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Research report

I take therefore I choose? The impact of active vs. passive acquisition on food consumption

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ABSTRACT

This research investigates the consequences of physically taking (actively acquiring) vs. receiving (passively acquiring) food items. Specifically, we demonstrate that the act of physically taking food can generate a false impression of choice, an effect we term "embodied illusion of choice." Across two studies, we document the mediating effect of this embodied illusion of choice on food evaluation and actual consumption, and show that these effects are moderated by an individual's need-for-control.

Introduction

In general, we tend to take things we choose. A child, for example, reaches out to grab the toy she chooses to play with at the time. Adults display similar behavior: we reach out and grasp our desired snack from a refrigerator, our favorite book from a bookshelf, and our preferred brand from a store shelf. On the other hand, we are often given things we do not choose. A loved one might hand us a gift they have picked out for us; a child might find unsolicited vegetables piled onto his or her plate. Perhaps then, this distinction between taking and receiving has built a pattern in our minds: we take what we choose, but are given what we do not choose. Might it be the case that if this blueprint is cemented in our minds, the simple physical act of reaching for and taking an object makes us feel as though we are choosing that object? In other words, even in instances where there is no actual choice, might active acquisition of objects create an illusion of choice nonetheless?

This research investigates the consequences of physically taking (actively acquiring) vs. receiving (passively acquiring) equivalent food items. We demonstrate that physically performing such active vs. passive activities can alter an individual's perception of choice. Specifically, we show that even when there is no true choice available, the act of physically taking food items can generate a false impression of choice, an effect we term "embodied illusion of choice." We further argue that this illusion can have meaningful consequences on an array of downstream variables including food evaluation and food consumption.

While there is a well-developed literature surrounding the provision of choice, our research adds to extant work by suggesting that a false sense of choice can manifest under non-choice conditions. Incorporating theories of embodied cognition, we contribute by documenting one particular means for creating an illusion of choice, suggesting that mere physical sensations can foster feelings of choice in an individual via active (vs. passive) acquisition. Importantly, by demonstrating the impact of this illusion on food evaluation and consumption, our work supplements existing literature on incidental cues that non-consciously impact eating behavior. In sum, we document the effects of such "embodied illusion of choice," establish boundary conditions for the effects, and examine the mediational role of illusion of choice.

Incidental influences on eating behavior

A growing body of research has documented the ability of incidental cues to impact eating behaviors, both in terms of food evaluation and consumption volume (how much one eats). In the area of taste perception, the existing literature has demonstrated that various extraneous variables impact both overall evaluations of foods and beverages, as well as flavor-specific perceptions. For example,

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hedonic evaluations of food items differ when individuals are primed with health (Connell & Mayor, 2013), or depending on the time of day the food is consumed (Kramer, Rock, & Engell, 1992). In addition, variables associated with eating or drinking implements have also been shown to shape taste perceptions. Specifically, research has documented the ability of cutlery weight (Piqueras-Fiszman & Spence, 2011), plate/bowl color (Harrar, Piqueras-Fiszman, & Spence, 2011), glassware shape (Hummel, Delwiche, Schmidt, & Hüttenbrink, 2003), and other implement-specific factors to impact people's reported evaluations of foods and beverages. Further, the eating environmental itself has been shown to impact taste perceptions of identical foods (Meiselman, Johnson, Reeve, & Crouch, 2000). For example, people reported liking wine more when they tasted it under blue or red lighting than under green or white lighting (Oberfeld, Hecht, Allendorf, & Wickelmaier, 2009). Similarly, environmental auditory cues have also been shown to influence taste perceptions (Spence & Shankar, 2010).

Just as the literature has demonstrated the influence of extraneous variables on taste perceptions, there also exists a wealth of research that documents how such variables impact actual consumption (Stroebele & de Castro, 2004; Wansink, 2004). For example, atmospheric variables such as temperature (Brobeck, 1948; Westerterp-Platenga, 1999), lighting (Lavin & Lawless, 1998), audio stimulation (Bellisle, Dalix, & Slama, 2004; McCarron & Tierney, 1989), and the number of other people eating (Bell & Pliner, 2003) have all been shown to unknowingly impact the amount of food consumed by participants. Similarly, packaging (Krishna & Morrin, 2008; Xiaoyan & Srinivasan, 2013), serving bowl size (Wansink & Cheney, 2005; Wansink, van Ittersum, & Painter, 2006), and portion size (Edelman, Engell, Bronstein, & Hirsch, 1986; Rolls, Morris, & Roe, 2002) have also led to differences in consumption volume.

