

Going against the Flow: The Effects of Dynamic Sensorimotor Experiences on Consumer Choice

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Sensorimotor experiences of going against the flow can affect the choices consumers make. Eight experiments show that consumers who experience the sensation of going against the flow pick alternatives that are normatively not preferred (experiments 1a and 1b). These effects are evident only when the sensations are dynamic and self-experienced (experiments 2a and 2b), subjective feelings are elicited (experiments 4a and 4b), and no other objective, external norm information is supplied (experiment 5). Experiences of going against the flow typically involve both movement and direction and are represented in memory schematically. Re-experiencing these sensations leads to the activation of this schematic representation and elicits a feeling-based behavioral disposition to do something different, or to go against one's initial inclination (experiment 3), leading participants to pick an option that is normatively not preferred.

Keywords: sensory motor experiences, embodied cognition, choice, affect, norms

Many routine sensory experiences are encoded in memory in sense modalities that retain features of the original information itself as well as of the conditions surrounding them (i.e., the behavior that occurred when the sensory input was received; Barsalou 1999, 2008;

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Wilson 2002). For example, the experience of walking on a wet, sandy beach can be encoded in memory through a representation that captures not only how the beach and the sand looked, but also how the wet sand felt, how the waves sounded, and the subjective experience of walking with the waves lapping at one's feet as well as one's reaction to it. Despite differences in detail, most theoretical formulations (including those proposed by neo-empiricists and amodal theorists) assume that concepts stored in memory contain some perceptual features. However, they differ in their views of the possibility of an additional distinct, linguistic representational system (Machery 2006). It is, therefore, not surprising that many theories of information processing include representations that retain some perceptual features of the original experiences (Lieberman et al. 2002; Strack and Deutsch 2004; Wyer 2004; Wyer, Adaval, and Colcombe 2002; Wyer and Radvansky 1999) as well as provide conceptualizations of how they can be retrieved later if they are cued by a descriptive label or a subset of similar sensory experiences (Adaval and Wyer 2004).

The current research examines how such multisensory experiences (specifically experiences of going against the flow) influence behavior (i.e., choices) in unrelated situations. Experiences that involve moving against the flow are

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fairly common. For example, people might enter a building from which many others are exiting; walk against the direction of the flow of traffic; or move counter to signs indicating the direction in which people are expected to move. They might experience it in a store when they run their hands against the weave of fabric or fur to see how it feels. Such experiences are accumulated over one's lifetime and have commonalities that might be coded schematically to capture the recurring themes in them (i.e., that of going against something; Johnson 1987). When such experiences are encountered again, they can activate these schematic representations and the associated feelings and behavioral tendencies and serve as inputs in decision making, altering the choices individuals make. That is, experiences of going against the flow can exert an influence in unrelated choice situations and elicit a behavioral disposition to go against one's initial inclination, leading individuals to pick options that are normatively less preferred (i.e., a less dominant option).

Choice situations typically consist of a couple of alternatives where one option often dominates the other. People might choose to go with what is considered to be the normatively preferred option (i.e., the dominant option) or alternately deviate from this option and choose to try something different (Maslach, Stapp, and Santee 1985; Nail, MacDonald, and Levy 2000; Snyder and Fromkin 1980). However, these decisions to deviate or not are typically based on information that is intrinsic to the choice alternatives (i.e., characteristics of the options available). The current research, however, suggests that extraneous sensorimotor experiences that people are not aware of (such as bodily experiences of having gone against the flow) can provide input into this decision-making process and make them want to go against their initial inclination and pick alternatives that are normatively not preferred.

Relatively few studies have examined the effects of such dynamic sensory experiences on choice or considered how and why they might affect choice. Briñol and Petty (2008) provide a review of research on the effects of body movements (such as head nodding or arm flexion) on attitudes. Yet much of this work is silent about the effects of these movements on choice where individuals engaging in the same movement (e.g., nodding their head) have to choose one option or the other. We suggest that dynamic sensorimotor experiences of flow might have special implications for choice primarily because the motor component has a directional aspect, which might suggest how one should behave. It is also worth noting that although other research has examined different types of dynamic experiences (Chandler and Schwarz 2009; Hung and Labroo 2011; Labroo and Nielsen 2010), the effects of a sensation per se and the effects of the dynamic motor component of the experience have typically not been distinguished.

In the research to be reported, participants moved their hands through a sample of fur to mimic the experience of

going with the flow or against it, or alternately imagined going with or against the flow of traffic. The effect these dynamic experiences had on subsequent choices (consisting of a dominant, normatively preferred option and a less preferred one) was then examined. The research also examined alternative ways in which such sensorimotor experiences can exert an influence (i.e., through the activation of semantic concepts or via a feeling-based mechanism). The empirical work suggests that the more dynamic these experiences are, the more likely they are to exert their influence through a feeling-based mechanism. This finding has more general implications for consumer choice because it provides an understanding of how and when such internal subjective inputs are considered relative to other objective criteria that are either intrinsic or extrinsic to the choice alternatives. Eight experiments, showing how the experience of going against the flow can affect consumers' choices between options that are normatively preferred and those that are not, are reported.

THEORETICAL FRAMEWORK

The Varied Nature of Sensorimotor Experiences

The idea that cognitive processes are rooted in bodily sensations is well established in research on embodied cognition (see reviews by Krishna and Schwarz 2014; Lee and Schwarz 2012; Meier et al. 2012; Niedenthal et al. 2005; Reimann et al. 2012). These sensory experiences have an impact on judgments in both related domains (Chandler, Reinhard, and Schwarz 2012; Crusco and Wetzel 1984; Huang, Li, and Zhang 2013; Krishna and Morrin 2008; Labroo and Nielsen 2010; Nelson and Simmons 2009; Peck, Barger, and Webb 2013; Peck and Wiggins 2006) and unrelated ones (Ackerman, Nocera, and Bargh 2010; Hong and Sun 2012; Hung and Labroo 2011; Martin 2012; Williams and Bargh 2008). With few exceptions, however (Zhang and Li 2012), the different processes that underlie the effects of bodily sensations and the various ways in which they could exert an impact have not been fully isolated, and multiple processes could explain the effects observed.

To understand the complexities involved in isolating the various mechanisms, it is useful to examine the sensations that have been studied in past work by placing them along a static-dynamic continuum. Many sensory experiences that have been studied are relatively static and can be easily labeled (e.g., warm, soft, rough). They could exert an impact on subsequent behavior through the activation of semantic concepts (Zhang and Li 2012). Other sensations, such as the ones under consideration, are relatively more dynamic and harder to label because they have not only a sensory aspect that one feels (e.g., wet, cool, or soft) but also a motor component that reflects the act of "doing something" while experiencing the sensation (e.g., walking

against the wind). In many cases, it is the motor component of these experiences that defines the sensory experience. These relatively complex sensorimotor experiences can not only activate semantic concepts but also elicit affective reactions and behavioral dispositions, all of which could influence behavior in unrelated situations by acting either in unison or independently.

Research that has investigated relatively static sensations suggests that these sensations have an effect on judgments through the activation of semantic concepts that are then applied to situations in which they are deemed relevant. For example, holding a warm cup can lead a person to be described as personally warm (Williams and Bargh 2008), holding a heavy book can make people judge the book to be more important if they have some knowledge about it (Chandler et al. 2012), and feeling something rough can lead people to consider a social interaction to be more difficult (Ackerman et al. 2010). These effects on judgment are particularly likely when the sensation is easy to label and has a metaphorical correlate in language. For example, holding a warm cup of coffee is unambiguous with respect to the concept that it can activate (i.e., warm) and its idiomatic use in language (“a warm person”). The same can be said of heavy, which is descriptive of weight and also implies seriousness (as in “a heavy topic”). Similarly, rough is a term that not only can describe a sensation but also can refer to speech (e.g., “being rough in manner and speech” or “speaking roughly”).

Other research has examined the effects of dynamic, bodily movements on attitudes. This research has shown that movements such as moving one’s head up and down (indicating agreement) can lead to more favorable attitudes than shaking it from left to right (Tom et al. 1991). Similarly, neutral objects are evaluated more favorably when presented during arm flexion, which is suggestive of approach behavior, than during arm extension, which is suggestive of avoidance behavior (Cacioppo, Priester, and Berntson 1993; Priester, Cacioppo, and Petty 1996; for a review, see Briñol and Petty 2008). Such movements presumably exert an impact on attitudes through (1) a simple associative mechanism (certain movements have been associated with positive or negative affect in the past and serve as conditioning stimuli), or (2) an inferential process where bodily experiences are used to infer one’s attitudes toward something via a misattribution process, or (3) the amount, direction, and confidence in the thoughts generated by the experience (Briñol and Petty 2008).

It is worth noting that many of the aforementioned experiences comprise sensations that are affectively positive or negative or movements that can be used to make inferences about how one should behave (e.g., approach/avoid the object or agree/disagree with the issue). Although past research has examined the effects of such movements on an attitude object or a persuasive message, it is relatively silent about how they might affect preference or choice.

Head nodding, for instance, should have similar effects on both options in a preference task—making both of them equally agreeable—and it would be hard to determine how such movements could increase preference for one, let alone reverse preferences. The current conceptualization, which builds on this previous work, provides an account for how this might happen.

To sum up, three characteristics of previous work are worth noting. First, some of the sensations that have been examined are typically distinctive and easy to label semantically. The semantic labels that are elicited often have corresponding idiomatic expressions in language, and this increases the likelihood that they will be applied in situations where they seem relevant. In contrast, the current research focuses on sensorimotor experiences of going against the flow. These experiences are not only quite diverse (i.e., they can be elicited while one is walking against the wind or through a crowded mall, testing fabric and furnishing materials) but also more dynamic. Consequently, they are harder to capture in simple semantic terms. Second, past research has not isolated the effects of the sensation per se and the motor aspects of an experience. Neither has it identified what produces the effects, although the assumption has been that active experiences include sensations and bodily movements (Lederman and Klatzky 1987). Third, the underlying mechanisms by which these experiences exert an impact have often not been isolated. To understand how these experiences of going against the flow might exert an influence on choice through multiple pathways, it is useful to consider how sensorimotor experiences might be represented and how they might be retrieved and used in unrelated situations.

