependent measures. The affective state by objective tactile quality interaction significantly influenced the tactile appeal rating ($F(2, 182) = 3.15$, $p < .05$). As predicted, negative affective state participants rated the tactile appeal of the lotion to be lower when the lotion had a low ($M = 5.38$) as opposed to high ($M = 6.93$) objective tactile quality ($F(1, 182) = 8.80$, $p < .01$) whereas neutral ($M_{\text{low q}} = 5.57$, $M_{\text{high q}} = 5.34$; $F(1, 182) = .18$, $p > .1$) and positive ($M_{\text{low q}} = 5.55$, $M_{\text{high q}} = 5.74$; $F(1, 182) = .12$, $p > .1$) affective state participants rated the two lotions to be equally appealing. It was also the case that participants in a negative affective state rated the tactile appeal of the high-quality lotion more favorably ($M = 6.93$) than participants in the neutral affective state ($M = 5.34$; $F(1, 184) = 9.08$, $p < .01$) and the positive affective state ($M = 5.74$; $F(1, 184) = 5.30$, $p < .05$) conditions did. This finding replicates the results of experiment 2.

It was predicted that the sensitivity to tactile quality exhibited by the participants in the negative affective state would influence their hedonic response to the lotion. The affective state by objective tactile quality interaction was significant for the hedonic response rating ($F(2, 182) = 3.12$, $p < .05$). Participants in a negative affective state had a more negative hedonic response to the low ($M = 5.59$) as opposed to the high ($M = 6.97$) objective quality lotion ($F(1, 182) = 6.32$, $p < .05$) whereas neutral ($M_{\text{low q}} = 5.17$, $M_{\text{high q}} = 5.47$; $F(1, 182) = .30$, $p > .1$) and positive ($M_{\text{low q}} = 5.59$, $M_{\text{high q}} = 5.77$; $F(1, 182) = .11$, $p > .1$) affective state participants had similar hedonic responses. It was also the case that participants in a negative affective state had a more positive hedonic response to the high-quality lotion ($M = 6.97$) than participants in a neutral affective state ($M = 5.47$; $F(1, 184) = 7.31$, $p < .01$) and positive affective state ($M = 5.77$; $F(1, 184) = 4.84$, $p < .05$). Again, this finding replicates the results of experiment 2.

It was predicted that changes in the objective tactile quality of the lotion would have greater impact on willingness to pay for participants in a negative affective state. The affective state by objective tactile quality interaction was marginally significant for the willingness-to-pay response ($F(2, 182) = 2.65$, $p = .07$). Participants in a negative affective state wanted to pay less for the low ($M = \$3.29$) as opposed to high ($M = \$4.71$) objective quality lotion ($F(1, 182) = 8.76$, $p < .01$), whereas neutral ($M_{\text{low q}} = \$2.98$, $M_{\text{high q}} = \$3.43$; $F(1, 182) = .85$, $p > .1$) and positive ($M_{\text{low q}} = \$3.79$, $M_{\text{high q}} = \$4.21$; $F(1, 182) = .78$, $p > .1$) affective state participants wanted to pay similar amounts for each level of quality.

Mediation Analysis for Negative Affective State Participants. We followed the Preacher and Hayes (2008) guidelines to assess whether tactile appeal and hedonic response mediated the influence of the objective tactile quality of the lotion on the amount that the participants were willing to pay for the lotion. The analysis used participants in the negative affective state. First, objective quality was a significant predictor of willingness to pay ($\beta = 1.41$; SE $= .50$, $t(61) = 2.85$, $p < .01$). Second, the objective quality was a significant predictor of the tactile appeal ($\beta = 1.55$; SE $= .50$, $t(61) = 3.13$, $p < .01$) and hedonic response ($\beta = 1.38$; SE $= .50$, $t(61) = 2.80$, $p < .01$). Third, when willingness to pay was regressed on objective quality and tactile appeal, the objective quality coefficient became nonsignificant ($\beta = .76$; SE $= .49$, $t(60) = 1.56$, $p = .13$) and the tactile appeal coefficient remained significant ($\beta = .42$; SE $= .12$, $t(60) = 3.60$, $p < .01$). A bootstrap analysis confirmed the tactile appeal rating mediated the relationship