Cumulatively, the literature overwhelmingly suggests that people are continuously influenced by subtle factors that impact, often nonconsciously, both how much they eat and how good they think food tastes. In this paper, we propose a distinct extraneous factor that influences these food behaviors: active vs. passive acquisition. We argue that this is because actively acquiring food items induces an "embodied illusion of choice," and this feeling leads to increased evaluation and consumption. Thus, we contribute not only by documenting a new antecedent of food behavior, but also by addressing a recent call to explore the psychological mechanisms that drive such effects (Wansink, 2004). In the following sections, we draw from psychology literature to explain why the mere act of physically taking food items would produce this proposed effect.

Embodied gestures

Embodiment research reminds us that our thoughts and feelings are not independent of physical and somatic perception, and bodily sensations do indeed impact how we think and feel (Barsalou, 2008; Varela, Thompson, & Rosch, 1991). This idea may find its root in self-perception theory, which posits that individuals infer their attitudes from their actions, which may include bodily states (Bem, 1972). For example, research has examined the ability of physical gestures, facial expressions, and body postures to induce various feelings and attitudes (Chandler & Schwarz, 2009; Stepper & Strack, 1993; Strack, Martin, & Stepper, 1988; Wells & Petty, 1980; Williams, Huang, & Bargh, 2009). More recent research has documented an "approach-must-equal-pleasure" heuristic, in which embodied cognitions rising from bodily approach to an object lead to more favorable evaluations of the object (Labroo & Nielsen, 2010). Existing literature on grounded cognition has demonstrated the ability of physical gestures to trigger feelings and thoughts of pleasure, pride, and agreement, among other associations. Might then, certain physical gestures signal "choice"? We argue that the gesture of actively taking vs. passively receiving objects can serve to impact individuals' perceptions of choice. It is worth emphasizing that our conceptualization of active vs. passive acquisition differs meaningfully from that of approach vs. avoidance behavior (i.e. Cacioppo, Priester, & Berntson, 1993; Labroo & Nielsen, 2010). In the approach vs. avoidance distinction, the defining difference is arm flexion vs. arm extension, or physically moving toward vs. away from an object. However, in our studies, the target object is acquired under both conditions (both instances entail arm flexion). The major difference stems from the agent of initiation: in the active condition, the individual initiates the acquisition, while in the passive condition, an outside agent acts as the initiator. We argue that this distinction, between initiated (active) acquisition and un-initiated (passive) acquisition, is what drives differences in perceived choice, even when there is no actual choice available. Accordingly, we have coined the increase of such feelings of choice stemming from active acquisition as an "embodied illusion of choice."

If such physical gestures can indeed induce perceptions of choice, what would be the behavioral consequences of such embodied illusions of choice? Specifically, how would this illusion impact an individual's evaluation and consumption of food items? The following section explores the relevance and importance of choice.

The significance of choice on food behavior

Literature on choice supports the general conclusion that individuals react differently under conditions that propose themselves to be choice scenarios (Szrek & Baron, 2007). Choice, in this context, can be defined as a construct involving the presence or absence of the ability to select a preferred option (Averill, 1973). Generally speaking, choice is desirable, and the mere ability to choose is valuable to most individuals (Ryan & Deci, 2000, 2006).

Accordingly, general findings have shown that personally-made choices, as compared to those made by another, lead to more favorable consequences, including improved evaluations (Deci & Ryan, 1985). Among other domains, this effect has been documented in the area of food and beverage evaluation and intake (Botti & Iyengar, 2004; Weber, King, & Meiselman, 2004; Zeinstra, Renes, Koelen, Kok, & de Graaf, 2010). For example, Weber et al. (2004) found that participants ate more salad when given a choice of dressing, and Zeinstra et al. (2010) found that children presented with a choice of vegetables in a restaurant setting showed greater vegetable liking and intake. In fact, early research has even demonstrated that people perceive aversive foods (e.g. grasshoppers) to be less disagreeable if they have chosen to eat them (Zimbardo, Weisenberg, Firestone, & Levy, 1965). In all these examples, consumers were actually given a choice, which ultimately improved evaluations and increased consumption. In line with this research, we propose that a mere illusion of choice, via active acquisition, will similarly increase food evaluations and intake.