The Representation of Sensorimotor Experiences and Their Use

Several conceptualizations describe how everyday experiences and events are represented in memory (Barsalou 1999, 2008; Lieberman et al. 2002; Pylyshyn 1973; Strack and Deutsch 2004; Wilson 2002; Wyer 2004; Wyer et al. 2002; Wyer and Radvansky 1999). For these representations to affect behavior in unrelated situations, two things must be true. First, the sensorimotor experience must be stored in memory in some nonverbal form that retains features of the original experience. Second, these representations must be related to other experiences so that the new experiences can be understood in terms of these representations. In the current research, we formalize these steps by drawing on work by Johnson (1987; Lakoff and Johnson 1980a, 1980b; Mandler 1992; Mandler and Cánovas 2014).

Representation in Memory. Johnson (1987) suggests that sensorimotor experiences might be encoded schematically as “image schemas.” Although this general term captures three distinct embodied, prelinguistic structures of

experience, they have only recently been clearly distinguished (Mandler and Cánovas 2014) as (a) spatial primitives, which are the first building blocks formed during infancy; (b) image schemas, which are simple spatial stories built on these primitives; and (c) schematic integrations, which use the first two to create concepts that include nonspatial elements (e.g., feelings of force). These three structures form the building blocks of conceptual metaphors that emerge with language.

Although a detailed discussion of how these prelinguistic structures develop over time is beyond the scope of this article (see Mandler and Cánovas 2014 for more details), such schematic representations develop at an early age when one learns about the world through one's senses (Piaget 1977). As children are exposed daily to certain experiences (e.g., objects falling down, the experience of being "in" something), they develop many schemas (e.g., an "up-down" schema or an "inside-outside" schema) that represent knowledge about the world (Mandler 1992; Mandler and Cánovas 2014). Numerous schemas have been identified that govern our understanding of space, containment, multiplicity, process, and force (Hampe and Grady 2005).

According to Johnson, schemas capture the "recurring, dynamic pattern of our perceptual interactions and motor programs that gives coherence and structure to our experience" (Johnson 1987, xiv). Importantly, they capture not only the spatial and physical characteristics of an experience but also its dynamic aspects (Mandler 1992; Mandler and Cánovas 2014; Rohrer 2006). In the current context, the experience of going against the flow might have emerged from initial reactions people had to experiences of force as they encountered things moving in the opposite direction (Hampe and Grady 2005; Johnson 1987; Mandler and Cánovas 2014). For example, a child walking against the wind for the first time to get to a destination might remember the sensation as well as the reaction it elicited. This reaction presumably involved doing something different (i.e., going against the natural inclination of falling back). Such initial experiences presumably helped create a schematic representation of force that could, over time, include cognitions (semantic concepts and associated thoughts), other feelings (i.e., the conscious experience of what the bodily experience of going against the wind and other similar sensations feel like; see Schwarz 2012 for a summary of different kinds of feelings), and associated behavioral reactions (see figure 1).

Use of These Representations in Unrelated Situations. If these bodily sensations are re-experienced, the new experience might reactivate these early schematic representations along with the associated semantic concepts, feelings, and behavioral reactions. Although theoretically it is conceivable that semantic concepts associated with the schema could be used to interpret a new situation (e.g., the choice

that should be made), the feelings and behavioral reactions associated with the experience could also exert an influence. It is conceivable that the more dynamic the sensation and the harder it is to label, the more likely it is that the effects are driven by feelings and associated behavioral dispositions. Thus, re-experiencing the same sensorimotor experience of going against the flow might trigger similar feelings and behavioral tendencies that are applied in an unrelated situation.

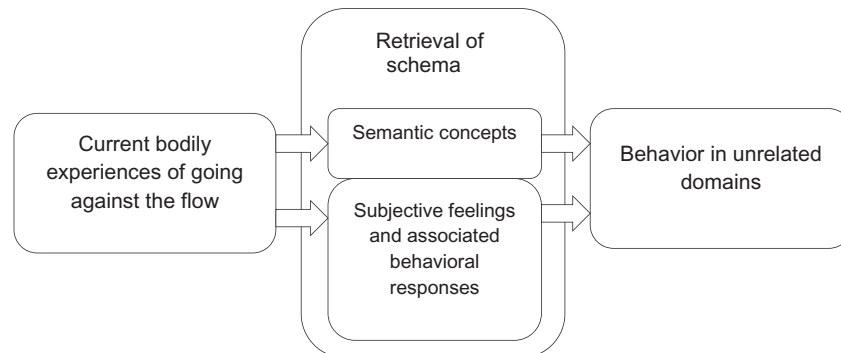
Going Against the Flow: Effects on Choice

Choosing between Alternatives. In many preference situations, there might be one option that dominates the other along some intrinsic attribute. (For example, a box containing 20 pieces of chocolate might be preferred to one containing only 10.) We call this option the normatively preferred option, since it is the one that most people gravitate toward. In the current research, we hypothesize that the experience of going against the flow influences the disposition to choose something that is *not* normatively preferred because people go against their initial inclination. This disposition should be evident regardless of whether the choice is a hypothetical one or one that has real consequences. In the studies we report, participants typically indicate their preference between two alternatives, of which one is a normatively superior one.

Identifying the Underlying Process. As noted earlier, the effects on behavior could occur through the activation of semantic concepts associated with the experience as participants experience the sensation of going against something (e.g., people might realize that they are doing something different, and this could activate concepts such as different, resist, or flow). Zhang and Li (2012) provide some evidence that this might be the case. Or, the effects could result from a feeling of wanting to do something different (i.e., the subjective reactions in response to the experience could lead to a feeling-based behavioral tendency). These mechanisms are difficult to tease apart. However, given that the activation of semantic concepts is equally likely if the experience is something that one experiences or alternately observes (e.g., holding an ice cube and seeing an ice cube should both elicit the semantic concept "cold"), manipulating observation of an experience versus actual experience might provide a diagnostic tool to identify if the effects on consumers' preferences are driven by these semantic concepts. Further, if the effects on behavior occur through a feeling-based mechanism (where the subjective feelings of going against the flow provide information about one's own behavioral inclinations), then the use of these feelings as information can be detected via the standard misattribution paradigm suggested by Schwarz and Clore (1983). These two procedures can collectively help identify the underlying mechanism.

FIGURE 1

CONCEPTUAL FRAMEWORK



Implications of the Underlying Process and Contingencies in the Effects. The proposed conceptualization also suggests that there are certain conditions in which the hypothesized effect is most likely to be evident. First, the experience of going against the flow presumably has an effect on choice behavior because the dynamic motor component provides input into the decision process. Thus, self-experienced sensations are essential. Previous research provides mixed findings on this issue. On one hand, Zhang and Li (2012) found that the physical experience of heaviness is not necessary to obtain the effects of importance in judgments (see also Schnall, Benton, and Harvey 2008; Zhong and Liljenquist 2006). However, other studies suggest the opposite. Specifically, Lee and Schwarz (2010, study 1) found that when participants washed their hands with soap it increased their preference for a previously rejected choice alternative, whereas simply examining the soap without using it did not have this effect. These latter studies, which are consistent with our conceptualization, suggest that mere observation or semantic activation of concepts might not be sufficient, and that the subjective experience associated with the behavior is necessary for the effects we postulate.

It is worth noting that one can “experience” a bodily state by remembering it (Bechara and Damasio 2005; Damasio 1994, Reimann et al. 2012) or simulating it mentally (Barsalou 1999; Reimann et al. 2012). Elder and Krishna (2012), for example, show that when a product is displayed in a way that makes it easy to imagine using it, the effect of this imagining (via mental simulation) is similar to the effects of actually using it. In the current context, we suggest that although imagining a sensorimotor experience may influence behavior when the experience is easy to imagine, merely observing someone else have the experience might activate concepts associated with the experience but should not have the effects that a real experience

does. This is because the presence of another person engaging in the experience requires a shift in perspective, making it less fluent (Jiang et al. 2014; see also Dalton, Chartrand, and Finkel 2010). Thus, our conceptualization emphasizes that for the sensorimotor experience to have the effects proposed, the self has to be involved, through either an actual physical experience or a vividly imagined simulation.

Second, according to our conceptualization, the dynamic, directional motor component of the experience is not only essential but also serves as an input in decision making through a feeling-based mechanism rather than through the activation of semantic concepts, because the latter might not be able to capture the experience accurately. To this extent, the effects should be more evident when (a) the motor component of the experience is personally experienced, (b) the feelings elicited can be used as a basis for decision making, and (c) the experience is more dynamic.

Third, when making their decision about which option to choose, participants might deviate from the normatively preferred option. In general, however, this deviation is less likely when some other objective criterion is available and feelings are less likely to be relied on (Schwarz and Clore 1996). At times marketers might explicitly provide such objective criteria through signs that indicate what the best-sellers are (Goodman et al. 2013) or information about others’ preferences, such as “x% of people prefer this brand” or “The brand most people like” (Burnkrant and Cousineau 1975; Cialdini 2001; Cialdini and Goldstein 2004; Goldstein, Cialdini, and Griskevicius 2008). When such clear and objective criteria are provided, consumers might follow these cues (West and Broniarczyk 1998; Wood et al. 1994) and sensorimotor experiences are less likely to have an influence especially if their effects are driven through a feeling-based mechanism. (Note: Internal

subjective criteria and feelings are less likely to be used in decision making when other objective criteria can be relied on.) In most cases, however, consumers rely on their own sense of what the normatively superior option is and choose it. Experiences of going against the flow might elicit feelings and a behavioral disposition of wanting to go against what they typically do, and this might lead them to choose the normatively less preferred option. Eight experiments provided empirical support for these conclusions.

