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THREE ESSAYS ON CONSUMER SELF-CONTROL AND RESTRICTIONS

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PhD Thesis by

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LONG ABSTRACT

My dissertation consists of three papers on two interrelated topics of consumer restrictions and self-control. Consumers might require to exert self-control when they feel the conflict between their immediate reward and long-term benefit (Hoch and Loewenstein 1991). For example, having financial restrictions require consumers to show higher self-control to save money or spend less on vice products, or having dietary restrictions involve self-control to avoid (choose) the unhealthy (healthy) food. In my dissertation, I explore firstly, the effect of duration of financial restrictions on self-control; secondly, the effect of evaluation modes on self-control; and thirdly the effect of duration of restrictions on information processing.

The first paper of my dissertation heeded the call of Hamilton et al. (2018) to better understand the temporal aspect of having financial restrictions by investigating the effect of duration of financial restrictions (i.e. short-term vs. long-term financial restriction) on self-control. Across four main studies and one supplementary study (i.e. one archival data and four experiments), this paper shows longer duration of financial restrictions leads to higher self-control in the financial domain (i.e. higher saving and lower impulsive spending) and in unrelated domains (e.g. higher preference for healthy over unhealthy food). This paper contributes to the research on financial restrictions and self-control by distinguishing between short-term and long-term restrictions to show how they affect different forms of self-control behavior (i.e. indulgence, impulsivity and unplanned behavior) and provides practical implications for managers and policy makers (e.g. financial institutes).

The second paper of my dissertation studies the effect of evaluation mode on choice of healthy and unhealthy food. In six main studies and one supplementary study (i.e. online and lab experiments), this research demonstrates that joint evaluation might enhance self-control (i.e.

higher relative choice of healthy to unhealthy food) compared to separate evaluation. The result of this research suggests that for most of the food that consumers eat, taste is perceived as easier to evaluate than healthiness. As a result, consumers are more likely to rely on taste (i.e. easy-to-evaluate attribute) in the separate evaluation mode and choose the tasty unhealthy food, whereas joint evaluation mode allows consumers to compare the health information (i.e. difficult-to-evaluate attribute), and hence shifts their preferences to the healthier option. Three alternative explanations of ease of justification, self-signalling and goal highlight are ruled out. This paper contributes to the literature on consumer choice and self-control and provides some practical implications for retailors and companies that are interested in promoting (decreasing) healthy (unhealthy) eating.

The third paper of my dissertation investigates the effect of duration of restrictions on information processing by distinguishing between temporary and permanent restrictions (e.g. physical or dietary restriction). Across four studies in the field (i.e. hospital, supermarket, diet center and gluten-free store), this research shows that people with permanent (temporary) restrictions are more likely to build higher (lower) construal about their restriction and hence have a more abstract (concrete) mind-set. Furthermore, this research shows that people who experience a permanent restriction (e.g. gluten allergy or diabetes) perceive more control, and hence do not attend to details about their restrictions, that results in a more abstract mind-set, compared to those who experience restriction temporarily. Construal level is measured by using action identification measure, product categorization and shelf format preferences. This paper contributes to the research on construal level and restriction and provides managerial implications for specialty retailers (e.g. gluten-free stores vs. diet stores).

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Last by not least, I dedicate my thesis to my husband. Adel, your love, encouragement and support is my source of energy to keep going and growing. You are always by my side specially when I needed you the most. You inspire me every day.

Do Financial Restrictions Deteriorate or Improve Self-Control?

The Role of Mindfulness

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ABSTRACT

Past research has largely investigated the effects of feeling financially deprived or restricted on individuals' well-being and behavior. In this research, we heed the call of Hamilton et al. (2018) to better understand the temporal aspect of how consumers respond to financial restrictions. Across four main studies and one supplementary study, we show that duration of financial restrictions influences self-control, such that a longer duration of financial restrictions enhances self-control. Specifically, our findings suggest that consumers who experience financial restrictions for a longer (vs. shorter) period of time save more and spend less money. Furthermore, consumers who experience financial restrictions for a longer (vs. shorter) period of time engage in less indulgent, impulsive and unplanned behavior. We test for the effect of mindfulness on the effect of duration of financial restrictions on self-control. The findings advance the literature on financial restrictions and self-control and generate further research questions and guidelines for managerial practice.