TABLE 2

THE INFLUENCE OF AFFECTIVE STATES ON THE EVALUATION OF SKIN LOTION THAT VARIES IN TACTILE QUALITY (EXPERIMENT 3)

	Dependent measure				
Affective state	Tactile appeal	Visual appeal	Olfactory appeal	Hedonic response	Willingness to pay
Negative:					
Low tactile quality	5.38	5.29	7.24	5.59	$3.29
High tactile quality	6.93	5.17	7.48	6.97	$4.71
Neutral:					
Low tactile quality	5.57	5.83	7.70	5.17	$2.98
High tactile quality	5.34	5.75	6.88	5.47	$3.43
Positive:					
Low tactile quality	5.55	6.79	6.70	5.59	$3.79
High tactile quality	5.74	6.62	7.24	5.77	$4.21

between objective quality and the willingness to pay (95% CI: .19, 1.43). Likewise, when the willingness to pay was regressed on the objective quality and the hedonic response, the objective quality coefficient became nonsignificant (β = .85; SE = .49, $t(60) = 1.75$, $p = .08$) and the hedonic response coefficient remained significant (β = .41; SE = .12, $t(60) = 3.46$, $p < .01$). A bootstrap analysis confirmed that the hedonic response mediated the relationship between objective quality and the willingness to pay (95% CI: .14, 1.15). A model testing for dual mediation of tactile quality and hedonic response, using the Hayes et al. (2010) MED-THREE macro, was significant (95% CI: .26, 1.45).

Mediated Moderation. Additional insight can be gained by assessing whether the mediating influences of tactile appeal and hedonic response were moderated by the objective tactile quality of the lotion (hypothesis 3c). Table 3 presents the Muller, Judd, and Yzerbyt (2005) mediated moderation analysis for each mediator. The analysis for the tactile appeal mediator shows a significant affective state by objective tactile quality interaction effect on willingness to pay (equation 1; $\beta = -.236$, $t(184) = 1.68$, $p < .1$) and tactile appeal (equation 2a; $\beta = -.355$, $t(184) = 2.45$, $p < .05$) plus a significant tactile appeal effect on willingness to pay (equation 3; $\beta = .343$, $t(182) = 3.39$, $p < .01$). Thus, the mediating influence of tactile appeal on the relationship between the affect state and willingness to pay is moderated by the tactile quality of the lotion. The analysis for the hedonic response mediator shows a significant affective state by tactile quality interaction effect on willingness to pay (equation 1; $\beta = -.236$, $t(184) = 1.68$, $p < .1$) and hedonic response (equation 2b; $\beta = -.243$, $t(184) = 1.69$, $p < .1$) plus a significant hedonic response effect on willingness to pay (equation 3; $\beta = .494$, $t(182) = 5.31$, $p < .01$). Thus, the mediating influence of the hedonic response on the relationship between the affect state and willingness to pay is moderated by the tactile quality of the lotion.

Discussion

Experiment 3 demonstrated that participants in a negative affective state were more sensitive to changes in the objective tactile quality of a lotion, leading to changes in their hedonic experience with the product and the amount that they were willing to pay for the product. In contrast, participants in neutral and positive affective states were relatively insensitive to changes in the objective quality of the lotion, leading to no significant differences in the hedonic experience or amount that they would pay for the product. In the next study, we show that participants in a positive affective state are more sensitive to changes in the objective visual quality of the product.

EXPERIMENT 4

In experiment 4, participants were asked to experience a skin lotion that varied in objective visual quality while in a negative, neutral, or positive affective state. Afterward, participants were asked to rate the tactile, visual, and olfactory appeal of the product; their hedonic response from using the product; and the amount they would pay for the product. It was expected that participants in a positive affective state would be more sensitive to changes in the visual quality of the lotion, as compared to participants in a neutral or positive affective state. This sensitivity to the change in the visual quality of the product should account for changes in the willingness to pay for the product.

