



# Balancing evolutionary impulses: Effects of mindfulness on virtue food preference

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## Abstract

Mindfulness is emerging as a contemplative tool that may positively influence consumers' preference for virtue food, thus supporting health and well-being. However, it remains unclear which consumer groups may benefit the most from mindfulness. Previous research has demonstrated that consumers who experienced unpredictable environments in low socioeconomic households as children exhibit the likelihood of an adaptive chronic preference for vice food. Against this backdrop, the current research explores how mindfulness can support consumers who experienced low socioeconomic environments as children and further sheds light on the psychological mechanism, reduced impulsivity, for increased virtue food choice. This effect is tested across different manipulations of mindfulness and virtue food contexts. The research also introduces the unique mindfulness intervention of object visualization for helping stabilize the present-moment for consumers. Overall, the findings show that mindfulness may be a potential solution to impulsivity and increase preference for virtue food, supporting consumers in health and well-being.

## KEYWORDS

consumer well-being, impulse, life-history theory, mindfulness, virtue food

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## 1 | INTRODUCTION

Mindfulness, a trait or state of non-reactive attention, acceptance, and awareness to the present-moment (Kabat-Zinn, 2013), has emerged as a powerful tool for enhancing consumer well-being (Bahl et al., 2016), including by influencing their food preferences. It has been associated with a range of beneficial eating outcomes, such as reduced binge eating (Wilson et al., 2021), emotional eating (Hsu & Forestell, 2021), intrusive thoughts about food (May et al., 2010; see Katterman et al., 2014 for review), and more recently choosing virtue foods (i.e., healthy, lower calorie) over vice foods (i.e., tasty, high calorie) (Jordan et al., 2014). The vice versus virtue food choice is important for the well-being of consumers. Vice foods offer immediate gratification in taste and are often high in calories for immediate satiation, however they contribute to long-term obesity and other negative physical impacts. Virtue foods, on the other hand, may be less immediately gratifying but have long-term health and well-being benefits (Van Doorn & Verhoef, 2011). While the potential influence of mindfulness on virtue food choice is clear, it remains uncertain which consumers may benefit the most from mindfulness (Mishra & Mishra, 2011). For instance, recent research has shown that consumer groups in low poverty situations are more likely to prefer unhealthy food due to increased stress in their environments (Thomas, 2013). We argue that if mindfulness can help reduce such perceived environmental stress throughout one's childhood, there may be a shift in preference towards healthy food.

Extant research demonstrates that certain consumer groups display a likelihood of chronic preference for vice foods, while avoiding virtue foods (Laran & Salerno, 2013). This has been explained in relation to evolutionary factors, known as life history theory, that arise in low childhood socioeconomic status (C-SES) environments (Hill et al., 2016). C-SES is an accurate proxy of exposure to an unpredictable environment during childhood (Griskevicius, Tybur, et al., 2011b). Environments that are unstable promote a short-term outlook in children, whereas stable environments promote an expectation of long-term predictability (Mittal & Griskevicius, 2014; Stamos et al., 2019). Thus, in unstable childhood environments individuals learn to avoid somatic pay-offs that benefit long-term well-being, such as healthy virtue foods, and instead have a likelihood to prefer the short-term reproductive benefits of high calorie indulgent vice food (Hill et al., 2016). Because mindfulness has been shown to help calm mental perceptions of external environments and internal emotions through present-moment focus (Bishop et al., 2004; Langer, 1992; Shapiro et al., 2006), we argue it can be used as a tool to support consumers to engage in the stabilizing experience of the present-moment, ultimately reducing impulsivity (Dhanda, 2020; Papiés et al., 2012) in food choice among low C-SES consumers.

We provide empirical evidence of this mindfulness effect across different mindfulness interventions. Various avenues for manipulating mindfulness states have been explored, including meditation (Errmann et al., 2022; Van De Veer et al., 2016), chanting (Simpson et al., 2021), videos (Bostock et al., 2019), as well as novel interventions (Pereira & Coelho, 2019). Further, different foci have been shown to influence different outcomes. For instance, Metta (loving-kindness) meditation may promote other-oriented pro-social behavior (Hafenbrack et al., 2021), while an internal focus has been shown to promote body satiation (Van De Veer et al., 2016) and awareness of materialism (Errmann et al., 2021). This suggests that different focal points for mindfulness may be effective for certain domains, but less influential in others. The current research extends this literature by exploring a lesser-known mindfulness intervention, object visualization, as a meditative focal point to help stabilize emotions in response to external

environments (Yamabe, 2021). Specifically, we argue that present-moment focus on an object in one's environment supports state mindfulness in consumers with low C-SES, who may struggle with chronic impulsive preferences as a reaction to growing up in unstable and unpredictable environments (Mittal & Griskevicius, 2014).

The impulsive consumption of vice food and associated harm to consumer well-being has emerged as an important topic in the field of marketing (Jaud & Lunardo, 2022; Kim et al., 2018; Thomas et al., 2011). More importantly, there are calls for research to further understand how mindfulness can support virtue food choices and which groups might benefit from this approach (Bahl et al., 2013; Brunneder & Dholakia, 2018). The current research contribution charts out conceptual relationships between mindfulness, the construct of impulsiveness, and their interaction with the evolutionary theory of life strategies, offering practical implications for consumers. We specify how impulse affects consumer groups that grew up in childhood environments perceived to be low SES. Through exploring the interaction between impulse and C-SES, we can better predict a condition under which mindfulness meditation may have the most impact. Such conceptual advances rest on envisioning, via revising existing theory, to help reveal practical and novel consumer theory insights (MacInnis, 2011).

One unique way that helps showcase the practical outcome for consumers is to highlight a mindfulness intervention incorporating object visualization to induce state mindfulness. Research has shown that low C-SES consumer groups may be at particular risk of unstable environments during childhood, increasing the likelihood of deprivation of needs, such as food, adequate shelter, or education support (Mittal & Griskevicius, 2014). We showcase how object visualization meditation might stabilize environments for low C-SES consumers who then immediately make food choices afterwards. Showcasing this causal intervention helps highlight how companies, organizations, or role models may use mindfulness more broadly, or object visualization specifically, to stabilize environments for low C-SES consumers. This intervention results in an understanding of how, when, and for whom mindfulness may be most effective. For instance, mindfulness may be implemented during life moments when low C-SES consumers may experience instability or face eating choices that undermine health and well-being. We discuss such meaningful outcomes to support consumers who experience challenges with chronic vice food preference to help increase healthy virtue food choice. In this regard, mindfulness offers a practical potential solution to impulsivity and vice food selection through a shift to a more thoughtful way of consuming virtue foods, broadly supporting the aim of helping consumers in their search for well-being (Luchs & Mick, 2018).