Keywords: duration of financial restrictions, self-control, saving, indulgence, impulsiveness, unplanned behavior

Financial restriction is the extent to which people believe their financial situation restricts desired consumption (Tully et al. 2015), and it is among the most prevalent restrictions that individuals may experience during their lifetime. Scholars have largely investigated the effects of feeling financially deprived or restricted on individuals' well-being (Diener, Suh, Lucas, and Smith 1999; Wilkinson and Pickett 2009) and behaviors (Ordabayeva and Chandon 2010; Sharma and Alter 2012). In this research, we heed the call of Hamilton et al. (2018) to better understand the temporal aspect of how consumers respond to financial restrictions. We specifically investigate the self-control behavior of consumers who experience financial restrictions for a longer (vs. shorter) period of time.

Self-control refers to overriding one's impulses to behave in accordance with a higher order goal (Baumeister, Vohs, and Tice 2007). Previous research offered contradictory findings on the effect of financial restrictions on self-control. One stream of research predicted that financial restrictions might lead to better self-control (Spiller 2011; Fernbach, Kan, and Lynch 2015). Specifically, individuals with financial restrictions engage in opportunity cost consideration (Spiller, 2011), prioritize longevity (Tully, Hershfield, and Meyvis 2015), and stretch their resources with efficiency planning or sacrifice less important goals with priority planning (Fernbach et al. 2015). Another stream of scholars suggested that those who have financial restrictions would be worse at self-control tasks. Specifically, individuals who have scarce resources (e.g. financial resources) focus single-mindedly on managing the scarcity at hand, which leads them to neglect other, possibly more important things (Mullainathan and Shafir 2013). There is growing evidence that resource scarcity, in general, and financial restrictions, in particular, produces diminished cognitive capacity, discounting of the future, and

a near-term focus (Mani, Mullainathan, Shafir, and Zhao 2013; Shah, Mullainathan, and Shafir 2012).

Across five studies, we showed duration of financial restrictions positively influences self-control. Our findings suggested that consumers who experience financial restrictions for a longer (vs. shorter) period of time are more likely to save more (study 1) and spend less money in a restaurant (study 4). We also showed that those who felt financially restricted for a longer time are more likely to show higher self-control even in unrelated domains by engaging in less unplanned behaviour (study 2), less indulgent (studies 2, 3 and 4), and less impulsive (pilot study in appendix A and study 4) behavior, compared to those who felt financially restricted for a shorter time.

THEORETICAL BACKGROUND

Financial Restriction Affects Mindset and Behavior

Financial restriction is the extent to which people believe their financial situation restricts desired consumption (Tully et al. 2015). Studies in economics, psychology, and consumer behavior have extensively investigated the antecedents and consequences of being financially restricted (Mullainathan and Shafir 2013; Sharma and Alter 2012; Tully, Hershfield, and Meyvis 2015). Research to date suggested that those who feel financially restricted are motivated to mitigate the effects with behavior that would help them enhance their financial state (Sharma and Alter 2012; Tesser 2000). For example, Mullainathan and Shafir (2013) suggested that to solve the problem of being financially restricted, enhance the financial state, and mitigate the effects of being financially restricted, people focus on their restrictions and adopt a restricted mindset.

Previous research also suggested that perceived restrictions cue consumers to consider opportunity costs (Spiller 2011). When consumers evaluate a single alternative, they rely on a metacognitive sense of sufficiency to end their search (Cohen and Reed 2006; Lynch, Marmorstein, and Weigold 1988). Spiller (2011) demonstrated that perceived restrictions would make consumers wonder whether what they know is sufficient for them to make a decision and ask themselves "What else should I consider?", such that it would increase opportunity cost considerations. For example, when a consumer decides to purchase a handbag when she feels financially restricted, she must exercise the self-control of thinking about the opportunity costs of purchasing that bag, another bag, or nothing. This view is also supported by research that showed that those who feel financially restricted are more likely to seek value and be more price conscious (Ailawadi, Neslin, and Gedenk 2001).

However, there is lack of research on the effect of duration of financial restrictions on consumer behavior (Hamilton et al. 2018). In this research, we aim to show how duration of financial restrictions (i.e. short-term versus long-term financial restriction) might affect self-control performance. In the next part, we first review the definition of self-control and different types of self-control acts. Next, we review previous research to show how financial restrictions might affect self-control performance.