TABLE 3

MEDIATED MODERATION ANALYSIS (EXPERIMENT 3)

	Equation 1 (WTP)		Equation 2a (tactile appeal)		Equation 3 (WTP)	
Study 1 predictors	Beta	$t(184)$	Beta	$t(184)$	Beta	$t(182)$
Affective state	.021	.21	.040	.40	.007	.08
Tactile quality	.363	2.93**	.369	2.98**	.069	.30
Affective state × quality	−.236	1.68*	−.355	2.45**	−.082	−.60
Tactile appeal					.343	3.39**
Tactile appeal × quality					.163	.75
	Equation 1 (WTP)		Equation 2b (hedonic response)		Equation 3 (WTP)	
	Beta	$t(184)$	Beta	$t(184)$	Beta	$t(182)$
Affective state	.021	.21	−.046	−.46**	.044	.49
Tactile quality	.363	2.93**	.318	2.52	.370	1.68
Affective state × quality	−.236	1.68*	−.243	−1.69*	−.145	−1.09
Hedonic response					.494	5.31**
Hedonic response × quality					−.158	−.77

*$p < .10$.
**$p < .05$.

Design and Procedure

Design. One hundred and fifty-two undergraduate students participated in the study for course credit. The study used a 3 × 2 between-subjects design, in which there was a between-subject manipulation of the affective state (negative, neutral, positive) of the participant and a between-subject manipulation of the objective visual quality (low, high) of the product.

Procedure. The procedure was identical to that used in experiment 3. The low visual quality lotion was the lotion used in previous experiments. The high visual quality lotion was created by infusing sparkle particles (Sephora Iridescent White Glitter) into the lotion.

Results

Primary Analysis. The mean responses are presented in table 4. The key predictions involved the visual appeal and willingness-to-pay dependent measures. The affective state by objective visual quality interaction was significant for the visual appeal of the product ($F(2, 146) = 6.17, p < .01$). Participants in a positive affective state rated the visual appeal of the lotion to be higher when the lotion had a high ($M = 8.79$) as opposed to low ($M = 6.62$) objective visual quality ($F(1, 146) = 17.41, p < .01$). Negative ($M_{low} = 5.43, M_{high} = 5.38; F(1, 146) = .01, p > .1$) and neutral ($M_{low} = 5.58, M_{high} = 5.35; F(1, 146) = .18, p > .1$) affective state participants rated the two lotions to be equally appealing. It was also the case that participants in a positive affective state rated the visual appeal of the high visual quality lotion more favorably ($M = 8.79$) than participants in the neutral affective state ($M = 5.35; F(1, 146) = 17.78, p < .01$) and the negative affective state ($M = 5.38; F(1, 146) = 17.41, p < .01$).

The affective state by objective visual quality interaction was significant for the willingness-to-pay measure ($F(2, 146) = 11.80, p < .01$). Participants in a positive affective state were more willing to pay for a lotion with high objective visual quality ($M = \$7.18$) compared to a lotion with low objective visual appeal ($M = \$3.75; F(1, 146) = 32.04, p < .01$). Negative ($M_{low} = \$4.78, M_{high} = \$4.39; F(1, 146) = .31, p > .1$) and neutral ($M_{low} = \$2.97, M_{high} = \$2.73; F(1, 146) = .14, p > .1$) affective state consumers were willing to pay similar amounts for the high and low visual quality lotions.

Mediation Analysis for Positive Affective State Participants. We followed the Preacher and Hayes (2008) guidelines to assess whether the visual appeal rating mediated the influence of the objective visual quality of the lotion on the amount that the participants were willing to pay for the lotion. The analysis used participants in the positive affective state. First, objective visual quality was a significant predictor of the willingness to pay ($\beta = 3.43$; SE $= .82$, $t(56) = 4.16, p < .01$). Second, objective visual quality was a significant predictor of perceived visual appeal ($\beta = 2.17$, SE $= .48$, $t(56) = 4.50, p < .01$). Third, when willingness to pay was regressed on objective visual quality and perceived visual appeal, the objective visual quality coefficient became less significant ($\beta = 1.85$; SE $= .88$, $t(56) = 2.11$, $p = .03$) and the visual appeal coefficient remained highly significant ($\beta = .725$, SE $= .21$, $t(56) = 3.48, p < .01$). A bootstrap analysis confirmed the visual appeal of the product mediated the relationship between objective visual quality and willingness to pay (95% CI: .72, 2.75).