In sum, this research offers a contribution to literature through integrating mindfulness with impulsive consumption and C-SES of individuals. We show how reduced impulse affects individuals with low C-SES through practical elicitations of mindfulness. Further, we shed light on state mindfulness to show when impulsive behaviors can be potentially mitigated through meditation. Our findings suggest that mindfulness interventions may be a fruitful avenue to increase the well-being of low C-SES consumers.

## 2 | THEORETICAL FRAMEWORK

Mindfulness has been defined as state of nonjudgmental enhanced attention and awareness to current experience (Kabat-Zinn, 2013; Rosenberg, 2005). This definition draws on Buddhist definitions of mindfulness and, of interest to the current research, embodies how individuals regulate behaviors (Mick, 2017) such as eating, as well the psychological implications of their



“propensity or willingness to be aware and to sustain attention to what is occurring in the present” (Brown & Ryan, 2003, p. 822). In the context of the present research, we focus narrowly on the awareness and attention the consumer gives to a particular food consumption experience (Brunner & Dholakia, 2018). Both trait and state mindfulness have been shown to reduce vice food choices (Jordan et al., 2014). In particular, when attention and awareness are directed to the body through exercises such as focusing on the breath there is an increased awareness of physiological body cues about food (Van De Veer et al., 2016). Further, shifting the mental focus in the eating process to the outcome post-consumption has been shown increase preferences for vice food (Muñoz-Vilches et al., 2019). Because mindfulness practices cognitively replenish (Orazi et al., 2019) and physically calm an individual's state towards their internal feelings and external environment (Droit-Volet et al., 2015), such techniques promote enhanced regulation in which consumers are encouraged to pay more attention to their food choices (Hendrickson & Rasmussen, 2013).

In the case of food preferences, adaptive traits may be at play when forming such preferences. In this respect, childhood environment has been shown to provide predictions for future behavior (Mittal & Sundie, 2017), with life-history theory proposing that individuals calibrate childhood experiences in ways that promote survival in adult environments (Del Giudice et al., 2016). As such, individuals who grow up in low SES environments may experience higher levels of mortality and stress, and have less stability in their day-to-day lives (e.g., more chaotic and unpredictable home environments) (Griskevicius, Delton, et al., 2011a; Miller et al., 2008). On the other hand, high SES childhood environments are generally more stable, and characterized by greater economic certainty (e.g., producing predictable outcomes) and aversion to risk to secure future benefits (Griskevicius et al., 2012; Mittal & Griskevicius, 2014). Consequently, individuals raised in low C-SES environments have a likelihood of adapting “fast life strategies” as adults, wherein decisions are made to fulfill efficient reproduction of the species (e.g., eating high calorie food to benefit current state). Further, children in low SES households may be more likely to experience other deprivation of needs, such as food, adequate shelter, or education support, which may influence their preference for fast life strategies (Mittal & Griskevicius, 2014). On the other hand, those from high C-SES environments elect for somatic pay-offs (e.g., eating low calorie healthy food to benefit future state) (Hill et al., 2016).

Overall, this means high C-SES consumers should tend to show a likelihood of greater preference for virtue food. If this is correct, mindfulness will be less influential for this group because high C-SES consumers place emphasis on future benefits, such as health (Griskevicius et al., 2012; Mittal & Griskevicius, 2014). In contrast, for low C-SES consumers who have a likelihood to put more emphasis on short-term strategies, indulgent vice food choices may be more attractive. As mindfulness regulates current environmental states (i.e., both cognitive and environmental), we propose that mindfulness could help low C-SES consumers feel more stable in their environments, as a result moderating the need to consume vice food with high caloric efficiency. Instead, feeling secure in the present-moment may support preferences for longer-term strategies. Formally, we propose that mindfulness may generally support those with low (but not high) C-SES to prefer virtue food:

**H1.** A mindful (vs. control) intervention will increase virtue food choice among low (but not high) C-SES consumers.

We further propose a mechanism for how mindfulness can help consumers with low C-SES in increasing virtue food choice. The lion's share of research shows that low C-SES groups have

a likelihood to exhibit less self-control and higher impulsivity when making decisions around health outcomes, and moreover have a chronic tendency to prefer short-term gratification, even though this may have deleterious future effects (Griskevicius et al., 2012). Higher impulsivity is conceptualized as an inhibition failure in low C-SES consumers, with decisions dominated by impulse rather than contemplation or reflection (Fennis, 2022). Consumers with low C-SES have been shown to experience more challenges in self-control due to high impulsivity than those with high C-SES. More specifically, low C-SES consumers show such impulsivity in obesogenic environments where indulgent vice food is plentiful (Kirk et al., 2010; Laran & Salerno, 2013). There is research consensus that reduced impulsivity improves consumers' judgments, choices, and overall well-being, with increased impulsivity impairing such metrics. As a result, there have been calls for interventions to “nudge” fast life strategies (low C-SES) to align with slow (high C-SES) strategies (Duckworth et al., 2018) to improve well-being for low C-SES consumers.

The effect of mindfulness on decision-making is attributed to increased self-regulation (Friese & Hofmann, 2016). Specifically, mindfulness alters responses via increasing conscious control of choices through increased attention to body and mind reactions (Hendrickson & Rasmussen, 2013; Papies et al., 2012). Mindfulness provides an abundance of resources to individuals through enhancing awareness and therefore self-regulation (Orazi et al., 2019). Further, previous research has demonstrated that consumers prefer virtue foods when attention is directed towards a focus on health benefits, decreasing impulsive decision-making (Petit et al., 2016). These findings suggest that interventions that shift attention and awareness (such as mindfulness) will reduce impulsivity, and subsequently vice food choice. In other words, if consumers with low C-SES are impulsive due to an embedded perception of their environment as unstable, mindfulness may counteract such tendencies by stabilizing the present-moment, thereby reducing impulsivity, and increasing preferences for virtue food:

**H2.** The mindful (vs. control) intervention will increase virtue food choices in low C-SES consumers via a reduction in impulsivity.

### 3 | OVERVIEW OF STUDIES

We conducted four experimental studies to test H1 and H2 across different mindfulness interventions and different contexts of virtue food choice. Study 1 showed initial evidence for H1. Study 2 extended the findings of Study 1 and offered stronger support for H1 using a consequential choice (a gift card), and more importantly, visualization as a unique mindfulness elicitation technique. Study 3 further tested H1 through another mindfulness meditation and examined virtue food choice using shopping scenarios. Finally, Study 4 provided empirical evidence for H2, demonstrating the mediating role of reduced impulsivity among low C-SES groups. A summary of the studies is shown in Table 1.