Self-Control and Financial Restriction

Self-control is defined as "restraint exercised over one's own impulses, emotions, or desires" (Merriam-Webster.com) and it refers to the tradeoff between short-term reward and long-term benefit (Hoch and Loewenstein 1991). Consumers might set a goal for themselves such as saving money, or face an external restriction such as having low income that might

require self-control to enhance goal-directed behavior or align the behavior with that restriction (Vohs, Baumeister, and Tice 2008). Self-control acts have different forms and include overriding an impulse, resisting an indulgence, delaying an immediate gratification or avoiding an unplanned behavior (Dewitte, Bruyneel, and Geyskens 2009). Consumers might make many financial decisions in their day-to-day life that involve self-control conflicts such as decisions about saving money, spending money on an unplanned purchase, or purchasing vice versus virtue goods. Failure in exerting self-control can have detrimental consequences in life. Hence, studying self-control failure in any of these types of decisions is important, especially when people have financial problems and self-control failure can have negative effect on their wellbeing.

Previous research showed how people with financial restrictions might be able to exert higher self-control in the financial domain. For example, Schnelle, Brandstätter, and Knöpfel (2010) found that people with limited resources were motivated to prevent losses and problems and were thus more likely to exert self-control, such as purchasing insurance rather than gambling. Hence, when people have financial restriction, they are motivated to manage their financial situation by controlling their spending and consumption. In another research, Wertenbroch (2001) showed that consumers who are aware of their own self-control problems strategically self-impose monetary restriction to control their lack of self-control and overconsumption. In a similar vein, Thaler and Shefrin (1981) demonstrated that tying up funds in non-interest-bearing Christmas Club savings plans serves as protection against being tempted to overspend and overconsume, whereas relaxing restrictions on purchasing and consumption is likely to lead to overconsumption of tempting products.

However, another stream of research showed how financial restriction might lead to self-control failure. Soman (2001) supported this view, noting that credit card financing (i.e. a means of relaxing restrictions on purchasing and consumption) increases purchase likelihood. Briers and Laporte (2013) showed that lack of financial resource leads to higher need for resource and motivates people to consume food with higher caloric resource, resulting in overconsumption. Mani et al. (2013) showed that poverty consumes cognitive resource and might consequently impair the attention, decreasing the ability to exert self-control. More recently, Plantinga et al. (2018) showed that those who are poor are less likely to engage in opportunity cost consideration.

From the review of the previous literature on the topic of financial restrictions and self-control, it results that the former one can either increase or decrease the later one. We investigate on these conflicting results, inspecting a possible boundary condition that may explain the differences in previous research. More specifically, we suggest that the duration of the financial restrictions might influence whether those who have financial restrictions would be good or bad at self-control.

Previous research suggested that people who face scarcity (e.g. financial restriction) are more likely to focus on their restriction (Mullainathan and Shafir 2013), consequently they are more likely to bring their attention to what they are doing when they face the restriction, and hence be more present. We argue that when people have financial restrictions for longer time, they have their restrictions on top of their mind for longer period of time. As a result, those who are financially restricted for longer time are more aware of their restrictions due to the higher repeated experiences and hence are more mindful (i.e. being aware of their present moment and accepting it non-judgmentally) of their current situation. We further suggest that being mindful

about financial restriction explains why those with long-term financial restrictions are better at self-control such that they are less likely to engage in activities that might have positive consequences now but negative consequences in the future, than those with short-term financial restrictions. Mindfulness is defined as the state of "enhanced attention to and open awareness of current experience or present reality" (Brown and Ryan 2003 p. 822). The relationship between mindfulness and enhanced self-control has also been shown in the literature (Elkins-Brown, Teper, and Inzlicht 2017). For example, after mindfulness interventions, people experienced less interference in a Stroop task (Wenk-Sormaz 2005). Papies, Barsalou, and Custers (2012) showed that being mindful about the present reduces the desire for the tempting food and enhances self-control. In this research, we show that longer duration of financial restriction would increase mindfulness about the situation and hence help people to show higher self-control.

In sum, in this research, we study the effect of duration of financial restrictions (i.e. short-term versus long-term financial restrictions) on different types of self-control tasks (i.e., avoiding indulgence, impulsiveness and unplanned behavior). In our studies, we examined self-control behavior in the financial domain in terms of preference for long-term benefit rather than short-term benefit (saving more money; study 1 and spending less money in a restaurant; study 4). In studies 2, 3 and 4, we investigated the spillover effect of duration of financial restriction on self-control (i.e. avoiding an indulgent or impulsive choice or an unplanned behavior) in an unrelated domain (i.e. eating food). We further tested the role of mindfulness as the underlying mechanism for this effect (studies 3 and 4).