Mediated Moderation. Additional insight can be gained by assessing whether the mediating influence of visual appeal was moderated by the objective visual quality of the lotion (hypothesis 4b). Table 5 presents the Muller et al. (2005) mediated moderation analysis. The analysis shows a significant affective state by objective visual quality interaction effect on willingness to pay (equation 1; $\beta = .535$, $t(148) = 4.62, p < .01$) and visual appeal (equation 2; $\beta = .391$, $t(148) = 3.53, p < .01$) plus a significant visual appeal effect on willingness to pay (equation 3; $\beta = .203$, $t(146) = 2.01, p < .05$). Thus, the mediating influence of visual appeal on the relationship between the affective state and willingness to pay is moderated by the visual quality of the lotion.

Discussion

Experiment 4 demonstrated that participants in a positive affective state were more sensitive to changes in the objec-

TABLE 4

THE INFLUENCE OF AFFECTIVE STATES ON THE EVALUATION OF SKIN LOTION THAT VARIES IN VISUAL APPEAL (EXPERIMENT 4)

	Dependent measure				
Affective state	Tactile appeal	Visual appeal	Olfactory appeal	Hedonic response	Willingness to pay
Negative:					
Low visual appeal	7.00	5.43	7.05	6.81	$4.78
High visual appeal	6.86	5.38	6.90	6.14	$4.39
Neutral:					
Low visual appeal	5.50	5.58	7.23	5.19	$2.97
High visual appeal	4.96	5.35	7.04	4.81	$2.73
Positive:					
Low visual appeal	5.86	6.62	7.34	5.83	$3.75
High visual appeal	5.38	8.79	6.86	5.24	$7.18

TABLE 5

MEDIATED MODERATION ANALYSIS (EXPERIMENT 4)

	Equation 1 (WTP)		Equation 2 (visual appeal)		Equation 3 (WTP)	
Study 1 predictors	Beta	$t(148)$	Beta	$t(148)$	Beta	$t(146)$
Affective state	−.024	−.23	.231	2.39**	−.071	−.71
Visual quality	−.058	−.64	−.032	−.37	−.343	−1.56
Affective state × quality	.535	4.62**	.391	3.53**	.309	2.22**
Visual appeal					.203	2.01**
Visual appeal × quality					.403	1.45

*$p < .10$.
**$p < .05$.

tive visual quality of a lotion, leading to changes in the amount that they were willing to pay for the product. In contrast, participants in neutral and negative affective states were relatively insensitive to changes in the objective visual quality of the lotion, leading to no significant differences in the amount that they would pay for the product.

EXPERIMENT 5

Thus far, the results suggest that negative affective states increase sensitivity to tactile information and positive affective states increase sensitivity to visual information. We contend that this increased sensitivity is a consequence of affect-gating, yet it could be that affective states direct attention to specific sensory channels. Although the two accounts appear similar, an attention account predicts nonspecific amplification toward channels in which attention is potentially directed to, whereas a gating account predicts specific amplification and hedonic sensitization toward the privileged channel. The two accounts differ in (1) the specificity of redirection, and (2) whether pleasure is generated as a consequence of the redirection. Put another way, a person can be made to pay more attention to stimulation (attention account), but he or she may not necessarily feel more pleasure from it (gating account).

To illustrate the difference between an affect-gating and directed attention hypothesis, consider the following manipulation. Suppose that one half of the participants in an experiment 2 procedure (experiencing lotion in a negative, neutral, or positive affective state) were asked to close their eyes during the application of the lotion. If our results depend on directed attention (i.e., attention determines the appeal of a sensory experience), then closing one's eyes should direct attention to the information in the other sensory channels (e.g., tactile, olfactory). As a consequence, the appeal of the product on these other dimensions should increase when participants close their eyes—that is, participants with their eyes closed should find the lotion more tactilely and olfactorily appealing, regardless of their affective state. In contrast, if our results depend on affect-gating, then closing one's eyes during product use should enhance only the tactile appeal of the product for participants in the negative affective state condition (i.e., there is privileged gating of information flow). Only participants in a negative affective state are gated to appreciate the enhanced focus on the tactile stimulation.

Design and Procedure

Design. Three hundred and nineteen undergraduate students participated in the study for course credit. The study used a 3 × 2 between-subjects design, with affective state (negative, neutral, positive) and visual channel blocking (block, control) as the between-subjects factors. Participants were induced into an affective state, and then experienced the lotion either while closing their eyes (block visual channel condition) or while keeping their eyes open (control condition). The participants then rated their hedonic experience, the product's perceived tactile, olfactory, and visual qualities, and indicated their willingness to pay in dollars and cents. One participant did not follow the instructions, and two participants listed prices that were more than three standard deviations from the mean. These participants were excluded from the analyses.