### 4 | STUDY 1

Study 1 provided initial evidence for H1 by examining the effect of the mindful (vs. control) intervention on virtue food choice in low versus high C-SES groups. In this study, we tested a mindfulness intervention that focused on noticing sensations of breathing to amplify attention

TABLE 1 Summary of studies.

<b>Study 1 (N = 209, 51% female, M<sub>age</sub> = 36.94, SD = 11.24, MTurk)</b>		
<b>DV: Virtue food choice</b>	<b>IV: Control (N = 105)</b>	<b>IV: Mindful (N = 104)</b>
W: Low childhood socioeconomic status; $B = 1.30$ , $p = 0.049$	21%	50%
W: High childhood socioeconomic status; $B = -0.51$ , $p = 0.323$	68%	56%
Main findings: Mindful (vs. control) intervention increases virtue food choice in consumers with low childhood socioeconomic status.		
<b>Study 2 (N = 185, 52.6% female, M<sub>age</sub> = 21.41, SD = 3.98, University Undergraduate Class)</b>		
<b>DV: Virtue food gift card choice</b>	<b>IV: Control (N = 92)</b>	<b>IV: Mindful (N = 93)</b>
W: Low childhood socioeconomic status; $B = 1.57$ , $p = 0.001$	27%	65%
W: High childhood socioeconomic status; $B = -0.11$ , $p = 0.805$	56%	53%
Main findings: Mindful (vs. control) intervention increases virtue food choice in consumers with low childhood socioeconomic status.		
<b>Study 3 (N = 216, 49.6% female, M<sub>age</sub> = 40.61, SD = 11.54, MTurk)</b>		
<b>DV: Virtue food shopping selection (average \$ virtue items in cart with \$10 spend)</b>	<b>IV: Control (N = 116)</b>	<b>IV: Mindful (N = 100)</b>
W: Low childhood household income; $B = 1.11$ , $p = 0.014$	3.63	4.75
W: High childhood household income; $B = -0.23$ , $p = 0.609$	4.07	3.83
Main findings: Mindful (vs. control) intervention increases virtue food shopping selection in consumers with low childhood household income.		
<b>Study 4 (N = 213, 49.40% female, M<sub>age</sub> = 37.56, SD = 11.98, MTurk)</b>		
<b>DV: Virtue food shopping selection (average virtue items in cart out of 10)</b>	<b>IV: Control (N = 104)</b>	<b>IV: Mindful (N = 109)</b>
W: Low childhood socioeconomic status; $B = 0.84$ , $p < 0.001$	6.88	7.73
W: High childhood socioeconomic status; $B = -0.18$ , $p = 0.473$	7.5	7.32
M: Mindful → impulse → virtue food shopping selection		
Low childhood socioeconomic status: ( $B = -0.2003$ , $SE = 0.1016$ , 95% CI including zero [ $-0.4191$ , $-0.0091$ ])		
High childhood socioeconomic status: ( $B = 0.0078$ , $SE = 0.0356$ , 95% CI excluding zero [ $-0.0713$ , $0.0817$ ])		
Main findings: Mindful (vs. control) intervention increases the selection of virtue food when shopping in consumers with low childhood socioeconomic status. This is mediated by reduced impulse.		

paid towards the body, rather than the external environment. The technique of body awareness has been shown to support individuals in noticing physiological sensations in the body (Van De Veer et al., 2016) and shift food consumption (Jordan et al., 2014). Then, we used the C-SES status measure, which is a valid proxy of exposure to unpredictability in early life (Chen &

Miller, 2012; Griskevicius, Tybur, et al., 2011b). As the dependent variable, we explored alternative choices of vice versus virtue food: a turkey and cheese grilled cheese sandwich (tasty), and a salad (healthy), as used in prior research (Laran & Salerno, 2013).

## 4.1 | Method

Two hundred and nine participants located in the U.S. (51% female,  $M_{\text{age}} = 36.94$ ,  $SD = 11.24$ ) from Amazon MTurk participated in the experiment. Eleven participants were previously eliminated for not completing their responses. The study employed a (C-SES; continuous)  $\times$  2 (mindful vs. control) between-subjects design. In the mindfulness condition, participants followed a 1-min video instruction on focusing on the breath (<https://youtu.be/9iJktkV8mLc>), whereas in the control condition, participants watched a 1-min video with instructions on how to replace a side mirror on a car, which was intended to induce neutral attention (Errmann et al., 2022) (<https://youtu.be/kDBKIfQtsxg>). Subsequently, all participants were asked to write a couple of sentences on how they were feeling as an attention check to ensure they had listened to the instructions.

Next, all participants were asked to select one of two proposed options for food based on what they would like to eat right now. The first option was a “turkey and cheese grilled sandwich,” framed as the tasty (or vice) choice, and the second option was a salad, framed as the healthy (or virtue) choice, used in previous research (Laran & Salerno, 2013). We conducted a separate pretest ( $N = 40$ ) to test the perceptions about these two food products, in which we asked the extent to which each food was “tasty” and “healthy,” measured on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*). *T*-tests showed that the vice choice was perceived to be tasty ( $M = 6.00$ ,  $SD = 1.50$ ) versus midpoint value (“4”),  $t(39) = 6.45$ ,  $p < 0.001$ , whereas the virtue choice was perceived to be healthy ( $M = 5.89$ ,  $SD = 1.93$ ) versus midpoint value (“4”),  $t(39) = 5.61$ ,  $p = 0.006$ . Further, *t*-tests revealed that the virtue choice was perceived as significantly healthier than the vice choice ( $M = 5.08$ ,  $SD = 1.66$ ),  $t(39) = 5.99$ ,  $p < 0.001$ . Additionally, the virtue choice was perceived to be significantly less tasty than the vice choice ( $M = 3.88$ ,  $SD = 1.83$ ),  $t(39) = -4.75$ ,  $p = 0.010$ .

Next, the mindfulness intervention was checked using the 15-item Mindful Attention Awareness Scale, which examines mindfulness inherent to an individual, adapted for use to ask how participants are feeling currently (e.g., “Right now I find it difficult to stay focused on what's happening in the present”) (Brown & Ryan, 2003). To instruct participants to answer how they were currently feeling, we clarified that they should answer how they are feeling *at this moment* in the instructions. The 15 items were measured on a 6-point scale (1 = *almost always*, 6 = *almost never*,  $\alpha = 0.91$ ). *T*-tests showed participants in the mindful intervention scored higher in mindful attentional awareness ( $M = 5.01$ ,  $SD = 1.10$ ) than participants in the control intervention ( $M = 4.70$ ,  $SD = 1.01$ ),  $t(207) = -6.05$ ,  $p < 0.001$ .