EXPERIMENT 1A: EFFECTS OF GOING AGAINST THE FLOW ON PREFERENCE

Experiment 1a examined the possibility that bodily experiences that involve going against the flow influence the choices that participants make. Participants evaluated a sample of faux fur by running their hands through it either in the direction of hair growth (“with the flow”) or against it (“against the flow”). Then, they made a choice between four types of T-shirts that varied in their normative desirability. In a third control condition, participants did not evaluate the fur sample. We expected that participants would be more likely to choose the normatively least preferred shirt when they had experienced going against the flow than in other conditions.

Method

Design. One hundred twenty-six undergraduate business students (52% female) participated in the experiment for extra course credit. They were randomly assigned to one of three conditions (flow experience: against the flow vs. with the flow vs. no flow control).

Procedure. Participants were told that they would take part in several unrelated experiments. In the two flow conditions, they were asked to evaluate materials to be used by a local interior design firm for furnishings. In the with-flow condition, they were given a sample of faux fur and asked to move their hand three times in the direction of hair growth. In the against-flow condition, they stroked the fur three times opposite to the direction of hair growth. In each case, however, participants were asked to move their hands “from A to B,” and other words that could imply resistance or flow were never used. Participants then indicated how much they liked the fur along a scale from 0 (not at all) to 10 (very much). They also indicated how they thought the material would look in interiors along a scale from -5 (very bad) to +5 (very good).

Participants were then told that reactions to a product are usually more stable once they have had some time to think about it and that they would be asked more questions about the sample they had touched a short while later. They were told that in the interim, they would be given an unrelated product preference task. These participants,

along with participants in the control condition (who did not get the fur sample), were told that the College of Business was collecting opinions from students to help design a college T-shirt for the following year. They were asked to choose the base color of the T-shirt they preferred from a set of four plain T-shirts with no logos. Three shirts were colored different shades of grey and one was green (see appendix A). A pretest with 48 participants revealed that the likelihood of preferring the green T-shirt (14.6%) was less than chance (25%); exact binomial p -value = 0.0611. (The probability that the observed proportion, 0.15, comes from a population less than .25 is 95.58%.)

Participants in the two flow conditions then returned to the fur evaluation task and indicated the extent to which their reaction to the fur was described by 12 different adjectives (rough, soft, comforting, soothing, pleasing, unique, common, irritating, dull, exciting, mundane, and original) along scales from 0 (not at all) to 10 (very much). After a demand check that ascertained whether participants related the two tasks (none did), demographic information was collected, and participants were thanked, debriefed, and dismissed.

Results

Evaluations of the Fur. Participants’ liking for the fur sample was similar in both the against-flow condition ($M_{\text{against_flow}} = 5.19$, $SD = 2.53$) and the with-flow condition ($M_{\text{with_flow}} = 5.32$, $SD = 2.64$), $F < 1$. Their assessment of how good the fur would look in furnishings also did not differ ($M_{\text{against_flow}} = -1.73$, $SD = 2.37$ and $M_{\text{with_flow}} = -1.49$, $SD = 2.65$), $F < 1$.

Preference for the Less Preferred Option. One participant failed to report a preference for the T-shirts and was excluded from the analysis. Logistic binary regression analyses indicated that the proportion of participants who chose the normatively less preferred (green) T-shirt varied significantly over conditions (Wald $\chi^2(2) = 6.13$, $p < .05$). Specifically, more participants chose this T-shirt if they had gone against the flow in the first task (25.58%) than if they had either gone with the flow (9.3%; Wald $\chi^2(1) = 3.68$, $p = .055$), or were not exposed to the fur (7.69%; Wald $\chi^2(1) = 4.16$, $p < .05$). The latter two conditions did not differ from each other (Wald $\chi^2(1) < 1$).

Ratings of the Fur. We averaged responses to six items (rough, irritating, soft, comforting, soothing, pleasing) after reverse-scoring the last four items to create a measure of roughness ($\alpha = .89$). We averaged the other six items (mundane, common, dull, unique, exciting, and original) after reverse-scoring the first three to create a measure of uniqueness ($\alpha = .61$). Participants’ ratings along the two dimensions did not differ in the two flow conditions (in each case, $F < 1.13$). (Analyses of these measures in subsequent studies yielded no significant main or interaction

effects with flow and other variables. Therefore, they will not be discussed further.)

EXPERIMENT 1B: IMAGINED EXPERIENCES OF GOING AGAINST THE FLOW

This experiment replicated the effect using a different manipulation of flow and a different product category, and also determined whether the effect of merely imagining the experience of flow would be similar to the effect of actually experiencing it. If people can visualize themselves clearly as going against or with the flow, analogous effects on choice should be observed.

Method

One hundred seventy-five participants from an online panel (40% female) participated in the experiment for a small payment of \$.30. They were told that we were interested in how well people can visually imagine being in different situations. On this pretext, they were asked to view a silent video clip of a crowd walking in a subway station and to imagine the scene as vividly as possible as if they were physically experiencing it themselves. Participants in the with-flow condition imagined that they were on the left conveyor belt walking in the same direction as the majority of the crowd, while those in the against-flow condition imagined that they were on the right conveyor belt, which depicted fewer people walking in the opposite direction to most of the crowd. After viewing the clip, participants indicated how easy it was to imagine the situation along a scale from 0 (not at all) to 10 (very much).

Then, as part of an ostensibly different experiment, participants were given a choice task in which they were asked to choose between two different brands of chocolates, A or B (see appendix B), the normative desirability of which differed. A separate pretest with 32 participants suggested that the less preferred option was option B (12.5% preferred; $t(1,31) = 14.73, p < .01$). After choosing their preference, they indicated how much they liked each option, how different they thought it was from a typical chocolate, and how appealing it was to most people along scales from 0 (not at all) to 10 (very much). Next, participants were asked to think about the initial simulation experience once again and to report the extent to which they felt they were going with the flow along a scale from 0 (not at all) to 10 (very much). They were also asked if the simulation had influenced their answer in the subsequent choice task (yes or no). (No participant responded affirmatively.) Basic demographic information was also collected.

Results

Manipulation Check of Flow. Participants were less likely to say that they went with the flow in the against-flow condition ($M_{\text{against_flow}} = 2.99, SD = 2.72$) than in the with-flow condition ($M_{\text{with_flow}} = 7.47, SD = 2.91$), $F(1,175) = 124.90, p < .01$.

Chocolate Choice. A logistic regression analysis of participants' choice of the less preferred option was performed as a function of flow conditions, the continuous measure of ease of imagining the situation, and their interaction. Only the interaction of flow and ease of imagining the scene was significant ($B = .70, SE = .36, \text{Wald } \chi^2(1) = 3.86, p = .049$). Spotlight analysis revealed that when the ease of imagining was easy (1 SD above the mean), imagining going against the flow increased participants' probability of choosing the less preferred option (from 36.8% to 46.3%; $p < .10$). When it was relatively harder to imagine the experience, however, this increase was not apparent (40.7% and 33.8% in with-flow and against-flow conditions, respectively; $p > .10$).

Evaluations of the Less Preferred Option. Participants in the two flow conditions did not differ in their evaluations of the less preferred option (liking: $M_{\text{with_flow}} = 6.69$ vs. $M_{\text{against_flow}} = 6.34$; perceived difference from the typical chocolate: $M_{\text{with_flow}} = 6.11$ vs. $M_{\text{against_flow}} = 6.08$; how appealing it would be to most people: $M_{\text{with_flow}} = 7.21$ vs. $M_{\text{against_flow}} = 6.90$; all $F_s < 2, p_s > .31$), suggesting that participants' sensorimotor experiences had a direct effect on preferences without changing their evaluation of the product.

Discussion of Experiments 1A and 1B

Experiments 1a and 1b provided evidence that dynamic sensorimotor experiences (either experienced or imagined) can activate a behavioral disposition to go against what is normatively preferred. In experiment 1a, the effects on preference were localized in the against-flow condition, and the with-flow condition was very similar to control conditions. Given that the schema of force is one that is usually developed early on as children encounter things that either block or prevent movement (Mandler and Cánovas 2014), it is conceivable that the feelings and behavioral dispositions to do something different and against one's initial inclination arise only when people experience going against something. Consequently, in later experiments, only the two flow conditions were compared. It is also worth noting that participants could have used their initial evaluations of the fur as a standard of comparison in judging the T-shirts they saw later. However, initial evaluations of the fur did not differ in the two fur conditions (in terms of how rough or unique it felt in the two flow conditions), and consequently these perceptions cannot account

for the increases in preference for the normatively less preferred option.

Experiment 1b showed that the effect of merely imagining the experience of going against the flow is similar to the effect of actually having the experience. Imagery apparently was sufficient to activate a prior representation of the experience of going against the flow. Given these findings, several theoretical and empirical questions about the underlying process arise. First, according to the proposed conceptualization, the dynamic component of the sensorimotor experience is responsible for the observed effect. Thus, a relatively static sensation should not create the same experience. Furthermore, the sensorimotor experience should be personally experienced (either directly or through vivid imagery) for it to exert an influence on choice. Thus, an experience that is merely observed should not have a similar effect because, although people tend to mimic others (Chartrand, Maddux, and Lakin 2005), the presence of another person engaging in the experience requires a shift in perspective that makes the experience less visceral and one that requires more cognitive resources (Jiang et al. 2014; see also Dalton et al. 2010). Experiments 2a and 2b provided evidence in support of these two contingencies.