The moderating role of need-for-control

The above studies presuppose that choice and autonomy are fundamentally attractive. However, previous literature also suggests that the impact of providing choice may vary for different types of people, implying that perhaps not everybody has an equal desire to choose. For example, individuals who place a lower value on autonomy and the need to control seem to value choice less than those who place a high value on such factors (Snibbe & Markus, 2005). Measurable differences emerge in individuals' need-for-control (Burger & Cooper, 1979), and the construct is often conceptualized as a composite of four related dimensions: general/self-control, leadership/other-control, relinquishing of control and dependence avoidance (Gebhardt & Brosschot, 2002; Parker, Jimmieson, & Amiot, 2009). Unlike those high in need-for-control, individuals low in need-for-control do not always respond to the availability of choice in a pos-

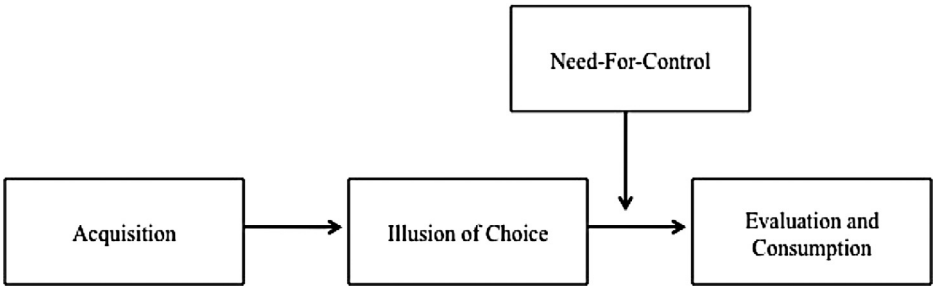

Fig. 1. Proposed model.

itive manner (Chua & Iyengar, 2006; Iyengar, 2011; Snibbe & Markus, 2005). In fact, research has suggested that people low in need-for-control (e.g. Asian Americans and those with collectivistic tendencies) demonstrate lowered evaluations for choice offerings than those high in need-for-control (Iyengar & Lepper, 1999; Kramer, Spolter-Weisfeld, & Thakkar, 2007). Since individuals who are low in need-for-control tend to respond to choice situations less positively than individuals who are high in need-for-control, then we would also expect these low need-for-control participants to respond to an illusion of choice (induced by the active acquisition of food items) in a less positive manner than those high in need-for-control. Thus, based on the extant literature, we hypothesize:

H1: Individuals who actively acquire a food item should demonstrate (i) more positive evaluations of the item, and (ii) increased consumption of the item compared to individuals who passively acquired the same item.

H2: The relationship in H1 is mediated by the illusion of choice.

H3: The impact of the mediator on evaluations and consumption is moderated by an individual's need-for-control, such that increased illusion of choice should only increase evaluations and consumption for those individuals high (vs. low) in need-for-control.

These predictions are summarized in our proposed model (Fig. 1). Since we hypothesize a moderating effect of need-for-control, it is important to highlight the crucial distinction between choice and control. The provision of choice and personal control are distinct constructs, both empirically and theoretically (Inesi, Botti, Dubois, Rucker, & Galinsky, 2011). Extant literature suggests the prerequisite of choice can, under some circumstances, lead to an increased sense of personal control (Rotter, 1966; Taylor, 1989), and that bequeathing individuals with seemingly trivial choices can lead to an illusion of control phenomenon: a perceived sense of personal control when there is no true control over a situation (e.g. when outcomes are objectively dependent on chance; Langer, 1975). However, choice does not always lead to a sense of control, and a sense of control can be achieved through factors other than choice (Botti & McGill, 2006, 2011; Langer, 1975). Thus, generating an illusion of choice may or may not impact an individual's perceived control, and the two illusions remain theoretically distinct.

Our first study provides an initial test of H1 by revealing an embodied illusion of choice effect on participants' evaluation of a candy product. We demonstrate that when participants actively acquire a piece of candy, they evaluate it more highly and are more likely to take another piece than if they passively acquire the candy. Our second study extends the embodied illusion of choice effect to actual consumption, demonstrates the mediational role of illusion of choice (H2), and examines the moderating role of need-for-control (H3). In other words, we wished to test our full model (Fig. 1) by showing that the impact of active (vs. passive) acquisition on evaluation and consumption is due to increased feelings of choice, even though there are no differences in "true choice" (all participants had already consented to try the products, and in neither condition were there options to choose from), and that the increased feelings of choice only lead to increased evaluations and consumption for those high in dispositional need-for-control.