Participants were then asked about their *perceived* childhood status using an established C-SES Scale ( $\alpha = 0.96$ ) (Chen & Miller, 2012; Griskevicius, Tybur, et al., 2011b) with the following statements: “my family usually had enough money for things when I was growing up”; “I grew up in a relatively wealthy neighborhood”; and “I felt relatively wealthy compared to the other kids in my school.”

Finally, preference for diet and food preference were controlled for in the experiment by asking participants to rate the following statements on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*): “I like the turkey-and-cheese sandwich better than the salad,” and “I

would be inclined to buy the turkey-and-cheese sandwich over the salad.” To control for hunger, participants were asked, “How hungry are you at the moment?”

## 4.2 | Results

We conducted a moderation analysis using Hayes' Process Model 1 (Hayes, 2017). We examined food choice as the dependent variable (vice = 0, virtue = 1), the mindfulness intervention (control = 0, mindful = 1) as the independent variable, and C-SES as the moderator. The main effect of C-SES was significant ( $b = 0.65$ ,  $t(204) = 2.83$ ,  $p = 0.004$ ), as was mindfulness ( $b = 2.76$ ,  $t(204) = 2.15$ ,  $p = 0.031$ ). More importantly, the interaction between mindfulness and C-SES was also significant ( $b = -0.57$ ,  $t(204) = -2.12$ ,  $p = 0.034$ ). Consistent with our predictions, the effect of mindfulness on virtue food selection was only significant in participants with a low C-SES (1 SD below mean;  $b = 1.3$ ,  $t(204) = 1.96$ ,  $p = 0.049$ ). However, in high C-SES participants (1 SD above mean), there was no significance difference ( $b = -0.51$ ,  $t(204) = -0.98$ ,  $p = 0.323$ ; see Figure 1). The preference for diet, food, and hunger did not change the results. These findings provided support for H1.

## 5 | STUDY 2

Study 2 further tested H1. This study had two main purposes. First, it tested a lesser-known mindfulness intervention, object visualization, by using an object as the meditative focal point to help stabilize emotions against stimulation from the external environment (Yamabe, 2021). Prior research has shown that regulating internal states better replenishes ones cognitive resources that enhance thoughtful decision-making (Errmann et al., 2022; Orazi et al., 2019). Further, we selected object visualization to further test attention directed towards the external environment, as some research has shown externally projecting attention does not promote

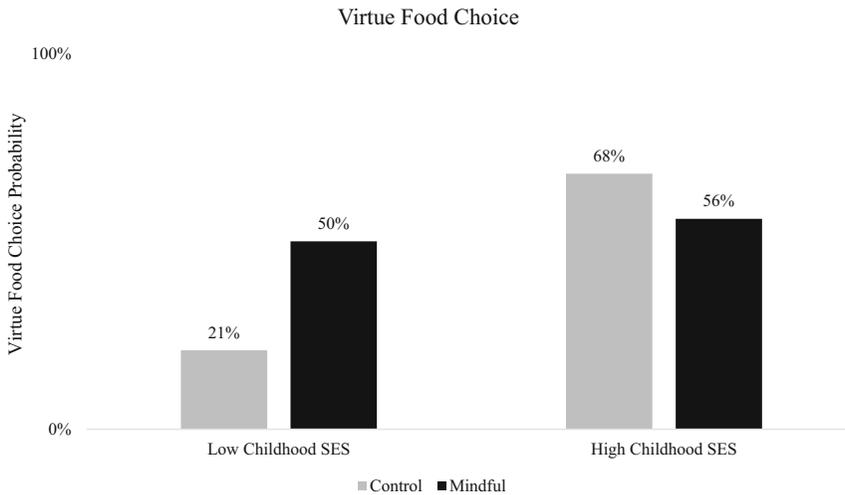


FIGURE 1 Virtue food choice probability of control and mindful conditions in low and high childhood SES groups.

physiological sensations towards food choice (Van De Veer et al., 2016), while in contrast other research has demonstrated that focusing externally on the environment may physically calm an individual's internal state to promote more conscious choices (Droit-Volet et al., 2015). Next, we explored vice versus virtue food through a consequential choice between a \$20 “KFC” (tasty) gift card and a “Tank Juice” (healthy) \$20 gift card. KFC and Tank Juice are well known in Australia/New Zealand for representing tasty versus healthy fast food (Mackay et al., 2021).

## 5.1 | Method

One hundred and eighty-five participants (52.6% female,  $M_{\text{age}} = 21.41$ ,  $SD = 3.98$ ) from an undergraduate university class in Australia participated in the experiment. The study employed a (C-SES; continuous)  $\times$  2 (mindful vs. control) between-subjects design. In the mindfulness condition, participants followed a 2-min video instructing them to pay attention to a single object and examine its features in detail (<https://youtu.be/b5Hw-6HzLPM>). In the control condition, participants watched a 2-min instructional video on how to play guitar notes (Cui et al., 2019) (<https://youtu.be/JF4eNtKu6C4>). Subsequently, all participants were asked to write a couple of sentences on how they were feeling as an attention check to ensure they had listened to the instructions.

Next, all participants were told they would be entered into a draw and one winner from the class could choose one of two gift cards. The first one was a “KFC” gift card, framed as the tasty (or vice) choice, and the second one was a “Tank Juice” gift card, framed as the healthy (or virtue), adapted from (Mackay et al., 2021).

As in Study 1, we conducted a separate pretest ( $N = 45$ ) to examine the perceptions about these two gift cards, in which we asked the extent to which each gift card was “tasty” and “healthy,” measured on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*). *T*-tests showed the vice choice was perceived to be tasty ( $M = 5.79$ ,  $SD = 1.11$ ) versus midpoint value (“4”),  $t(44) = 5.25$ ,  $p = 0.005$ , while the virtue choice was perceived to be healthy ( $M = 5.93$ ,  $SD = 1.36$ ) versus midpoint value (“4”),  $t(44) = 6.48$ ,  $p = 0.003$ . Further, *t*-tests revealed that the virtue choice was perceived significantly healthier than the vice choice ( $M = 4.99$ ,  $SD = 1.52$ ),  $t(44) = 5.21$ ,  $p < 0.001$ . Additionally, the virtue choice was perceived to be significantly less tasty than the vice choice ( $M = 2.75$ ,  $SD = 1.12$ ),  $t(44) = -7.79$ ,  $p < 0.001$ .