Study 1 – Financial Restrictions and Saving- Preliminary Evidence from Real Life

In study 1, we tested the relationship between duration of financial restrictions and self-control behavior using responses to the Survey on Household Income and Wealth (SHIW) that has been conducted by the Bank of Italy since 1960. The survey gathers data on income, savings, and other financial behaviors of Italian households. We analyzed the data starting from 2006 through the most recent (i.e. 2014). This dataset includes over 43,342 observations.

To measure self-control behavior, we used the amount of savings in deposits that individuals have. Literature suggests that money commitments (such as savings and time deposits) are evidence of individuals' self-control (Ashraf, Gons, Karlan, and Yin 2003). We calculated self-control variable as the amount of money that an individual has in a bank or in postal deposits (i.e., current account deposits, saving accounts or deposit books). We used the natural logarithm of this variable as a proxy for self-control, in which higher amounts saved indicated more self-control (M = 2.655, SD = 4.083).

In the survey, respondents indicated the extent to which their household's income is sufficient for them to see through to the end of the month on a scale of five points (1 = with great difficulty and 5 = very easily). We used the responses to this question as a proxy for financial restrictions. We measured duration of financial restrictions as the number of consecutive years that respondents reported experiencing financial restrictions. We controlled for income and liabilities. We measured liabilities as the logarithm of the sum of the amount of all of the liabilities to banks and financial companies, amount of trade debt, and amount of liabilities to other households; M = 2.063, SD = 3.969).

We tested our prediction that duration of financial restrictions influence self-control using the following equation:

$S = \beta_0 + \beta_1 FR + \beta_2 Duration + \beta_3 FR*Duration + \beta_4 FRextent + \beta_5 Liabilities + \beta_6 Income + \varepsilon$,where *S* is the logarithm of the savings in bank deposits, *FR* is the dummy variable indicating whether the respondent has experienced financial restrictions in the previous year, *Duration* is the logarithm of number of subsequent years respondent has been exposed to financial restrictions up to the previous year, *Fr*Duration* is the interaction variable between duration of financial restrictions and financial restrictions in the previous year, *FRextent* is the extent to which respondent expressed feeling constrained financially in the previous year, *Liabilities* is logarithm of the sum of the liabilities of the respondent (i.e. the proxy for financial restrictions), *Income* is the logarithm of financial income, and ε is a standard normal random error.

Results and Discussion

We regressed our proxy for self-control on the duration of financial restrictions, controlling for income and liabilities. We used the *xtreg* syntax in STATA with fixed effects. The results showed that there is a significant effect of duration of financial restrictions on savings ($\beta_2 = 1.653$, $p < .001$; see Table 1 and Figure 1), indicating that the longer the duration of financial restrictions, the greater the amount of savings – proxy for self-control.

Insert figure 1 about here

Moreover, there is a significant and negative effect of being exposed to financial restrictions on savings in the coming year ($\beta_1 = -1.75$, $p < .001$), indicating that individuals who

experience financial restrictions save less than those who do not experience any. However, when considering together the interaction of financial restrictions with duration, the results indicate that the negative effect of financial restrictions on savings is attenuated when individuals have been exposed to financial restrictions for a longer period of time ($\beta_3 = 1.444$, $p < .001$).

The result of this study provided us with preliminary evidence for the relationship between the duration of financial restriction and self-control (i.e. saving higher portion of income) with data from real life. However, one limitation of using real life data is that it can only provide us with correlational relationship, and hence to show the causal relationship between duration of financial restriction and self-control behavior, we used online and lab experiments for the next studies.

Study 2 –Duration of Financial Restrictions and its Spillover Effect to Self-Control in an Unrelated Domain

The aim of study 2 is to extend the previous finding to non-financial domains. We expected to find that when people have financial restriction for a longer period of time, they are more likely to be able to exert self-control in an unrelated domain, as well. In this study, we manipulated duration of financial restrictions (i.e. short vs. long duration) and measured self-control in another domain (i.e. preference for healthy versus unhealthy food). We predicted that those who have had long-term financial restrictions would be better at self-control compared to those with short-term financial restrictions. More specifically, we expected that those who have had long-term financial restrictions would prefer more healthy food than unhealthy food compared with those who have had short-term financial restrictions.