EXPERIMENT 2A: DYNAMIC VERSUS STATIC EXPERIENCES

Participants were asked to either move their hands through a sample of fur as in experiment 1a or simply to touch the fur by placing their hand on it for a similar length of time. This was done under each of the two flow conditions. If participants are being influenced by the experience of going against the flow, then increases in the preference for the less preferred option should be more evident only when the experience is a dynamic one.

Method

Design. One hundred six introductory marketing students (44.3% female) participated in the study for course credit. Participants were randomly assigned to conditions of a 2 (flow experience: against the flow vs. with the flow) \times 2 (type of motor experience: dynamic vs. static) between-subjects design.

Procedure. The procedure was similar to experiment 1a except as noted. Participants were told that we were interested in how people evaluate materials based on different levels of sensory input. As in previous experiments, participants in the dynamic motor condition were asked to test a sample of fur by moving their hands through it in a direction that would mimic the experience of going with the flow or against it. In the static conditions, participants were asked to spend an equivalent amount of time merely

touching a fur sample that had previously been ruffled or smoothed by the experimenter. Thus, the visual aspect was the same as that in dynamic conditions, but participants merely differed in how they interacted with the fur sample. After exposure to the fur sample, participants evaluated it using the same measures as in experiment 1a and were then presented with the same product preference task used in experiment 1b (chocolates; see appendix B).

Participants then indicated the extent to which they felt they were going against and with the flow to see if the manipulation was successful. They also indicated how much resistance they felt when touching the fur, how irritated they felt, and how happy they felt, along scales from 0 (not at all) to 10 (very much). After a suspicion check to see if participants linked the two tasks (none did), demographic information was collected.

Results

Manipulation Check. We averaged responses to the two manipulation-check items after reverse-coding the second measure ($r = .56, p < .01$) and analyzed them as a function of flow and type of motor experience. Participants reported that they felt like they were going against the flow to a greater extent in against-flow conditions ($M_{\text{against_flow}} = 5.87, SD = 2.59$) than in with-flow conditions ($M_{\text{with_flow}} = 2.66, SD = 2.13$), $F(1, 102) = 45.92, p < .001$. This difference was contingent on the type of motor experience they had, $F(1, 102) = 20.03, p < .001$. Contrasts showed that this difference was significant in dynamic conditions ($M_{\text{against_flow}} = 6.59, SD = 2.83$ vs. $M_{\text{with_flow}} = 1.74, SD = 1.82$, $F(1, 102) = 74.40, p < .01$), but not in static conditions ($M_{\text{against_flow}} = 4.82, SD = 1.76$ vs. $M_{\text{with_flow}} = 3.83, SD = 1.96$, $F(1, 102) = 2.29, p = .13$). No main effect of type of experience was observed, $F < 1, p > .72$.

Fur Sample Evaluation. Participants' ratings of the fur were averaged ($r = .519, p < .001$) and analyzed as a function of flow and motor experience conditions. As expected, there were no significant effects on this measure ($p > .10$).

Preference for the Less Preferred Option. As in the previous experiment, a binary logistic regression was performed on choice of the less preferred option as a function of flow and motor experience. This analysis yielded a marginally significant interaction of flow and motor experience (Wald $\chi^2(1) = 3.012, p = .083$). Participants in the dynamic condition were more likely to choose the less preferred option if they had gone against the flow ($M_{\text{against_flow}} = 40.6\%$) than if they had gone with the flow ($M_{\text{with_flow}} = 17.2\%$, Wald $\chi^2(1) = 3.809, p = .05$), replicating the previous findings. On the other hand, participants in the static experience condition showed no difference in preference in the two conditions ($M_{\text{with_flow}} = 30.4\%$ vs. $M_{\text{against_flow}} = 22.7\%$; Wald $\chi^2(1) < 1, p > .56$).

Resistance and Effect on Feelings. Participants reported that they felt more resistance when going against the flow ($M_{\text{against_flow}} = 3.20$, $SD = 2.23$) than when going with the flow ($M_{\text{with_flow}} = 2.38$, $SD = 2.54$), $F(1, 102) = 3.27$, $p = .073$), and this difference was not contingent on the type of experience, $F < 1$, $p > .48$. This greater experience of resistance in the against-flow conditions did not, however, translate into irritation and neither did it affect participants' mood (all F s < 2 , p s $> .30$).

EXPERIMENT 2B: OBSERVED VERSUS ACTUAL SENSORIMOTOR EXPERIENCES

Experiment 2b examined the role of self-experience and the extent to which the effects on choice might be driven by the activation of semantic concepts. Participants in this experiment were asked to (a) engage in the sensorimotor experience themselves, (b) view a videotape of someone else engaging in it (without any instructions to imagine themselves in that situation), or (c) view a static picture of the fur in a ruffled versus smooth state (once again without any instructions to imagine that they had ruffled the fur). Two questions were addressed. First, does the sensation have to be personally experienced? If participants choose the less preferred option only when they engage in the experience themselves, it suggests that the effect occurs only when the sensory experience is grounded in one's own experiences and not when it is observed.

A second question pertains to the extent to which descriptive aspects of the action are responsible for the effect. When going against the flow, participants might notice that they are doing something different, which could activate semantic concepts such as different, resist, or flow, and these concepts might guide subsequent behavior. A lexical decision task was used to determine the accessibility of these concepts. It is worth noting, however, that such concepts are likely to be activated even when one observes someone else stroking the fur in the direction that is against the flow. Consequently, one would expect to see increased accessibility of such concepts regardless of whether the experience is one's own or another's. If the effects are driven by the accessibility of semantic concepts, then respondents should be faster to respond to these concepts in both observed and self-experienced conditions.

Method

Design. One hundred fifty-nine undergraduate business students (51.6% female) participated in the study for extra course credit. Participants were randomly assigned to conditions of a 2 (flow experience: against the flow vs. with the flow) \times 3 (type of experience: dynamic self-experience vs. observed dynamic experience vs. observed static

experience) between-subjects design along with a seventh control (no flow) condition.

Procedure. Participants were told that we were interested in how people evaluate materials based on different levels of sensory input (i.e., either tactile or visual input), and that based on the condition they were assigned to, they would be asked to evaluate the fur sample after (a) touching it, (b) viewing a video of someone else touching a fur sample, or (c) looking at a photograph of the fur sample. As in previous experiments, participants in the dynamic self-experience condition were asked to test a sample of fur by moving their hands through it in a direction that would mimic the experience of going with the flow or against it. In the dynamic observed experience conditions, participants viewed a video clip of someone either ruffling or smoothing the fur sample. (The video clip captured only the hands moving over the sample and not the individual.) In the observed static experience conditions, participants viewed a still photograph of the fur sample either ruffled (a result of someone having gone against the flow) or smoothed (a result of someone having gone with the flow). After exposure to the sample, participants evaluated it using the same measures as in experiment 1a. In the control conditions, participants did not view or touch any fur sample.

All participants then completed a product preference task in which they indicated their preference for different options of jewelry (see appendix C). One set of options consisted of two women's bracelets, and a second set consisted of two men's pendants. In each case participants were asked to choose between the options, and the total number of less preferred options selected served as the dependent measure. (A separate pretest with 93 participants was used to identify which of these was the more preferred option. Results showed that the less preferred option was option A for the bracelet (32.26% preferred; $t(1,92) = 6.619$, $p < .01$; exact binomial p -value = .0004; the probability that the observed proportion comes from a population less than .50 is 99.97%) and option B for the pendant (40.86% preferred; $t(1,92) = 7.973$, $p < .01$; exact binomial p -value = .0483; the probability that the observed proportion comes from a population less than .50 is 96.05%).

Next, to determine if descriptive semantic concepts were activated upon exposure to the fur, participants were given a lexical decision task that was ostensibly being used by a psychology professor to assess visual perception. Participants were presented with letter strings on the computer screen and were asked to press one of two designated keys (Z and M) when they saw a word or a nonword. They were told that both speed and accuracy were important and that the computer would measure both responses. The presentation list included target words that were likely to be elicited by the experience (e.g., different, resist, soothe,

flow), irrelevant words (e.g., forget, chair), and nonwords (e.g., iocabu, oxitil). Two stimulus lists were constructed to control for the order in which the target words appeared.

Participants were then asked to reflect on the fur evaluation task and complete five items that assessed the experience of flow. They indicated the extent to which they felt they were experiencing something rough, going against the flow, doing something different, agitating something or someone, and experiencing resistance along scales from 0 (not at all) to 10 (very much). After a suspicion check to gauge if they had connected the first two tasks (none did), participants provided demographic information, and were thanked, debriefed, and dismissed.

Results

Manipulation Check of Flow. Participants' responses to the manipulation-check items were averaged ($\alpha = .77$) and analyzed as a function of flow and type of experience. As expected, participants reported that they felt like they were "going against the flow" to a greater extent in against-flow conditions ($M_{\text{against_flow}} = 3.84$, $SD = 1.54$) than in with-flow conditions ($M_{\text{with_flow}} = 2.82$, $SD = 1.73$; $F(1, 131) = 10.82$, $p < .01$). This difference was not contingent on the type of experience they had, $F(1, 131) = 2.91$, $p > .10$. The main effect of type of experience was not significant, $F < 1$, $p > .48$.

Evaluations of the Fur. Participants' liking for the fur and their evaluations of how good it would look were averaged ($r = .68$, $p < .01$) and analyzed as a function of flow and type of experience. Participants in the dynamic self-experience condition evaluated the sample more favorably ($M_{\text{dynamic_self_experience}} = 6.92$, $SD = 1.32$) than those who merely observed the action ($M_{\text{dynamic_observed_experience}} = 5.45$, $SD = 1.78$), with the latter condition being more favorable than when they viewed a still image of the fur ($M_{\text{observed_static_image}} = 4.44$, $SD = 2.00$), $F(1, 130) = 26.24$, $p < .01$. This is consistent with previous evidence that touching a product increases liking for it (Peck and Wiggins 2006). However, this effect did not depend on the experience of flow ($F = 1.22$, $p > .29$), the main effect of which was also not significant ($F < 1$, $p > .89$). Furthermore, these differences cannot explain the effects obtained, since increased liking of the product should not necessarily lead to a higher likelihood of choosing a normatively less preferred option in a different choice setting.