After, participants completed the 21-item State Mindfulness Scale (e.g., “I actively explored my experience in the moment”); all items used the same 7-point scale: 1 = *strongly disagree*, 7 = *strongly agree*) to check the mindfulness manipulation (Tanay & Bernstein, 2013). *T*-tests showed participants in the mindful intervention scored higher in state mindfulness ( $M = 4.87$ ,  $SD = 1.01$ ) than participants in the control intervention ( $M = 4.19$ ,  $SD = 0.96$ ),  $t(183) = -4.91$ ,  $p < 0.001$ . Next, participants filled out the same C-SES scale as in Study 1. Similarly, preference for diet, fast food preference, and hunger were also controlled for in the experiment.

## 5.2 | Results

We conducted a moderation analysis using Hayes' Process Model 1 (Hayes, 2017). We examined food choice as the dependent variable (vice = 0, virtue = 1), the mindfulness intervention (control = 0, mindful = 1) as the independent variable, and C-SES as the moderator. The main effect of C-SES was significant ( $b = 0.44$ ,  $t(182) = 2.25$ ,  $p = 0.023$ ), as was mindfulness

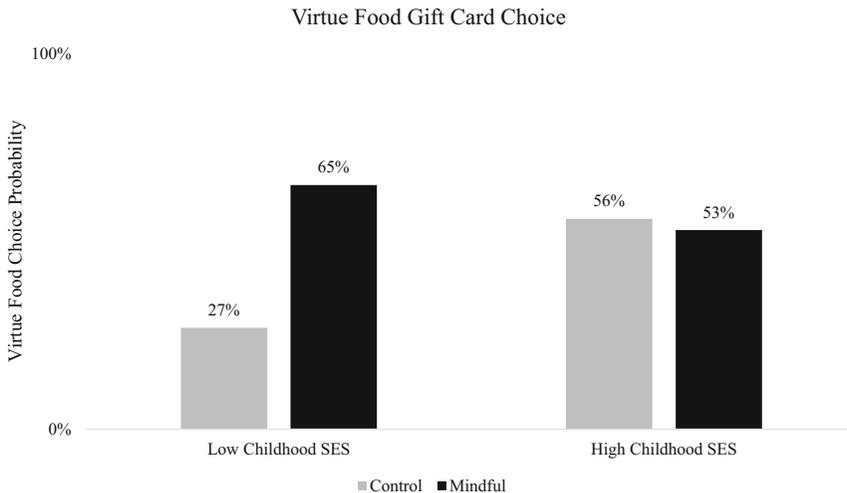
( $b = 3.57$ ,  $t(182) = 3.00$ ,  $p = 0.002$ ). These results were qualified by a significant interaction effect ( $b = -0.62$ ,  $t(182) = -2.49$ ,  $p = 0.012$ ). Specifically, the effect of mindfulness on gift card selection was only significant in low C-SES participants (1 SD below mean;  $b = 1.57$ ,  $t(182) = 3.38$ ,  $p < 0.001$ ), but not in high C-SES participants (1 SD above mean) ( $b = -0.11$ ,  $t(182) = -0.24$ ,  $p = 0.805$ ; see Figure 2). As in Study 1, preference for diet, fast food preference, and hunger did not change the results. These findings offered stronger evidence for H1.

## 6 | STUDY 3

Study 3 sought to extend the findings of Studies 1 and 2 in three ways. First, the study tested a mindfulness intervention that focused on awareness of body sensations, which has previously been shown to support physiological awareness of the body in relation to its external environment (Van De Veer et al., 2016). Second, we tested a different measure of life strategies, childhood household income (C-HH). C-HH has been used in previous research as a valid proxy of *perceived exposure* to scarcity in early life and acts as an alternative proxy to support and validate C-SES predictions (Griskevicius et al., 2013; Griskevicius, Delton, et al., 2011a; Mittal & Griskevicius, 2014). Third, we explored a different context for vice and virtue foods using an online shopping scenario. This research approach has been used to induce real-life scenarios based on vice versus virtue shopping decisions (Huyghe et al., 2017).

### 6.1 | Method

Two hundred and sixteen participants located in the U.S. (49.6% female,  $M_{\text{age}} = 40.61$ ,  $SD = 11.54$ ) from Amazon MTurk participated in the experiment. Four participants were previously eliminated for not completing their responses. The study employed a (C-SES; continuous)  $\times$  2 (mindful vs. control) between-subjects design. In the mindfulness condition,



**FIGURE 2** Virtue food choice probability of control and mindful conditions in low and high childhood SES groups.

participants followed a 1-min instruction on body and thought awareness (Errmann et al., 2022) (<https://youtu.be/xuK7JE-gcKc>), whereas in the control condition, participants listened to a 1-min reading from a newspaper article (Mittal & Griskevicius, 2014) ([https://youtu.be/O\\_Cx\\_NxvD6o](https://youtu.be/O_Cx_NxvD6o)). Subsequently, all participants were asked to write a couple of sentences on how they were feeling as an attention check to ensure they had listened to instructions.

Next, participants were asked to imagine they were online grocery shopping and had approximately \$10 to spend, as adapted from prior research (Huyghe et al., 2017). They were asked to think more about the items they wanted in their cart and less about whether the prices matched their exact spending budget—the budget was approximate. They had 10 vice items and 10 virtue items to select from (see Appendix A), adopted from prior research (Huyghe et al., 2017). The item order was randomly switched for each participant, with all participants seeing the same items, but in varying order of placement to avoid a salience effect. Participants were able to select any items for their cart, as long as the cost ended up as approximately \$1 > or \$1 < than \$10. Next, participants completed the same 21-item State Mindfulness Scale as in Study 2. *T*-tests showed participants in the mindful intervention scored higher in state mindfulness ( $M = 5.22$ ,  $SD = 0.92$ ) than participants in the control intervention ( $M = 3.87$ ,  $SD = 1.27$ ),  $t(214) = -8.72$ ,  $p < 0.001$ .

They then indicated their parents' annual household income (during their childhood), on a 7-point scale: (1) less than \$15,000, (2) \$15,000–\$24,000, (3) \$25,000–\$49,000, (4) \$35,000–\$49,000, (5) \$50,000–\$99,000, (6) \$85,000–\$99,000, and (7) greater than \$100,000, as used in prior research (Griskevicius, Tybur, et al., 2011b). Finally, product preferences, diet preferences, and hunger were controlled for in the experiment as in Studies 1 and 2.