Method

Study 1: candy

Participants and procedure

Ninety-six undergraduate students (38.9% female) from an American university participated in our study in exchange for extra credit. The study was a two-level (acquisition: passive vs. active) between-subjects design. After obtaining informed consent from all participants, the experimenter told participants they would taste and evaluate a piece of wrapped candy, namely, a watermelon-flavored Jolly Rancher. The experimenter's script was identical in both conditions to avoid any effect due to verbal semantics. All candies were uniform in size, shape, and color. The experimenter handed participants in the passive condition a piece of candy from the bowl she was holding. Participants in the active condition took the candy from the experimenter's bowl. Importantly, to ensure that participants' arm extension/flexion in both conditions were identical in both angle and distance, both the bowl (active condition) and the experimenter's hand (passive condition) were presented at approximately five inches above desk height. Further, the experimenter replenished the bowl of candy after each additional participant, to ensure that the number of candies in the bowl was constant across all participants. These precautions were repeated across both studies.

After the manipulation, participants sampled the candy and answered a series of questions. Product evaluation was measured first with a scale of six seven-point items ("Please evaluate the candy you sampled on the following dimensions: 'Dislike (1)/Like (7)', 'Negative (1)/Positive (7)', 'Unfavorable (1)/Favorable (7)', 'Bad (1)/Good (7)', 'Poor Quality (1)/High Quality (7)', and 'Unpleasant (1)/Pleasant (7)'"; $\alpha = .95$); and then with a two-item composite ("I like the way this candy tastes," and "Overall, I enjoyed this piece of candy"; $r = 0.78$, $p < .01$). On their way out, the experimenter told participants they could take another piece of the candy if they wished. Per our theorizing, we expected individuals who actively acquired the candy would feel they chose it, and thus evaluate the candy more highly and be more likely to take another.

Results and discussion

Product Evaluation. As predicted, an ANOVA revealed a significant main effect of acquisition condition on the six-item product evaluation: participants who actively took the candy evaluated it more highly than those who passively received it ($M_{Active} = 5.38$ vs. $M_{Passive} = 4.71$; $F(1, 94) = 6.02$, $p < .05$). The two-item product evaluation measure showed convergent results ($M_{Active} = 5.64$ vs. $M_{Passive} = 4.97$; $F(1, 94) = 5.50$, $p < .05$). Thus, H1 is confirmed.

Additional candy. As predicted, a binary logistic regression analysis confirmed a significant main effect of acquisition condition on whether participants took another piece of candy ($\chi^2 = 3.97$ $p < .05$). Results were in the predicted direction: in the passive condition, only 34% of participants took another candy, while in the active condition, 54% of participants took another candy.

Results from this first study suggest that actively (vs. passively) acquiring a food item can lead individuals to evaluate it more highly. Individuals who actively acquired the item were also more likely to take another with them. While this hints at the notion that active acquisition may also lead to increased consumption, we cannot determine whether they immediately consumed the second candy. The purpose of our second study was fourfold. First, we wished to more determinedly test whether the embodied illusion of choice effect could extend to impact actual food consumption (specifically, consumption of a chocolate bar). Secondly, we wished to rule out an alternative explanation: that improved attitudes in the active condition were due to increased haptic sensations. Previous research has documented the ability of even incidental haptic sensations to nonconsciously influence consumer perceptions (Krishna, 2012; Peck, 2009). One could argue that in study 1, participants in the active condition had greater overall haptic sensation, i.e. touched multiple pieces of the stimuli as they acquired the item (e.g. multiple pieces of candy in the bowl). To rule out this alternative account, we manipulated serve-ware type (bowl vs. tray). In the bowl condition, the stimuli (chocolate bars) were touching each other and overlapping, thus participants would likely touch multiple stimuli in the active condition, mimicking the conditions of study 1. In the tray condition, however, the bars were placed flat on a tray and spaced apart, so participants would only touch the one chocolate bar that they reached for in the active condition. Importantly, the same number of chocolate bars was present in both conditions (8), and the experimenter replenished the chocolate bars before each additional participant, to ensure the number of the chocolate bars in the bowl/tray was consistent across all participants. The third objective of this study was to explore the mediational role of the illusion of choice to confirm H2. Lastly, we wished to investigate the role of an individual's need-for-control as a moderator, and thus provide support for H3.