Preference for the Less Preferred Options. The number of less preferred options that participants chose could range from 0 to 2. A one-way analysis of variance on this index as a function of the seven conditions showed that the seven conditions were significantly different from one another $F(6, 151) = 2.14$, $p = .05$. Next, a 3 (type of experience) \times 2 (flow condition) analysis was conducted on this index. Results are tabulated in table 1.

TABLE 1

EXPERIMENT 2B: MEAN (SD) NUMBER OF SELECTIONS OF THE LESS PREFERRED OPTIONS AS A FUNCTION OF FLOW AND TYPE OF EXPERIENCE

	Control	Flow	Against flow
No-flow experience	0.85 ^{ab} (0.66)		
Dynamic observed experience		0.95 ^{ab} (0.60)	0.75 ^{ab} (0.70)
Static observed experience		1.04 ^b (0.66)	0.65 ^a (0.58)
Dynamic self experience		0.59 ^a (0.68)	1.07 ^b (0.60)

NOTE.—Mean number of choices of the less preferred options range from 0 to 2.

—Means with common superscripts do not differ at $p < .05$.

Although there were no main effects of experience type or flow on the number of less preferred options that were selected ($F < 1$), the predicted interaction involving the two variables emerged, $F(2, 151) = 6.35$, $p < .01$. Planned contrasts indicated that, in the dynamic self-experience condition, people were more likely to choose the less preferred options when they had gone against the flow than when they had gone with the flow ($M_{\text{against_flow}} = 1.07$, $SD = 0.60$ vs. $M_{\text{with_flow}} = 0.59$, $SD = 0.68$; $F(1, 151) = 8.12$, $p < .01$). This pattern of results replicates that shown in previous experiments. Interestingly, participants in the dynamic observed experience condition did not vary significantly in the number of less preferred options they chose ($M_{\text{against_flow}} = 0.75$, $SD = 0.70$ vs. $M_{\text{with_flow}} = 0.95$, $SD = 0.60$; $F < 1$, $p = .35$). In the observed static experience conditions, when participants merely looked at a static picture of fur that looked ruffled versus smooth, their preference for less preferred options were reversed ($M_{\text{against_flow}} = 0.65$, $SD = 0.58$ vs. $M_{\text{with_flow}} = 1.04$, $SD = 0.66$; $F(1, 151) = 3.83$, $p = .05$), suggesting that they perhaps felt motivated to smooth the fur and go with the flow.

Lexical Decision Task: Responses to Target Words. Participants' reaction time to target words (soothe, flow, different, resist) were averaged and submitted to a one-way analysis of variance involving the seven experimental conditions. As expected, the conditions were not significantly different from each other ($F = 1.66$, $p > .13$). A follow-up analysis involving the two levels of flow and three levels of experience type also revealed that the interaction of the two variables on reaction time to target words was not significant ($F = 1$, $p > .36$). There was also no main effect of flow ($F < 1$, $p > .76$). However, there was a significant main effect of experience type on reaction time to target words ($F(2, 152) = 3.04$, $p = .05$), which showed that those in the dynamic observed experience condition were 71.31 ms faster at recognizing the target words

($M = 625.77$, $SD = 22.81$) than those in the dynamic self experience condition ($M = 697.08$, $SD = 19.11$; $F(1,152) = 5.75$, $p < .02$). Further, the reaction time to target words in the observed static experience condition ($M = 652.06$, $SD = 22.53$) was not significantly different from that in the self experience condition ($F = 2.32$, $p > .12$) or the observed dynamic experience condition ($F < 1$, $p > .41$). However, given that these differences in reaction time to the words were not contingent on flow experiences, they cannot account for the effects of flow on preferences.

Discussion of Experiments 2A and 2B

The two experiments in conjunction provided important insights. First, experiment 2a demonstrated the importance of the motor aspect of the sensorimotor experience (“going against the flow”). Participants who actually used their hands to simulate going against the flow were more likely to choose the less preferred option, whereas those who merely touched the fur did not show this effect. It is worth noting that in the static condition, participants were also exposed to the fur as being “ruffled” or “smooth.” Thus, the visual input was kept the same and the experiences differed only in the extent to which the experience was dynamic. The experiment also ruled out the possibility that the results were driven by participants’ mood and feelings of irritation that might have been elicited in the against-flow conditions.

Second, experiment 2b showed that participants must experience the bodily sensation of going against the flow in order for flow to influence consumer choices. That is, observed experiences do not trigger a similar reaction. It is worth considering these results in light of the finding that imagined experience (experiment 1b) produces an effect. Imagining an experience requires that people put themselves in the situation (Jiang et al. 2014), and if they are able to do so successfully, the hypothesized effects occur.

Third, experiment 2b suggests that the effects are not driven by the activation of semantic concepts. As noted earlier, the observed effects on preference for the less preferred options could have been driven by the activation of semantic concepts such as different or resist. However, the lexical decision task revealed that target descriptive words were not differentially activated as a result of the experience. In other words, the descriptive aspects of the fur (i.e., its appearance of being ruffled or smooth) did not elicit any semantic concepts that could then be used as a basis for determining preferences. If anything, viewing a still image of ruffled fur appeared to evoke the motivation to go *with* the flow. This was suggested by the fact that even fewer people chose the less preferred option when they saw the ruffled fur sample than when they saw the smooth fur sample. Even though null results ought to be treated with caution, these findings are consistent with our assumption that bodily experiences that are often dynamic

and hard to label might exert their influence through the subjective feelings they elicit and the use of these feelings as information in new situations. When participants make a decision about whether to pick a preferred option or one that is less preferred, their subjective feelings of flow dictate what they feel like doing. Additional evidence for this is presented in experiments 4a and 4b.

EXPERIMENT 3: GOING AGAINST ONE’S INITIAL INCLINATION

The proposed conceptualization also assumes that people have a preference for the normatively stronger option but that they go against this initial preference. That is, participants might have a preference but then decide to deviate from it. If this conceptualization is correct, feelings of going against the flow activate a behavioral disposition to go against one’s initial inclination. Experiment 3 determined if the tendency to choose options that are less preferred as a function of the experience of going against the flow is likely to be the result of internal feeling states that make people go against their initial inclination.

Method

Design. One hundred twenty-one university students (51.2% female) participated in the experiment for extra credit. The participants were randomly assigned one of two flow conditions (with and against flow). They were run individually, and their eye movements during choice were tracked with a Tobii eye-tracker to determine if participants revealed more back-and-forth movement between the options or greater time spent on the one they eventually chose.

Procedure. The procedure to induce flow was similar to experiment 1a. After a brief evaluation of the sample to experience going with or against the flow, participants moved on to a product preference task in which they were asked to choose between the two chocolate options presented in experiment 1b. After reporting their preference, participants indicated (a) how much they felt like trying something different when making their choice between the two chocolate options, and (b) how much they were influenced by what they thought others liked along scales from 0 (not at all) to 10 (very much). Then, their reactions to the chocolate options were measured. They indicated (a) how much they liked each option, (b) how different they thought each option was from a typical chocolate, (c) how appealing they thought each option was to most people, and (d) how much they felt like going against their initial inclination when they made their choice, along similar scales. Participants then reported the extent to which they felt they were going against the flow when they moved their hands through the fur sample along a scale from 0

(not at all) to 10 (very much). Following this, suspicion checks and demographic information were collected; participants were thanked, debriefed, and dismissed.

Results

Manipulation Check. Participants reported that they felt like they were “going against the flow” to a greater extent in the against-flow conditions ($M_{\text{against_flow}} = 5.92$, $SD = 2.64$) than in with-flow conditions ($M_{\text{with_flow}} = 3.23$, $SD = 2.58$), $F(1, 119) = 32.06$, $p < .01$.

Choice of the Less Preferred Option. A binary logistic regression indicated that participants were more likely to choose the less preferred option when they had gone against the flow than when they had gone with the flow ($M_{\text{against_flow}} = 59\%$ vs. $M_{\text{with_flow}} = 42\%$; $B = -.70$, $SE = .37$, Wald $\chi^2(1) = 3.61$, $p = .058$).

Wanting to Try Something Different. Participants felt like they wanted to try something different to a greater extent when they went against the flow ($M_{\text{against_flow}} = 5.11$, $SD = 2.56$) than when they went with the flow ($M_{\text{with_flow}} = 3.92$, $SD = 2.40$), $F(1, 119) = 7.05$, $p = .009$. However, there were no differences in the extent to which they were influenced by what they thought others liked ($F < 1$, $p = .345$).

Thoughts about Chocolate Options. As in previous experiments, there were no significant differences in how much each option was liked, or perceived as being different, or was considered appealing to most people in the two flow conditions ($ps > .19$).

Going Against Initial Inclination. Participants reported that they felt like they were “going against their initial inclination” to a greater extent when they went against the flow ($M_{\text{against_flow}} = 4.26$, $SD = 1.97$) than when they went with the flow ($M_{\text{with_flow}} = 3.28$, $SD = 1.75$), $F(1, 119) = 8.33$, $p = .005$.

Eye-Tracking Measures. Participants who went against the flow spent marginally more time looking at decision alternatives ($M_{\text{against_flow}} = 30.41$, $SD = 7.64$) than those who went with the flow ($M_{\text{with_flow}} = 28.19$, $SD = 6.78$), $F(1, 119) = 2.86$, $p = .093$. Thus, the tendency to go against their inclination may have made them spend a little more time on the decision alternatives. All other eye-tracking measures (time spent on each option, number of switches between two options, saccades, etc.) were not significant (all $F_s < 2$).