Procedure. The procedure was identical to that used in experiment 2 with the exception of the sensory channel blocking condition. Participants in the blocking condition were told, "Please close your eyes and try the lotion. Remember to keep your eyes closed (for 20 seconds or so) while you are applying the lotion." In the control condition, participants were not given any instructions. The experiment administrator and an assistant confirmed that participants in the control condition kept their eyes open during the application of the product.

Results

Primary Analysis. The mean responses are presented in table 6. The key predictions involved the tactile appeal, hedonic response, and willingness-to-pay dependent measures. The affective state by blocking interaction was significant for the tactile appeal measure ($F(2, 312) = 3.91$, $p < .01$). Consistent with the affect-gating hypothesis, participants in a negative affective state rated the tactile appeal of the lotion higher when their eyes were closed during product application ($M = 7.83$) as opposed to when their

TABLE 6

THE INFLUENCE OF AFFECTIVE STATES AND SENSORY ACCESS ON THE EVALUATION OF SKIN LOTION (EXPERIMENT 5)

Affective state	Dependent measure				
	Tactile appeal	Visual appeal	Olfactory appeal	Hedonic response	Willingness to pay
Negative:					
Eyes closed	7.83	5.45	6.94	7.92	\$5.93
Eyes open	6.54	6.12	6.86	6.60	\$4.27
Neutral:					
Eyes closed	5.04	5.74	6.72	5.22	\$3.12
Eyes open	5.40	5.77	6.57	5.28	\$3.29
Positive:					
Eyes closed	5.49	6.49	7.43	5.53	\$4.42
Eyes open	5.47	6.81	7.03	5.49	\$4.87

eyes were open ($M = 6.54$; $F(1, 312) = 8.69$, $p < .01$), whereas neutral ($M_{closed} = 5.04$, $M_{open} = 5.40$; $F(1, 12) = .66$, $p > .1$) and positive ($M_{closed} = 5.49$, $M_{open} = 5.47$; $F(1, 312) = 0$, $p > .1$) affective state participants were insensitive to the visual channel blocking manipulation. Inconsistent with the directed attention hypothesis, there was no main effect of the visual channel blocking manipulation on olfactory appeal ($M_{closed} = 7.04$, $M_{open} = 6.83$; $F(1, 312) = .65$, $p > .1$). In addition, visual channel blocking did not reduce the visual appeal of the product ($M_{closed} = 5.90$, $M_{open} = 6.26$; $F(1, 312) = 1.47$, $p > .1$), as might be implied by a directed attention hypothesis.

It was predicted that the increased sensitivity to blocking exhibited by the participants in the negative affective state would influence their hedonic response to the lotion and the amount they were willing to pay for the lotion. Participants in a negative affective state had a more positive hedonic response when they rubbed the lotion on their skin while their eyes were closed ($M = 7.92$) as opposed to when their eyes were open ($M = 6.60$; $F(1, 312) = 8.99$, $p < .01$), whereas neutral ($M_{closed} = 5.22$, $M_{open} = 5.28$; $F(1, 312) = .02$, $p > .1$) and positive ($M_{closed} = 5.53$, $M_{open} = 5.49$; $F(1, 312) = .01$, $p > .1$) affective state participants had similar hedonic responses. Participants in a negative affective state wanted to pay more for the lotion when they used the lotion while their eyes were closed ($M = \$5.93$) as opposed to when their eyes were open ($M = \$4.27$; $F(1, 312) = 13.04$, $p < .01$), whereas neutral ($M_{closed} = \$3.12$, $M_{open} = \$3.29$; $F(1, 312) = .13$, $p > .1$) and positive ($M_{closed} = \$4.42$, $M_{open} = \$4.87$; $F(1, 312) = 1.04$, $p > .1$) affective state participants wanted to pay similar amounts.