## 6.2 | Results

We conducted a moderation analysis using Hayes' Process Model 1 (Hayes, 2017). The model examined virtue shopping selection (average \$ virtue items in cart with \$10 spend) as the dependent variable, the mindfulness intervention (control = 0, mindful = 1) as the independent variable, and C-HH income as the moderator. The main effect of mindfulness was significant ( $b = 1.96$ ,  $t(213) = 2.48$ ,  $p = 0.013$ ). However, the main effect of C-HH income was non-significant ( $b = 0.12$ ,  $t(213) = 0.99$ ,  $p = 0.321$ ). More importantly, the interaction between mindfulness and C-HH income was significant ( $b = -0.38$ ,  $t(213) = -2.10$ ,  $p = 0.036$ ). Specifically, the effect of mindfulness on virtue shopping selection was only significant in low C-HH income participants (1 SD below mean;  $b = 1.22$ ,  $t(213) = 2.10$ ,  $p = 0.036$ ), but not in the high C-HH income participants (1 SD above mean) ( $b = -0.23$ ,  $t(213) = -0.51$ ,  $p = 0.609$ ; see Figure 3).

## 7 | STUDY 4

Study 4 extended Studies 1–3 by empirically testing the mediating role of reduced impulsivity (H2).

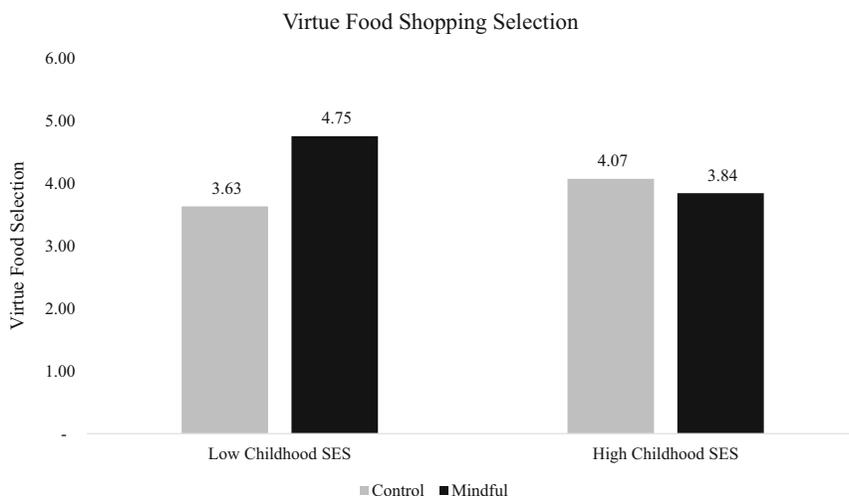


FIGURE 3 Virtue food selection of control and mindful conditions in low and high childhood SES groups.

## 7.1 | Method

Two hundred and thirteen participants located in the U.S. (49.40% female,  $M_{\text{age}} = 37.56$ ,  $SD = 11.98$ ) from Amazon MTurk participated in the experiment. Seven participants were previously eliminated for not completing their responses. The study employed a (C-SES; continuous)  $\times$  2 (mindful vs. control) between-subjects design. The mindful and control interventions followed the same procedure used in Study 3.

Next, participants were asked to imagine they were in a grocery store and could pick five items to bring home. They had 10 vice items and 10 virtue items to select from. These were the same items as in Study 3 presented in random order, but this time with no price (Huyghe et al., 2017). Participants then completed the same 21-item State Mindfulness Scale as in Study 2. *T*-tests showed participants in the mindful intervention scored higher in state mindfulness ( $M = 4.80$ ,  $SD = 1.35$ ) than participants in the control intervention ( $M = 4.06$ ,  $SD = 1.14$ ),  $t(211) = -4.25$ ,  $p < 0.001$ .

Next, impulse was measured using a 10-item Consumer Impulsivity Scale (Puri, 1996), with participants asked to indicate how certain adjectives described them “at this moment” (Zhang & Shrum, 2009), as measured on a 7-point scale (1 = *not at all*, 7 = *very much*). The adjectives were: “impulsive,” “careless,” “self-controlled” [reversed-coded], “extravagant,” “far-sighted” [reversed-coded], “methodical” [reversed-coded], “rational” [reversed-coded], “responsible” [reversed-coded], “restrained” [reversed-coded], and “easily tempted,” with higher (lower) values indicating higher (lower) impulse. Next, participants filled out the same C-SES scale as in Study 1 and the control questions from Study 3.

## 7.2 | Results

We conducted a moderation analysis using Hayes’ Process Model 1 (Hayes, 2017). This model examined virtue shopping selection (average virtue items in cart out of 10) as the dependent variable, the mindfulness intervention (control = 0, mindful = 1) as the independent variable, and C-SES as the moderator. The main effect of C-SES was significant ( $b = 0.23$ ,  $t(210) = 2.76$ ,  $p = 0.006$ ),

as was mindfulness ( $b = 1.56$ ,  $t(210) = 3.31$ ,  $p = 0.001$ ). However, these results were qualified by a significant interaction between mindfulness and C-SES income ( $b = -0.33$ ,  $t(210) = -2.78$ ,  $p = 0.006$ ). Specifically, the effect of mindfulness on virtue shopping selection was only significant in low C-SES participants (1 SD below mean;  $b = 0.84$ ,  $t(210) = 3.32$ ,  $p = 0.001$ ), but not in high C-SES participants (1 SD above mean) ( $b = -0.16$ ,  $t(210) = -0.62$ ,  $p = 0.533$ ; see Figure 4).

To test H2, we ran a moderated mediation analysis using PROCESS Model 15 with 5000 bootstrap resamples (Hayes, 2017). We included the virtue shopping selection (average virtue items in cart out of 10) as the outcome, the intervention (mindful vs. control) and C-SES as predictors, and impulse as the mediator. The results revealed a significant index of moderated mediation ( $B = 0.06$ ,  $SE = 0.03$ , 95% CI: 0.0033, 0.1487), such that the indirect effect of the mindfulness intervention via reduced impulse was significant among participants with a low C-SES ( $B = -0.20$ ,  $SE = 0.10$ , 95% CI:  $-0.4191$ ,  $-0.0091$ ) but not among those with a high C-SES ( $B = -0.18$ ,  $SE = 0.25$ , 95% CI: 0.4737,  $-0.6824$ ) (see Table 2).