Discussion

Experiment 3 provides further evidence that the experience of going against the flow is internal and subjective, and that it makes people want to go against their initial inclination and try something different. The fact that the

chocolate options did not differ in terms of whether they were considered appealing to most people also eliminates the ambiguity regarding whether participants' preferences are based on subjective perceptions of a product's popularity with other consumers. Further, as the eye-tracking data suggest, participants appear to pause a bit while making their choice after they have gone against the flow. This corroborates the idea that participants go against their initial inclination and take more time to make their decision. It is worth pointing out that this tendency to go against one's initial inclination could simply be cognitively driven. That is, participants who went against the flow could have deliberated more on their choice because they were more involved or careful. If, however, the sensorimotor experience of going against the flow elicits subjective feelings of wanting to go against their initial inclination or elicits an urge to do something different, then misattributing these feelings and urges to something else should eliminate the effect. Experiment 4a provides evidence in support of such a feeling-based explanation, and experiment 4b uses the same misattribution paradigm to show that the more dynamic the experience is, the more likely it is that affect elicited by the experience is used as a basis for decisions.

EXPERIMENT 4A: MISATTRIBUTION OF SUBJECTIVE FEELINGS

Method

Design. One hundred eighteen business undergraduates (57% female) participated in the experiment for extra course credit. They were randomly assigned to cells of a 2 (flow experience: going against the flow vs. with the flow) \times 2 (attribution: misattribution of feelings vs. no misattribution) between-subjects design.

Procedure. Participants were introduced to the experiment with instructions similar to those in experiment 1a. However, those in the attribution conditions were also told that the department monitors research conditions and how participants are feeling at different points in the day and that if they were asked a few questions about this, they should answer them based on how they were feeling at that point.

Participants were then given the first study, which was ostensibly for a design firm, and under that pretext evaluated the sample along the same scales that were used in previous studies. Then, they were told that their responses are often more reliable after they have had some time to think about it, and on this pretense were given the product preference task employed in experiment 1b. Participants in no-misattribution conditions proceeded to this task directly. However, those in misattribution conditions were told that others had reported that the room in which the experiment was being conducted had made them feel

uncomfortable, and then were asked to report how comfortable they personally felt at the moment on a scale from -5 (very uncomfortable) to $+5$ (very comfortable), and whether they were experiencing any sensations that did not “feel right” (yes or no) before they moved on to the product preference study.

In the product preference task, participants were asked to choose between two different brands of chocolates. After doing so, they indicated how much they liked each chocolate, how different they thought each chocolate was from a typical chocolate, and how appealing each chocolate was to most people along scales from 0 (not at all) to 10 (very much). Finally, participants indicated whether the first product sample task influenced their responses to the second choice task, and indicated what they perceived to be the purpose of the study. Participants also provided some demographic information, and then were thanked, debriefed, and dismissed.

Results

Unlike other studies in which participants did not link different parts of the study, in this experiment twelve participants indicated that the first fur evaluation task influenced their responses in the chocolate choice task. This could indicate that the instructions explicitly sensitized participants to their feelings and they were more likely to come up with hypotheses relating the various aspects of the experiment. These participants were excluded from the analyses to be reported. That left us with 106 participants (51.9% female) in the analysis. Analyses including these participants did not change the conclusions reported.

Manipulation Check. Participants reported that they felt they were going against the flow to a greater extent in the against-flow conditions ($M_{\text{against_flow}} = 7.83$, $SD = 2.99$) than in with-flow conditions ($M_{\text{with_flow}} = 2.85$, $SD = 2.21$), $F(1, 102) = 79.22$, $p < .01$.

Fur Sample Evaluation. Analyses of participants' ratings of the fur were analyzed as a function of flow and attribution conditions and yielded no significant effects ($F_s < 1.5$).

Choice of the Less Preferred Option. A binary logistic regression analysis of product preference as a function of flow and attribution conditions yielded a significant interaction of these variables (Wald $\chi^2(1) = 4.40$, $p < .04$). Consistent with expectations, participants in no-attribution conditions were more likely to choose the less preferred option if they had gone against the flow in the fur evaluation task ($M_{\text{against-flow}} = 51.7\%$) than if they had gone with the flow ($M_{\text{flow}} = 23.3\%$), Wald $\chi^2(1) = 4.88$, $p < .03$. On the other hand, when participants were able to misattribute their feelings to the room, this difference was not evident ($M_{\text{against-flow}} = 26\%$ vs. $M_{\text{flow}} = 37\%$; Wald $\chi^2(1) < 1$). There were no main effects of sensorimotor experience of

flow or misattribution on chocolate choice (Wald $\chi^2(1) < 1$, Wald $\chi^2(1) = 1.26$, respectively).

Evaluations of the Less Preferred Option. Participants' liking for the less preferred option was affected in a similar manner. Analyses of these judgments yielded a marginally significant interaction of flow and attribution conditions, $F(1, 102) = 3.33$, $p = .07$. Although participants in misattribution conditions reported greater liking for the less preferred option when they went against the flow ($M_{\text{against_flow}} = 7.66$) than when they went with the flow ($M_{\text{flow}} = 6.43$), $F(1, 102) = 4.43$, $p < .05$, this difference was not evident when participants could attribute their feelings to the room ($M_{\text{against_flow}} = 6.39$, $M_{\text{flow}} = 6.79$, $F < 1$, $p > .56$). However, because of the lack of effects observed for judgments in previous studies on this variable, this result should be treated with caution.

As in other experiments, there were no differences in estimates of how different the less preferred option was from a typical chocolate ($F < 1$, $p > .50$) or how appealing they thought each chocolate was to others ($F < 1.5$, $p > .23$). Thus, participants did not pick this option for these reasons. Rather, they appeared to be using their subjective feelings as an input in choice. When these feelings were misattributed to an alternate source (the room), the effect of the sensorimotor experience on preference was not evident.

EXPERIMENT 4B: ARE DYNAMIC EXPERIENCES MORE LIKELY TO EXERT AN IMPACT THROUGH FEELINGS?

According to the proposed conceptualization, the more dynamic an experience is, the harder it is to describe in simple semantic terms and the more likely it is that the motor component of the experience exerts its influence through a feeling-based route. To assess if this is indeed the case, we gave participants in experiment 4b either a dynamic or a static experience of going against the flow. If the dynamic experience elicits more feelings and exerts its impact through these feelings, then the effects of misattribution should be more evident in the dynamic condition (as seen in experiment 4a) than in the static condition.

Method

Design. Three hundred thirteen business undergraduates (69% female) participated in the experiment for course credit. They were randomly assigned to a 2 (type of motor experience of going against the flow: dynamic vs. static) \times 2 (attribution: misattribution of feelings vs. no misattribution) + control (no flow experience, no misattribution) between-subjects design.

Procedure. Participants were given one of two experiences of going against the flow before they received the product preference task used in experiment 4a. In the dynamic against-flow condition, participants were asked to test the sample of fur by moving their hands against the direction of hair growth. In the static against-flow condition, participants were asked to merely touch a fur sample that had previously been ruffled by the experimenter. Participants in no-misattribution conditions then proceeded to the product preference task, whereas those in misattribution conditions were given an opportunity to misattribute any feelings or urges they were experiencing to the room as in experiment 4a. Participants in the control condition did not receive the fur sample task or the misattribution manipulation and proceeded directly to the product preference task. After indicating their preference, all participants completed manipulation checks of going against the flow using similar scales as in previous studies. Then, after a suspicion check to see if participants linked the two tasks, they provided demographic information, and were thanked, debriefed, and dismissed. As in the previous study, 20 participants made a connection between the two tasks and were omitted, leaving 293 participants in the analysis (68.6% female).

Results

Manipulation Check. Participants reported that they felt they were going against the flow to a greater extent in the against-flow dynamic conditions ($M_{\text{against_flow_dynamic}} = 5.83$, $SD = 3.28$) than in the against-flow static conditions ($M_{\text{with_flow}} = 3.11$, $SD = 2.30$), $F(1, 225) = 52.45$, $p < .01$.

Preference for the Less Preferred Option. A logistic regression analysis on preference for the normatively less preferred option as a function of the five conditions showed that the five conditions were significantly different from one another, $\chi^2(4) = 15.80$, $p < .01$. Planned contrasts showed that the control condition (38%) was significantly different from the dynamic no-misattribution condition (75%; $\chi^2(1) = 14.83$, $p < .001$) and marginally different from the static no-misattribution condition (54.4%; $\chi^2(1) = 3.07$, $p < .10$). However, as expected, the control condition was not different from the misattribution conditions (all $\chi^2(1) < 2.5$, $p > .10$). Additional contrasts revealed that the dynamic no-misattribution condition was significantly different from all other conditions (table 2).

Discussion of Experiments 4a and 4b

As noted earlier, feelings of going against the flow activate a schematic representation of past experiences. These representations could contain features of the original experience, semantic concepts that have become associated with it, affective reactions, and the associated behavioral

TABLE 2

EXPERIMENT 4B: PERCENT OF SELECTIONS OF THE LESS PREFERRED OPTIONS AS A FUNCTION OF FLOW AND TYPE OF EXPERIENCE

	Misattribution	No attribution
No-flow experience		38.0% ^a
Static against-flow experience	46.6% ^{ab}	54.4% ^{ab}
Dynamic against-flow experience	52.6% ^{ab}	74.6% ^c

NOTE.—Means with common superscripts do not differ at $p < .05$.

response. The effects of such experiences could be through either the semantic concepts that are elicited when one has the experience or the affective reactions and their associated behavioral tendencies that are elicited. The proposed conceptualization suggests that the complex nature of these sensorimotor experiences comes from the motor component and makes the experience hard to label in purely semantic terms. Consequently, in these cases, affective reactions are more likely to produce the effect. Experiment 4a tested this using a classic misattribution paradigm from Schwarz and Clore (1983). If the effects were guided by feelings, then attributing these feelings to another source should eliminate the effect. This was the case.