Study 2: chocolate

Participants and procedure

One hundred and thirty-five undergraduate students (47.2% female) from an American university participated in the study in exchange for subject pool credit. Eight participants indicated they could not sample the chocolate due to dietary restrictions (e.g. dairy allergies, kosher adherence), and were excluded from the remainder of the analysis. This resulted in 127 active observations.

After the experimenter obtained informed consent, participants completed an eight-item need-for-control scale (adapted from Burger & Cooper, 1979; see Appendix A; $\alpha = .71$), and were told they would taste and evaluate a Kinder Bueno chocolate bar. One advantage of this product is that it comes in a package of two bars, and each bar has four notched sections (see Appendix B), allowing for more variation in consumption since there were several acceptable "end points."

Participants were randomly assigned to one of four conditions according to our 2 (acquisition: passive vs. active) × 2 (serve-ware: bowl vs. tray) between-subjects design. Acquisition was manipulated in the same manner as study 1. The experimenter instructed participants to eat as much of the chocolate as they wished, but that they were not allowed to take any remaining chocolate with them outside the lab. Consistent with our cover story, participants evaluated the chocolate on two items ("I like the way this chocolate tastes," and "Overall, I enjoyed this chocolate"; r = 0.75, $p < .01$), and completed an illusion of choice scale ("I was able to choose which chocolate to take," "I had an assortment of chocolate to choose from," "I played an active role in deciding which chocolate to try," "I had control in deciding which chocolate to take," and "I felt obligated to try the chocolate," (reverse-coded); $\alpha = .81$). After participants left the lab, the experimenter weighed the remaining chocolate.

Results and discussion

Serve-ware type. Analysis results (using the Model 3 of the PROCESS SPSS macro, which allows for interactions with any combination of manipulated and continuous variables; Hayes, 2013), produced no significant main effects of serve-ware on consumption, nor any significant two-way interactions of serve-ware × acquisition or serve-ware × need-for-control on consumption, nor any significant three-way interactions of serve-ware × acquisition × need-for-control consumption (all $p > .70$). Thus, we collapsed the bowl and tray data, concluding that there was no difference in consumption due to serve-ware type. This allowed us to rule out the alternative explanation that improved attitudes in the active condition were due to increased haptic sensation.

Chocolate consumption. Chocolate consumption was measured by subtracting the weight (in grams) of each subject's leftover chocolate from the weight of a full bar of the chocolate (standard across all bars at 46 grams). Supporting H1, results of an ANOVA revealed a significant main effect of acquisition condition on consumption such that participants consumed more chocolate ($M_{Active} = 35.05$) in the active acquisition condition than in the passive condition ($M_{Passive} = 28.50$; $F(1, 125) = 7.01$, $p < .01$). We did not, however, find significant differences in the evaluation of the chocolate, due to very high levels of favorability for the chocolate in both conditions. Due to these ceiling effects, analytic statistics were not carried out on this dependent variable.

Illusion of choice and need-for-control. ANOVA results confirmed a significant main effect of acquisition condition on illusion of choice ($M_{Passive} = 2.28$ vs. $M_{Active} = 3.84$; $F(1, 125) = 38.70$, $p < .01$), supporting our theory that active acquisition leads to higher feelings of choice than passive acquisition. According to our previous theorizing, the degree to which increased feelings of choice lead to increased consumption should depend on whether or not individuals respond to such feelings of choice in a positive way, which we argue may depend partially on one's dispositional need-for-control. To empirically test this framework (Fig. 1) and provide support for H2 and H3, we employed a moderated mediation bootstrapping procedure (using Model 15 in the macro suggested by Hayes, 2013, with 95% confidence and 5000 bootstraps). Results confirmed a significant interaction of acquisition × need-for-control ($\beta = 4.88$, $t = 2.38$, $p < .02$) and a marginally significant interaction of illusion of choice × need-for-control ($\beta = -2.25$, $t = -1.83$, $p < .07$) on consumption. Further, results confirmed that for those high (one standard deviation above the mean) in need-for-control, the indirect effect of acquisition on chocolate consumption through the illusion of choice was significant, with a confidence interval excluding zero ($\beta = -1.92$; CI: -3.74 to -.3412). However, the indirect effect was not significant for those low (one standard deviation below the mean) in need-for-control ($\beta = .76$; CI: -.9852 to 3.2485). In other words, while active (as compared to passive) acquisition led to an illusion of choice for participants regardless of their need-for-control, this illusion only led to increased consumption for those individuals high in need-for-control.