Mediation Analysis for Negative Affective State Participants. We followed the Preacher and Hayes (2008) guidelines to assess whether the tactile appeal rating and hedonic response mediated the influence of the visual channel blocking manipulation on the amount that the participants were willing to pay for the lotion. The analysis used participants in the negative affective state. First, visual channel blocking was a significant predictor of willingness to pay ($\beta = -1.66$; SE $= .54$, $t(101) = -3.07$, $p < .01$). Second, visual channel blocking was a significant predictor of tactile appeal ($\beta = -1.29$; SE $= .38$, $t(101) = -3.36$, $p < .01$) and the hedonic response ($\beta = -1.32$; SE $= .40$, $t(101) = -3.28$, $p < .01$). Third, when the willingness to pay was regressed on visual channel blocking and tactile appeal, the visual channel blocking coefficient became nonsignificant ($\beta = -.44$; SE $= .42$, $t(100) = -1.03$, $p = .31$) and the tactile appeal coefficient remained significant ($\beta = .94$; SE $= .10$, $t(100) = 9.10$, $p < .01$). A bootstrap analysis confirmed that the tactile appeal rating mediated the relationship between visual channel blocking and willingness to pay (95% CI: -1.92, $-.53$). Likewise, when the willingness to pay was regressed on visual channel blocking and hedonic response, the visual channel blocking coefficient became nonsignificant ($\beta = -.45$, SE $= .42$, $t(100) = -1.08$, $p = .28$) and the hedonic response coefficient remained significant ($\beta = .91$; SE $= .10$, $t(100) = 9.25$, $p < .01$). A bootstrap analysis confirmed the hedonic response mediated the relationship between visual channel blocking and willingness to pay (95% CI: -1.93, $-.53$). A model testing for dual mediation of tactile quality and hedonic response, using the Hayes et al. (2010) MEDTHREE macro, was significant (95% CI: -2.1, $-.67$).

Mediated Moderation. A mediated moderation analysis was used to assess whether the mediating influences of tactile appeal and hedonic response were moderated by visual channel blocking (hypothesis 3c). Table 7 presents the Muller et al. (2005) mediated moderation analysis for each mediator. The analysis for the tactile appeal mediator shows a significant affective state by visual channel blocking interaction effect on willingness to pay (equation 1; $\beta = .236$, $t(312) = 2.83$, $p < .01$) and tactile appeal (equation 2a; $\beta = .311$, $t(312) = 2.94$, $p < .01$) plus a significant tactile appeal effect on willingness to pay (equation 3; $\beta = .632$, $t(310) = 8.03$, $p < .01$). Thus, the mediating influence of tactile appeal on the relationship between the affect state and willingness to pay is moderated by visual channel blocking. The analysis for the hedonic response mediator shows a significant affective state by visual channel blocking interaction effect on willingness to pay (equation 1; $\beta = .307$, $t(312) = 2.83$, $p < .01$) and hedonic response (equation 2b; $\beta = .245$, $t(312) = 2.29$, $p < .05$) plus a significant hedonic response effect on willingness to pay (equation 3; $\beta = .663$, $t(310) = 7.91$, $p < .01$). Thus, the mediating influence of

TABLE 7

MEDIATED MODERATION ANALYSIS (EXPERIMENT 5)

	Equation 1 (WTP)		Equation 2a (tactile appeal)		Equation 3 (WTP)	
Study 1 predictors	Beta	*t*(312)	Beta	*t*(312)	Beta	*t*(310)
Affective state	−.551	−6.17**	−.615	−7.06**	−.163	−1.85*
Open/closed	.003	.36	.078	.09	.117	.75
Affective state × open/closed	.307	2.83**	.311	2.94**	.086	.85
Tactile appeal					.632	8.03**
Tactile appeal × open/closed					−.163	−.94
	Equation 1 (WTP)		Equation 2b (hedonic response)		Equation 3 (WTP)	
	Beta	*t*(312)	Beta	*t*(312)	Beta	*t*(310)
Affective state	−.551	−6.17**	−.557	−6.31**	−.182	−2.11**
Open/closed	.003	.36	.013	.15	.172	1.19
Affective state × open/closed	.307	2.83**	.245	2.29**	.113	1.15
Hedonic response					.663	7.91**
Hedonic response × open/closed					−.189	−1.17

*$p < .10$.
**$p < .05$.

the hedonic response on the relationship between the affect state and willingness to pay is moderated by visual channel blocking.