## 8 | DISCUSSION

Consumer well-being concerns due to impulsive food consumption choices are now a feature of marketing research (Huyghe et al., 2017; Kim et al., 2018). Across four experimental studies, the current research used mindfulness as an intervention to support consumers in leveraging preference for virtue (vs. vice) food choices. This was demonstrated through a mindful (vs. control) intervention that increased virtue food choice in low C-SES consumers (Studies 1–4), with a reduction in impulse identified as the mechanism underlying this effect (Study 4).

### 8.1 | Theoretical and practical implications

The current results represent important conceptual and practical implications for consumers. We examine the construct of impulse and how reduced impulse affects low C-SES groups.

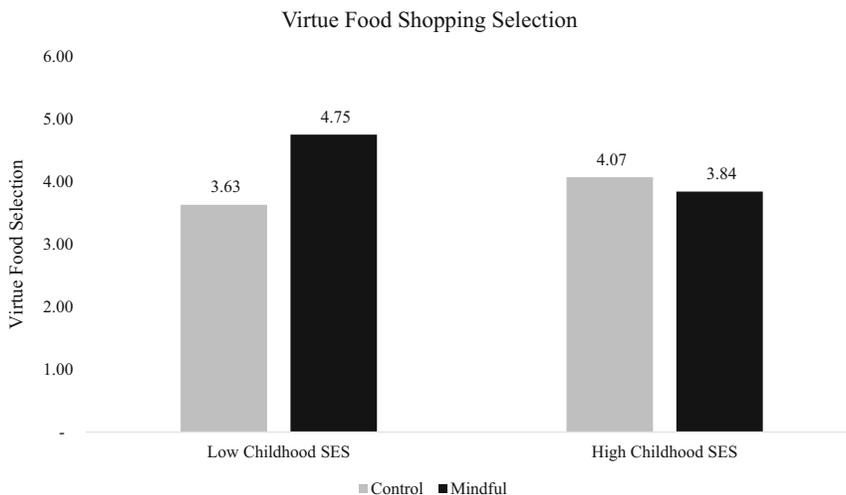


FIGURE 4 Virtue food selection of control and mindful conditions in low and high childhood SES groups.

TABLE 2 Moderated mediation results.

Effect	Regression analysis		Bootstrap analysis	
	<i>b</i>	<i>t</i>	Index/ indirect effect	95% CI
Impulse				
Constant	5.00	<b>36.99***</b>		
Mindfulness intervention: Mindful versus control (1 = mindful, 0 = control)	0.43	<b>2.09**</b>		
Virtue food shopping selection (average virtue items in cart out of 10)				
Constant	10.56	<b>12.64***</b>		
Mindfulness intervention: Mindful versus control (1 = mindful, -1 = control)	1.56	<b>3.52***</b>		
Impulse	-0.79	<b>-5.47***</b>		
Childhood socioeconomic status (1 SD $\pm$ mean)	-0.61	<b>-3.16**</b>		
Mindfulness intervention $\times$ childhood socioeconomic status	-0.34	<b>-2.94**</b>		
Impulse $\times$ childhood socioeconomic status	0.15	<b>4.50***</b>		
Mindfulness intervention $\times$ childhood socioeconomic status at value of childhood socioeconomic status				
Low childhood socioeconomic status: mindfulness intervention $\times$ childhood socioeconomic status	0.84	<b>3.52***</b>		
High childhood socioeconomic status: mindfulness intervention $\times$ childhood socioeconomic status	-0.18	-0.71		
Impulse $\times$ childhood socioeconomic status at value of childhood socioeconomic status				
Low childhood socioeconomic status: impulse $\times$ childhood socioeconomic status	-0.45	<b>-5.58***</b>		
High childhood socioeconomic status: impulse $\times$ childhood socioeconomic status	0.01	0.24		
Mindfulness intervention $\rightarrow$ impulse $\rightarrow$ virtue food shopping selection (moderated mediation)			<b>0.06***</b>	<b>0.0033, 0.1487</b>
Low childhood socioeconomic status			<b>-0.20***</b>	<b>-0.4191, -0.0091</b>
High childhood socioeconomic status			0.00	-0.0713, 0.0817

Note: Bootstrapping based on 5000 samples. Bold values indicate significant effect.

\*\*\* $p < 0.01$ ; \*\* $p < 0.05$ .

Typically, consumer groups with perceived low C-SES environments show a likelihood of behaving impulsively (Mittal & Sundie, 2017). We show how state mindfulness can be used to highlight the moderating role of C-SES—that is, the conditions under which mindfulness may

or may not reduce impulse preferences for food—to identify reduced impulsivity as an underlying mechanism of the mindfulness effect.

The research demonstrates unique relationships between theoretical constructs to explore how mindfulness can have specific benefits for a specific consumer group, in this case individuals who have grown up in a low C-SES environment and have a tendency to elect a fast life strategy (reproductive efforts to benefit current and not future states). This is meaningful because prior research highlights that low C-SES consumers are at particular risk from high impulsivity, due to a lack of perceived predictability in their future environments (Mittal & Griskevicius, 2014; Mittal & Sundie, 2017); they therefore have a chronic preference for tasty, high calorie food (Hill et al., 2016; Laran & Salerno, 2013). Our findings suggest that techniques such as mindfulness interventions may be a fruitful avenue to support consumers with differing life-history strategies.

Our conceptualization helps showcase the intervention incorporating visualization to induce state mindfulness and increase virtue food choices in low C-SES groups. Research has shown these consumer groups may be at particular risk of unstable environments, as there is the likelihood of unstable environments enhancing feelings of scarcity (Wang et al., 2020). We showcase the connection of object visualization to stabilize environments for consumer groups who then immediately make food choices. A causal intervention helps highlight how companies, organizations, or role models may use mindfulness more broadly, or object visualization specifically, to stabilize environments for low C-SES consumers. We suggest that mindfulness practice can interact with the effects of impulse that may be present in adults who had unstable childhoods.

While impulsivity has previously been identified in the mindfulness literature (Brunelle & Grossman, 2022; Papiés et al., 2012; Wilson et al., 2021), we provide empirical evidence for impulsivity as a mechanism for the mindfulness effect emerging only among consumers with low C-SES. Mindfulness has been associated with a range of beneficial food consumption outcomes, such as reducing binge or emotional eating (Katterman et al., 2014; Wilson et al., 2021), mindless eating (Bahl et al., 2013), and supporting healthy food choices (Jordan et al., 2014) and satiation awareness (Van De Veer et al., 2016). The current research extends such findings to include the mediating role of impulsivity in increasing preference for virtue food among low C-SES consumers, supporting them to respond to impulses with enhanced self-control over their decisions (May et al., 2010) and enhancing health and well-being in the long run (Fennis, 2022; Mick, 2017).