It is worth noting that these feelings do not refer to a person's mood or any specific emotion. Rather, they are diffuse subjective feelings of the sort one experiences when one engages in sensory exploration. Given that these feelings of going with or against the flow are not experienced as pleasant or unpleasant, it is not surprising that judgments of the fur sample or of the options selected were not affected in most studies except marginally in experiment 4a.

Experiment 4b provided additional support for the proposition that the more dynamic an experience is, the more likely it is to elicit feelings and exert an impact on preferences through a feeling-based mechanism. The misattribution manipulation had an effect largely in the dynamic against-flow condition, as preference for the less preferred option dropped from 74.6% to 52.6%. This was less apparent in the static against-flow experience and lends support to the idea that the more dynamic a sensorimotor experience is, the more likely it is that the effects it has will be through a feeling-based mechanism.

EXPERIMENT 5: INTERNAL SUBJECTIVE CRITERIA VERSUS EXTERNAL OBJECTIVE NORMS

Experiment 5 examined whether the effects of these feelings would be evident when an external norm is made salient. Our conceptualization suggests that if the external norm is made clear, participants will be *less likely* to be guided by internal subjective feelings and would be more likely to go with the overtly stated norm. This is predicted

by evidence that people rely on their subjective feelings when objective criteria are not available (see Clore, Schwarz, and Conway 1994 for a review; Schwarz and Clore 1996). Thus, if people are explicitly told that 60% of the people prefer an option, participants will be less likely to be guided by internal subjective feelings that form the basis for their internal norms of behavior and would be more likely to go with the overtly stated norm.

An additional objective of experiment 5 was to determine if the experience of going against the flow activated complex idiomatic expressions and exerted an impact through these idioms. Although simple semantic labels (e.g., different, resist, flow) were not activated as shown in experiment 2b, it is conceivable that these dynamic experiences activate complex idioms. To determine this, we administered an idiom task at the end of the experiment.

Method

Overview and Design. Three hundred eighteen university students (61.3% female) participated in the study for course credit. Participants were randomly assigned to conditions of a 2 (flow: going against the flow vs. going with the flow) \times 3 (external norm: no external norm provided vs. option A preferred by 60% of others vs. option B preferred by 60% of others) between-subjects design and a seventh (no flow, no norm information) control condition.

Procedure. As in previous studies, participants in the two flow conditions were first exposed to the fur evaluation task. After completing the task, they were asked to choose between two chocolate options, one of which (A) was normatively more preferred to the other (B). When an external norm was provided, some participants were told that 60% of the people preferred A (the normatively most preferred option in reality), whereas others were told that 60% of the people preferred B (the normatively less preferred option in reality). In the default no external norm conditions, this information was not provided. Finally, a seventh, no flow/no norm condition was run in which participants did not evaluate the fur sample nor were they given external norm information. After participants indicated their preference, they also indicated how much they liked each option and how different they perceived the two product options to be relative to the typical chocolate along scales from 0 (not at all) to 10 (very much).

Next, to assess whether the experience of experience of going against the flow had per chance activated linguistic metaphors, participants were told that a pretest was being conducted for a doctoral student who was interested in language usage. On this pretext, participants were given a questionnaire containing 10 idiomatic expressions. The expressions included “going against the flow” and “going with the flow” along with fillers (e.g., “there is no smoke without fire,” “you reap what you sow”). Participants were

asked to indicate how likely they were to use the different expressions on a scale from 0 (not at all) to 10 (very much).

As a manipulation check, participants were asked to report the extent to which they experienced the feeling of resistance when they moved their hands through the fur along a scale from 0 (no resistance) to 10 (a lot of resistance). Finally, a suspicion check was administered to see if participants thought the various tasks were related (none did), demographic information was collected, and participants were thanked, debriefed, and dismissed.

Results

Manipulation Check of Flow. Participants reported experiencing a greater feeling of resistance when moving their hands against the direction of fur growth ($M_{\text{against-flow}} = 5.05$, $SD = 2.62$) than when they moved it in the direction of hair growth ($M_{\text{flow}} = 2.50$, $SD = 2.27$), $F(1, 257) = 70.85$, $p < .01$, and this effect was not contingent on norm type ($F < 1$, $p > .48$). These feelings also did not vary as a function of norm type, as evidenced by a nonsignificant main effect of norm type ($F < 1$, $p > .65$).

Chocolate Preference. Consistent with earlier pretests, the control (no flow/no norm) condition revealed that the less preferred option was B (38%). A binary logistic regression conducted on choice of the less preferred option as a function of the seven conditions showed that these conditions were marginally different from one another (Wald $\chi^2(6) = 10.82$, $p < .10$). The mean preference of the less preferred option in each condition is shown in table 3.

Planned contrasts showed when no external norm information was provided (i.e., the default conditions), participants who went against the flow were more likely to choose the less preferred option B (65.8%) than either those who experienced going with the flow (42%; Wald $\chi^2(1) = 4.79$, $p < .03$) or those in the control condition (38%; Wald $\chi^2(1) = 6.48$, $p = .01$). Thus, consistent with experiment 1, the effect was localized in the going against the flow condition.

However, if an external norm was provided, participants went with that norm information. That is, when the external norm suggested that A was the most preferred (which in reality was true), people were more likely to pick this option, and preferences for the less preferred option B were the same going both against the flow and with the flow ($M_{\text{against-flow}} = 40.8\%$ vs. $M_{\text{flow}} = 44.7\%$; Wald $\chi^2(1) < 1$). If the external norm information that was given indicated that B was the most preferred option (even though in reality it was not), people picked that option and there were no differences in choice of that option as a function of flow ($M_{\text{against-flow}} = 56\%$ vs. $M_{\text{flow}} = 56.4\%$; Wald $\chi^2(1) < 1$).

Although both these proportions were different from the control (see table 3), the absence of any difference between the two flow conditions suggests that this difference from the control can be attributed to the external norm

TABLE 3

EXPERIMENT 5: PERCENTAGE OF PARTICIPANTS CHOOSING THE LESS PREFERRED CHOCOLATE (CHOICE B) AS A FUNCTION OF FLOW AND NORM INFORMATION PROVIDED

	Control	Flow	Against flow
No norm/no flow	38.0% ^a		
No norm provided		42.0% ^a	65.8% ^b
"60% prefer A" (incorrect information provided)		40.8% ^a	44.7% ^{ab}
60% prefer B (correct information provided)		56.0% ^{ab}	56.4% ^{ab}

NOTE.—Means with common superscripts do not differ at $p < .05$.

information provided and that it was not affected by the flow experience. However, in the condition where no external norm information was provided and people had experienced going against the flow (vs. not), people used the feelings elicited by this experience to go against what they would have normally picked.

Use of Idiomatic Expressions. The target idioms "go with the flow" and "go against the flow" were combined into a single item ($r = .44, p < .01$) and analyzed as a function of flow and norm conditions. Participants who went against the flow reported that they were more likely to use the target idioms ($M_{\text{against_flow}} = 4.79, SD = 2.54$) than those who went with the flow ($M_{\text{flow}} = 4.30, SD = 2.05$), $F(1, 257) = 3.03, p = .08$, suggesting that the former group was more likely to use both idioms (i.e., go with the flow and go against the flow) in against-flow conditions.

Discussion

The findings from experiment 5 suggest that the feeling of going against the flow is internal and subjective. When participants are either able to attribute the feeling to something else (experiment 4a) or have some other clear criteria to rely on (experiment 5), the effect on preference for the less preferred option is not evident. Experiment 5 clearly provides a boundary condition for the effect. However, it also suggests that the effect of such bodily experiences might be more ubiquitous. In many instances, people do not have clear, unambiguous information about what is preferred and what is not preferred. In such instances, experiences that involve going against the flow might lead to choices that deviate from what one would typically have chosen. Experiment 5 explored this possibility and disentangled whether participants were going against internal preferences or possible external norms that were obvious.

Interestingly, people who had gone against the flow were also more likely to use both the idiomatic expressions "going against the flow" and "going with the flow." This suggests that going against the flow might increase the use of such idiomatic expressions that capture the sensorimotor

experience they have just had. However, the activation of both of them together negates the possibility that they could have accounted for our results. It is also possible that the use of such idiomatic expressions is likely an epiphenomenon or consequence of having had the sensorimotor experience of going against the flow and not the reason for our results.

GENERAL DISCUSSION

The current research suggests that sensorimotor experiences of going against the flow can have intriguing behavioral effects. Specifically, the subjective feeling of going against the flow increased consumers' preferences for options that are normatively less preferred. Our conceptualization suggests that such sensorimotor experiences, which involve both movement and have direction, are represented in memory schematically. Re-experiencing these sensations activates the schema and elicits subjective feelings that trigger behavioral dispositions of going against one's initial inclination. Experiments 1a and 1b documented the basic effect using two different manipulations. They also suggested that the effects are localized in going against the flow conditions (experiment 1a), and that imagining these sensations affects choices in the same way that actually experiencing them does (experiment 1b). Experiments 2a and 2b showed that these effects of consumer preferences are evident only when the sensations are dynamic and self-experienced, providing further support for the fact that the motor component is responsible for the effects we observed. Unlike findings by Zhang and Li (2012), the current effects cannot be explained in terms of semantic priming alone (experiment 2b). A feeling-based explanation where participants go against their initial inclination appears more plausible (experiments 3, 4a, and 4b). Moreover, these feelings appear to come into play only when other objective norm information is unavailable (experiment 5).