Discussion

Experiment 5 showed that blocking the visual channel increased the appreciation for the tactile appeal of a product, but only when a person was in a negative affective state. This result is consistent with the affect-gating hypothesis. The affective-gating hypothesis argues that blocking the visual channel increases the strength of the activation of the tactile representation, but that a person must be in a negative affective state to appreciate the increased stimulation from the tactile channel (i.e., sensitivity to sensory stimulation is affective state specific). The affective-gating hypothesis assumes that people in a negative affective state release β-endorphins when there is beneficial tactile stimulation, and that the release of these endorphins results in hedonic pleasure. The results were not consistent with a directed attention hypothesis, in which blocking the visual channel should have resulted in increased attention to, and appreciation for, stimulation in the unblocked sensory channels (including the olfactory channel) regardless of the affect state.

GENERAL DISCUSSION

Taken together, the five experiments suggest that the affective-perceptual system has gating properties, in which certain sensory stimulation can be intensified depending on the affective state. Consumers appear to be more perceptually sensitive to tactile stimulation when in a negative affective state than when in a neutral or positive affective state (experiment 1). The negative-state-induced sensitivity to beneficial tactile information results in a heightened hedonic affective response (experiment 2) and a greater appreciation for differences in tactile product quality (experiment 3). The positive-state-induced sensitivity to visual information results in a heightened responsiveness to changes in objective visual quality (experiment 4). Finally, affective-state-induced responses to tactile and visual information resulted in a higher willingness to pay for the product (experiments 2, 3, 4, and 5). This influence of an affective state on the willingness to pay for a product was mediated by the perceived tactile appeal and the hedonic response when participants were in a negative affective state and by perceived visual appeal when participants were in a positive affective state.

There are four conceptual issues related to the different forms of affect and sensory experience. The first issue concerns the influence of sensory stimulation during affective states. The results from the studies suggest that tactile experience influences hedonic affect when people are in a negative affective state. The subsequent conceptual question is, "How does this change in hedonic affect (an experience of pleasure) influence the consumer's original affective state (a mood)?" Does tactile stimulation provide a temporary hedonic experience with no influence on the affective state (e.g., the person feels good temporarily, but remains in a negative affective state; Andrade 2005; Vohs, Baumeister, and Lowenstein 2007), or does the hedonic affect from tactile stimulation turn a negative affective state into a neutral or positive affective state?

The literature suggests that the influence of tactile stimulation during a negative affective state depends on whether the organism perceives an opportunity to search its environment. If there is no clear opportunity to search the environment, tactile stimulation turns a negative affective state into a neutral state. For example, isolation-induced vocalizations in rats are reduced or eliminated when they receive tactile stimulation (Hofer 1987; Kuhn, Pauk, and Schanberg

1990). However, if rats are presented with the opportunity to search or interact with littermates, tactile stimulation can turn a negative state into a positive state. Imanaka et al. (2008) showed that tactile stimulation not only alleviates negative affect but also induces positive affect and makes the rats show enhanced exploration and locomotor activity in an open-search task. The positive affect is sustained and intensified as long as the environment appears to be conducive for searching or playing (Panksepp 1998), with many novel and unpredictable stimuli (Schultz 2006). Thus, given an opportunity for consumers to subsequently explore their world or interact with other people, tactile stimulation may not only alleviate a negative affective state but may also subsequently activate a mild form of positive affective state that can subsequently be intensified.

A second conceptual issue involves the two sources (types) of affect, and their implication on consumer goal pursuit and consumption means valuation. Although the literatures on affect and goal pursuit are not well-integrated, emerging findings suggest that goal states are mediated by many of the same neurotransmitters that mediate state and hedonic affect. Positive affective states appear to be mediated by dopaminergic activation, whereas positive hedonic affective responses appear to be mediated by opioidergic activation. The former initiates search processes, a general sense of excitement, and exploration (stimulus hypervaluation during goal pursuit), whereas the latter activates satisfaction, neural habituation, and satiation (stimulus devaluation following goal fulfillment). Given that the two types of positive affect have different underlying processes and valuation outcomes, the novelty, unpredictability, and variety of products on one hand, versus the sensory-hedonic qualities of products on the other hand, should be differentially important in influencing consumer goal pursuit. For example, it may be more important for product novelty (e.g., new product, new packaging), unpredictability (e.g., sales promotions, product-related trivia), and product-line variety (e.g., number of product variations) to activate search processes stimulated by positive state affect (see Kahn and Isen 1993). In contrast, the objective sensory quality of the perceptual stimulation (e.g., tactile quality) may be more important for influencing the hedonic experience, slowing down habituation, and limiting exposure-induced satiation.