Such predictions may help guide practical implications for consumers. One important consideration is how to help increase well-being of individuals who grow up in low C-SES households. Given that not all households will be unstable (there will be many cases where parents provide predictable and stable environments), it is a question of how to support children and youth who *perceive* their environments are unstable. For instance, research has shown that low-income youth are at greater risk for persistent exposure to environmental stressors, with mindfulness interventions showing improvements for emotional regulation and perceived stress in this group (Segal et al., 2021). Mindfulness as a state can be cultivated as a manipulation through meditation using apps or audio recordings, or practice in meditation centers with training, music, or live teaching (Hafenbrack, 2017; Hafenbrack & Vohs, 2018). If policy makers, mentors, or marketers involved in social ethics can help intervene during periods of perceived stress and instability during youth, even brief meditations may support choices that can better inform well-being.

Contributing to the domain of consumer affairs and consumption in general, mindfulness can encourage reflection on the impact of one's behavior and choices in the face of multiple

consumption pursuits, including virtue food and beyond. For instance, mindfulness has been shown to reduce impulse buying through enhanced regulation of self-esteem; when consumers are better able to regulate their self-esteem, the need to spend impulsively is reduced (Dhendra, 2020). In a similar vein, Gentina et al. (2021) have shown that mindfulness reduces materialistic pursuits through an increase in ethical behavior. Other studies report that those who show more mindful behavior demonstrate better efficacy in saving for the future and regulating debt management (Celsi et al., 2017; Pereira & Coelho, 2019). Similarities between consumer affairs exploring self-regulation offers positive shifts in daily behaviors that influence well-being.

Further, the current research viewed reduction of impulse to have interesting implications for different consumer groups. As mindfulness has been shown to influence consumers through philosophical values congruent with the Buddhist philosophies of mindfulness, such as priority for environmental values (Amel et al., 2009) or compassion for nature and maintenance of ecological environments for others (Kaytaz Yigit, 2020), there may be interesting considerations in how these values might influence high or low SES consumers. Considering life-history strategies differ from one another in short versus long-term outlook, assessing the influence of mindfulness values in life-history groups may unveil interesting outcomes for low C-SES consumers to take a long-term view of well-being (i.e., climate footprints) or high C-SES consumers to make short-term beneficial changes (i.e., selecting eco-friendly products while shopping). The current research yields interesting evidence for the topical issue of how to support consumer well-being, specific to consumer groups who may struggle in this regard.

## 8.2 | Limitations and future research

One strength of the study is its exploration of the causal effects of mindfulness via experimental studies, rather than correlation (Pereira & Coelho, 2019). However, in endeavoring to investigate state mindfulness, the research does not address the long-term influences of mindfulness on virtue food choice. Since the life strategies of SES groups are known to be chronic traits, future research could explore how mindfulness influences C-SES groups long-term. Other research that has explored the effects of mindfulness on healthy eating behaviors (Van De Veer et al., 2016) could be used as a basis to corroborate any positive long-term effects on life strategy groups.

According to life-history theory, the nature of an individual's childhood environment disposes that individual to adopt a fast or a slow life-history strategy; however, the behavioral tendencies associated with each strategy are especially likely to emerge in stressful contexts such as economic scarcity or mortality salience (Griskevicius, Tybur, et al., 2011b). In contrast, mindfulness has been shown to replenish the cognitive resources lost in stressful situations (Friese et al., 2012; Kang et al., 2013). Future research could test scarcity interventions for SES to understand if they enhance the effects of mindfulness, or act as a boundary condition.

We want to acknowledge that not all individuals who were reared in low C-SES households are prone to high impulse behaviors or prefer vice food. Existing research has provided evidence for this premise as a general case (Griskevicius et al., 2012; Mittal & Griskevicius, 2014), however we remain sensitive to the knowledge that not all individuals within such scenarios exhibit such tendencies. In fact, Chen and Miller (2012) come to the conclusion that some low C-SES individuals may have poorer health outcomes due to a constellation of stressors rather than simply unstable environments, and further, may benefit from "shift-and-persist" strategies such as finding a role model or mentor to support various stress factors.

Furthermore, we acknowledge that measures of C-SES and C-HH acts as proxies to understanding evolutionary life strategies—as such strategies cannot be directly measured. Although our measurements act as proxies to perceptions of participants as snapshots of time during childhood, they have been used in previous studies to explore similar predictions and patterns (Griskevicius et al., 2013; Griskevicius, Delton, et al., 2011a; Mittal & Griskevicius, 2014).

Finally, we note that choices that we describe as “impulsive” may only be perceived as one if consumers have specific goals (e.g., has an active health goal or tries to lose weight). While we control for food (diet) preferences and hunger in the studies to account for such potential goals, we acknowledge that it might not be a complete account for various consumption goals. We also did not control for self-reported weight or height (BMI scores). Hence, it would be interesting for future research to explore how different consumption goals might interact (i.e., be strengthened or weakened) with mindfulness.

### CONFLICT OF INTEREST STATEMENT

There is no conflict of interest to disclose.

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**APPENDIX A: Vice versus virtue grocery products in Study 3 and Study 4**

Vice	Virtue
<p>Chips Ahoy Chocolate Chip Cookies \$3.91</p> 	<p>Kashi Go Lean \$3.85</p> 
<p>Coca Cola Classic \$4.99</p> 	<p>Arnold/Brownberry 100% Whole Wheat Bread \$3.85</p> 
<p>Ghirardelli Hot Cocoa \$4.25</p> 	<p>Bush's Baked Beans \$2.19</p> 
<p>Little Debbie Muffins—Banana Nut \$3.85</p> 	<p>Del Monte Diced Peaches (no added sugar) \$3.95</p> 
<p>Mrs. Smith's Apple Pie \$5.85</p> 	<p>Healthy Valley Granola (no added sugar) \$4.59</p> 
<p>Mrs. Smith's Pumpkin Pie \$5.85</p> 	<p>Quaker Oatmeal (original no sugar) \$5.39</p> 

(Continues)

## Vice

Oreo Cookies—Chocolate Sandwich

\$3.71



Oreo Cookies—Golden Sandwich

\$3.71



Sara Lee Cheesecake

\$5.99



Ruffles Chips Original Salted

\$2.99



## Virtue

Yoplait Fat Free Yogurt

\$2.99



Special K Cereal (original)

\$3.99



Kellogg's Fiber Cereal

\$5.99



Aquafina Water

\$4.99