Several aspects of this work are noteworthy. We conceptualized many of the bodily experiences that have been studied as varying in terms of how dynamic or static they were. Although some past research has focused largely on bodily experiences that are relatively static and can be described in terms of descriptive labels (e.g., warm, fishy, heavy), others have looked at body movements (e.g., arm flexion and extension, head movements) that are relatively harder to describe with simple, semantic expressions. Whereas some of the former experiences have been shown to activate semantic concepts that are then applied in a new situation (Zhang and Li 2012), the latter, more dynamic sensorimotor experiences appear to exert their influence through a different mechanism. The motor component of "going against the flow" provides information about how one should behave through the feelings associated with it.

The sorts of subjective feelings evoked by these experiences should not be confused with other feeling states like

moods and emotions. They are akin to those associated with sensory exploration (Schwarz 2012). In fact, in some cases, they might not be strongly valenced (i.e., seen as positive or negative experiences) but could nevertheless be used as inputs in decision making. In the current research, these feelings of going against the flow rarely yielded any significant effects on attitudes. Yet the reactions that were elicited had implications for the decisions people made, and when these feelings were misattributed to something else, the effects on choice were not evident. Thus, dynamic sensorimotor experiences might elicit feelings that operate like most affective reactions and provide inputs in decision making.

The fact that experiences that are relatively more dynamic appear to be driven by feelings rather than through the activation of semantic concepts associated with the sensation is corroborated by two findings. First, when participants were able to attribute the feelings to an alternative source, the effects on choice were no longer evident, suggesting that feelings were the basis for the judgments being made (see experiment 4a). Second, the more dynamic the experience of going against the flow, the more likely it was to elicit feelings that could be misattributed (see experiment 4b). Third, feelings were more likely to have an effect when no other objective criteria were presented and people relied on their own internal sense of flow (experiment 5). When objective norm information was provided, however, they relied on this information instead. Further, semantic concepts did not appear to be activated differentially by the two experiences. Although null findings cannot be used to prove that semantic concepts were not activated, support for a feeling-based mechanism suggests that a different process guided the effects on what people chose.

It is worth noting that the feeling-based reactions noted here are different from a conditioned affective response. Conditioning is restricted to the situations that have led to the conditioned response. It should not affect judgments in other situations (e.g., a second, unrelated task) as it did in the current research. Rather, it appears to be more similar to the type of subjective feelings described by Schwarz (2012). These feelings include affective reactions as diverse as moods, emotions, metacognitive experiences, and bodily sensations, but are likely to follow the same principles. That is, they provide a valid source of information when they pertain to the target that elicits them, but their effects can generalize to other, unrelated situations unless people attribute them to another source, undermining their informational value for the task at hand. The sensorimotor experience of going against the flow provided such affective input that made people want to go against their natural inclination (experiment 3).

Another aspect that is worth noting is that the dynamic aspect of the experience appears necessary, as static conditions did not yield similar effects. Further, self-experience is crucial for the effects on choice to be evident. This self-experience can be real or imagined. The more visceral or

real the imagined experience is, the more likely it is that it will have the hypothesized effects. Simply observing the experience, however, did not have analogous effects. Observing someone else engaging in the experience is not the same as having the experience because it requires a shift in perspective that can take away from the vividness of the experience (Elder and Krishna 2012; Jiang et al. 2014). The fact that merely observing another's behavior has little effect adds strength to the conclusion that the activation of semantic concepts cannot account for the findings because such concepts are equally likely to be activated through observation.

The results presented here are important theoretically because they examine more dynamic sensorimotor experiences and bring in the role of self-experience and feelings in decision making. To our knowledge, this distinction between relatively static and dynamic sensorimotor experiences has not been clearly articulated and examined before. We consider this research important because it goes beyond the descriptive representation of sensations to a consideration of motor aspects of sensorimotor experiences. Such experiences, because they involve action and direction, possess the power to alter not just judgments but also what people choose in unrelated situations (i.e., their behavior). Past research that examines motor actions (e.g., arm flexion and extension) has focused largely on attitudinal responses and not choice (particularly choice of options that are normatively not superior). The current research adds to this body of literature.

We used a broad framework to conceptualize these effects and suggested that two assumptions were necessary to explain these effects. First, recurring everyday experiences must be represented in some nonverbal schematic form (Johnson 1987). Second, for these experiences to have an effect in unrelated situations, some aspect of the experience has to be used in the new situation. What might that aspect be? We suggested that these nonverbal schematic representations are made more accessible when an individual re-experiences some of the sensations that led to the formation of the original representations. As a consequence, semantic concepts, affective reactions, and behavioral responses associated with these schematic representations are also made accessible and used as a basis for understanding other types of situations. The more static and easy to label the experience is, the more likely it is that semantic concepts will be elicited and will lead to effects through the activation of these labels. The more dynamic the experience is, the more likely it is that the underlying process that affects behavior will be through an affect-based path. This conceptualization is flexible enough in that it allows us to examine different underlying cognitive mechanisms (e.g., the activation of semantic concepts, feelings, behavioral dispositions, and linguistic metaphors).

Our conceptualization has some features in common with other existing ones (Niedenthal et al. 2005; Reimann et al. 2012). For instance, Niedenthal et al. (2005)

conceptualize many embodied experiences using Barsalou's (1999) perceptual symbols system. Our conceptualization recognizes similar representational systems but uses the concept of image schemas to identify how these early experiences might be coded in multiple sense modalities. While their conceptualization may aid in understanding how these representations are retrieved, our focus is more on understanding how the retrieval of these different experiences exerts an impact in unrelated domains through multiple pathways. As we note, the static-dynamic nature of the experience might play an important role, with more dynamic experiences exerting an effect through an affect-based route. Similarly, although Reimann et al. (2012) make a distinction between bodily experiences (e.g., arm/face/hand movements or actions) and sensory perceptions (touching, smelling, etc.), the conceptualization presented here examines sensory experiences that might be driven by motor actions. As we have noted, the motor action might fundamentally change the sensory experience.

The current research also has substantive implications. When people have to choose between two alternatives, it is very common for them to go with the normatively preferred option. Yet, as suggested earlier, people might want to maintain some level of distinctiveness and be different (Brewer 1991; Snyder and Fromkin 1980). The vagaries of choice are often hard to predict. Experiment 5 shows that people who went against the flow were more likely to choose normatively less preferred options when no obvious external norm information is present. It is worth noting that marketers often fail to indicate which items are preferred and, in these cases, consumers are likely to use their own internal sense of flow to make their choices. Bodily experiences that result from walking in the direction that is opposite to store traffic, or touching sample materials in a certain way, might disrupt this sense of flow and lead consumers to choose options that are less preferred. Although the experiments we conducted examined the effect of flow experiences on what people chose in a hypothetical choice task, the effects in a realistic environment are not expected to be different. In today's online environment, many choices are made under similar conditions (e.g., people pick an option they like on a computer, or choose which cable plan they would like on a form). Thus, although some realism was compromised in the lab experiments that were conducted, the choice domain was varied to include different products, and different manipulations of flow were also examined.

To summarize, we have shown that sensorimotor experiences of going against the flow, although nonconscious, can have intriguing behavioral effects on people's preferences. These feelings of flow are important but have rarely been studied in the context of behavioral norms. Although the current work used only two manipulations of going against the flow (for reasons of control), it is a first step and paves the path for additional work on how people use their own sense of flow to make decisions about what to choose, what to

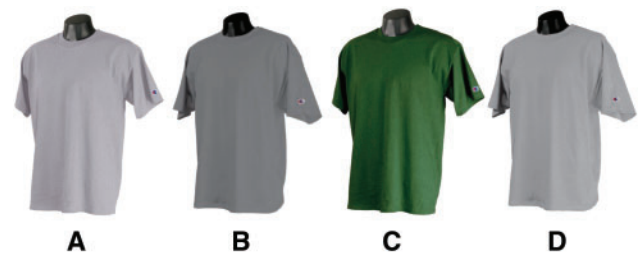
oppose, and what to say. Future research can be extended to consider similar types of dynamic sensorimotor experiences and the role of volition in the experience of different types of flow experiences. Additional substantive implications of this work are possible, as it might be feasible to encourage risk taking, variety seeking, activism, and other such behaviors by disrupting one's sense of flow.

DATA COLLECTION INFORMATION

The first author collected data for studies 1a and 4 under the supervision of the second author at a behavioral lab at the University of Illinois Urbana-Champaign in fall 2010 (study 1a) and fall 2013 (study 4). The first author supervised data collection by research assistants in the behavioral lab at the University of Louisville for study 2a (spring 2016). The second author supervised data collection by research assistants in the behavioral lab at HKUST for studies 2b and 5 (spring 2013), study 3 (fall 2014), and study 4b (spring 2017). Data for study 1b was collected on MTurk in 2016. The first author analyzed all the data.

APPENDIX A

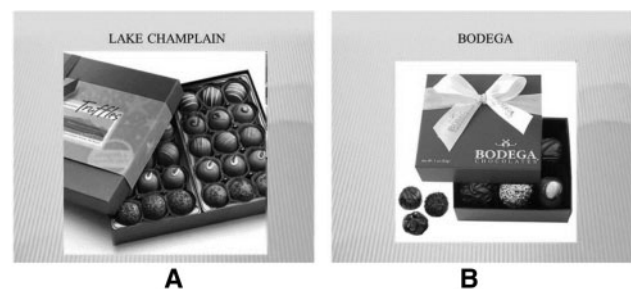
EXPERIMENT 1A T-SHIRT OPTIONS



NOTE.—Third T-Shirt from left in a green shade. See online version for color enhancement.

APPENDIX B

EXPERIMENTS 1B, 2A, 3, 4, AND 5 CHOCOLATE OPTIONS



APPENDIX C

EXPERIMENTS 2B JEWELRY OPTIONS



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