Consumers under positive affective states may be more likely to search, and be attracted to, products and product lines with high novelty, unpredictability, and variety, whereas consumers under negative state affect may be more likely to use their remembered hedonic experience as a result of the sensory-hedonic qualities (how good it felt; e.g., Cowley 2007; MacInnis, Patrick, and Park 2006; Pham and Avnet 2009) as the main driver for repeat purchasing. Given that consumers in a positive affective state are relatively insensitive to veridical product information (experiment 3), marketers who sell to this segment might consider releasing a greater number of new products, increasing unpredictability, or enhancing the variety of the product line. In contrast, given that consumers in a negative affective state are more sensitive to objective sensory product qualities (experiment 3), marketers who sell to this segment might consider improving product quality and the sensory usage experience that will directly act on the consumer's hedonic system.

An important social implication is how the experience of hedonic affect influences compulsive consumption. The beta opioids generated from hedonic affect can contribute to biologically mediated compulsive behavior, a form of aberrant goal pursuit. For example, consider sexually compulsive behavior. It is estimated that between 17 million and 37 million Americans exhibit uncontrollable sexual behaviors that result in negative consequences for the person and relevant others (Hagedorn and Juhnke 2005). Although occasional public displays of socially aberrant sexual behaviors receive significant media attention, roughly 70% of sexually compulsive people perform these behaviors in private (Kafka 2001). One contribution to the compulsion may be that the tactile-induced hedonic pleasure is not subsequently accompanied by readily available, nonsexual opportunities to search, play, or interact. In nonenriched environments, repeated hedonic self-stimulation can lead to hypersensitization toward object-specific incentives related to the pleasure-generating stimulation and subsequent devaluation of other stimuli (Tindell et al. 2005). Repeated hedonic pleasure and hypersensitization can increase the "seeking" of one specific stimulation (as opposed to nonspecific seeking of general rewards in a healthy, positive affective state) and the seeking of cues predictive of that specific source of hedonic affect (hedonic pleasure). This can cause the consumer to spiral into a cycle of hedonic self-stimulation. Thus, the lack of access to alternative means of enrichment appears to be a key moderator that tilts hedonic consumption toward compulsion, although there are undoubtedly other variables that contribute to the phenomenon.

Finally, this article is an effort to bring attention to the under-researched area of real-time consumer experience and perception. Despite the undeniable importance of studying the actual consumer experience and real-time hedonics in consumption, the literature in consumer behavior has hitherto focused disproportionately on higher order cognitive processes that explore how the consumer predicts the consumption experience from advertising messages, branding, and other linguistic and symbolic stimuli, rather than how the consumer experiences the lower order sensory consumption of the product stimulus itself. The cognitive revolution sparked by Miller (1956) and the linguistic revolution sparked by Chomsky (1955) has served the field of consumer behavior well for 5 decades, but the last decade has seen the affective and consciousness revolution provide equally important insights into real-time consumption experiences. Certainly, consumer prediction based on linguistic symbols is important, but exploring the processes that generate hedonic experience in real time is equally important in understanding the actual process of consumption and repeat consumption (Pham et al. 2001). Given that Nisbett and Wilson (1977) admonishes that people are generally unable to accurately predict their affective preferences through symbolic cognition (e.g., lay theories about mental processes), studying affective hedonics and non-thinking-mediated preferences generated from consumption experiences in real time would be an important complement to the symbol-based legacy that we have inherited from the cognitive and linguistic revolution.

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CORRECTION.—Since this article was published online on June 7, 2011, corrections have been made in order to fix a typographical error. For experiment 5, in the section titled Design, the earlier version read: "Participants were induced into an affective state, and then experienced the lotion neither while closing their eyes (block visual channel condition) nor while keeping their eyes open (control condition)"; "neither" has been changed to "either," and "nor" has been changed to "or." These changes were made in both the online and print versions of the article. Corrected on June 13, 2011.