General discussion

Can the mere act of reaching for and taking a food item make us feel as though we are choosing that food? In this paper, we demonstrate that physically performing active vs. passive gestures can

alter one's perception of choice. Specifically, we show that the act of physically taking food items can generate a false impression of choice, an effect we term "embodied illusion of choice." We further demonstrate that such illusion of choice can have meaningful consequences the downstream variables of evaluation and actual consumption.

Our first study provides initial evidence of an embodied illusion of choice effect on participants' evaluation of a candy product. Our second study documented the embodied illusion of choice effect on actual consumption, revealed the role of an individual's need-for-control as a moderator, and supported the mediational role of the illusion of choice.

This work contributes to literature on eating behavior and the provision of choice by demonstrating that artificial feelings of choice can form under non-choice circumstances, and ultimately impact food evaluation and consumption. Specifically, we document one vehicle that generates an illusion of choice, illustrating that simple physical gestures may produce a sense of choice in individuals and lead to increased consumption and taste perceptions.

This research offers a number of practical implications. Many food and beverage establishments are self-service in nature, encouraging consumers to help themselves at a buffet, or to serve themselves frozen yogurt, drinks, etc. Other restaurants encourage active acquisition via mechanisms like dim sum carts and sushi conveyor belts, which require patrons to reach out and take their desired dish themselves, as opposed to being served by a waiter. Our research suggests that consumers would rate such products more highly and perhaps consume more than if those same foods/beverages were passively received. On a parallel vein, there are implications for sampling: when offering free samples to potential customers, store owners may find it beneficial to encourage customers to reach for their own samples as opposed to handing them out. Existing research suggests that people tend to eat most of what they serve themselves, and thus any contextual cues that lead them to over-serve should lead them to over-eat (Wansink & Cheney, 2005; Wansink et al., 2006). This research is very much consistent with our findings, and thus our research may likely have public health implications as well. For example, previous research has suggested that children eat more vegetables when they are offered a choice (Zeinstra et al., 2010). Give the childhood obesity epidemic, it may accordingly be beneficial to encourage children to self-serve themselves healthy foods (e.g. by providing a salad bar) at school cafeterias, but discourage self-service of unhealthy foods.

Interestingly, other work suggests that individuals feel more responsible for unhealthy food that they served themselves (as opposed to food that was served to them; Hagen, McFerran, & Krishna, 2012). This is again consistent with the notion that taking feels like choosing, but would imply more complex practical consequences: perhaps individuals only prefer a feeling of choice regarding unhealthy food if they do not have to assess their responsibility post-consumption.

A future research direction may involve manipulating the "giver." In our studies, the giver in the passive condition was an irrelevant stranger (the experimenter). However, if the giver were a trusted source (due to personal acquaintance, dietary expertise, etc.), perhaps personal choice might be less crucial. The giver's characteristics may also interact with the nature of the food, since choice seems to matter more for hedonic vs. utilitarian decisions (Botti & McGill, 2011).

Perhaps most importantly, our research documents what we believe to be the first exploration of an illusion of choice phenomenon. While the vehicle we examine in this manuscript is an embodiment-induced effect, there are likely other mechanisms that may foster false impressions of choice in individuals. While this paper is a start, the illusion of choice remains an unexplored phenomenon, leaving several potential antecedents, consequences, and processes undiscovered, and thus lends it itself to an exciting and potentially fruitful research stream.

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Appendices

Appendix A

Need-for-control items in study 2

1. I enjoy making my own decisions.
2. I try to avoid situations where someone else tells me what to do.
3. I would prefer to be a leader than a follower.
4. I like to wait and see if someone else is going to solve a problem so that I don't have to be bothered with it.*
5. I enjoy being able to influence the actions of others.
6. I enjoy having control over my own destiny.
7. When I see a problem, I prefer to do something about it rather than sit by and let it continue.
8. When it comes to orders, I would rather give them than receive them.

*Reverse coded.

Appendix B

Stimuli for study 2