Participants. One hundred and fifty adults (87 female, M_{age} = 37.15, *SD* = 12.62) participated in the study on MTurk in exchange for 20 cents. Five participants did not follow the instructions. Hence, we did all of the analyses with the remaining one hundred and forty-five adults.

Procedure. Participants were initially assigned randomly to either the short-term or the long-term financial restriction conditions. Participants in the short-term financial restriction conditions read the following:

> "Please assume that you're out. When you come to the shopping district of your residence, you realize that you've forgotten your credit card at home. You have some cash with you. You enter your favorite store. You like several items but because you do not have enough cash with you, you have to select the ones that you can get with your available cash. You choose some of the goods that you like and you leave the others in the store."

Participants in the long-term financial restrictions condition read the following:

> "Please assume that you're out. You have been living with some financial problems for some time and you cannot use your credit card because you maxed out for the month. You also do not have a lot of cash with you but you do have some. You enter your favorite store. You like several items but because of your current situation, you have to select the ones that you can get with your available cash. You choose some of the goods that you like and you leave the others in the store."

Participants were then asked whether they had experienced any such situation and how they felt if they had experienced such a situation. If they had not experienced any such situation, we asked the participants to write for us how they would have felt had they experienced such a

situation. In the writing task, we also asked participants to think about how they would select the items that they would buy to boost the conflict that they experienced because of their financial restriction. After participants completed the writing task, we asked them to move on to the second part of the study.

In the second part of the study, we measured for unplanned behavior and impulsive choice in the food domain, as a measure for self-control. To measure self-control with an unplanned behavior, we asked participants to choose between a product that they planned to buy before their shopping trip and an attractive product that they unexpectedly encountered during the shopping trip. Sticking to the plan shows higher self-control. We adapted the following scenarios from previous research (Dewitte et al. 2009). Participants read the following in both conditions:

> "You are dining with friends. It's time for dessert. You decide to choose a fruit salad with seasonal fruit. The waiter comes to take your orders. He suggests the homemade specialty—ice cream with Chantilly made of fresh milk."

Then, we asked them to indicate whether they would keep to their first plan or choose the ice cream.

To measure self-control for an impulsive choice, we asked participants to choose between a healthy option and a tempting but unhealthy alternative. Higher preference for the healthy food over the unhealthy option showed higher self-control. In both conditions, participants read the following scenario adapted from previous research (Dewitte et al. 2009):

> "You're at a restaurant and you order chicken with rice. The waiter tells you that the restaurant has run out of rice. He suggests either potatoes or French fries. The people at the table next to you are eating fries."

We then asked them to indicate whether they would order boiled potatoes or fries. We summed the scores, with higher scores implying lower self-control (i.e. choice of the ice cream and the French fries). Next, we asked participants to indicate the extent to which they felt financially constrained on a scale of 7 points (*1 = not at all* and *7 = very much*). They also indicated the extent to which they thought about their financial restrictions when answering the questions on a scale of 7 points (1 = not at all and *7 = very much*). Furthermore, we asked them to indicate the extent to which they felt as though they have had financial restrictions for a long period (*1 = not at all* and 7 = very much). Participants then answered the demographics questions and were thanked.

Results and Discussion

Manipulation check**.** As intended, participants in the short-term and long-term financial restrictions condition did not significantly differ in the extent to which they felt financially constrained ($M_{shortterm}$ = 4.76, *SD* = 1.73 versus $M_{longterm}$ = 5.23, *SD* = 1.61, *t*(143) = -1.686, *p* = .094). However, participants in the long-term financial restrictions condition indicated that they thought more about their financial situation when answering the questions compared with those in the short-term financial restrictions condition ($M_{shortterm}$ = 3.35, *SD* = 2.18 versus $M_{longterm}$ = 4.56, *SD* = 2.24, *t*(143) = -3.30, *p* = .001). Moreover, participants in the long-term financial restrictions condition indicated that they thought that they had had financial restrictions for a longer period compared with those in the short-term financial restrictions condition ($M_{shortterm}$ = 4.40, *SD* = 1.82 versus $M_{longterm}$ = 5.04, *SD* = 1.77, *t*(143) = -2.155, *p* = .033; Figure 2) .

Insert figure 2 about here

Self-control. The result of binary logistic regression showed that when people feel financially restricted for a longer time, the number of people who stuck with their plan and ordered fruitsalad (70%) is significantly higher compared to when people feel financially restricted for a shorter time (52%; λ^2 = 4.84, p = .028; Figure 3).

Insert figure 3 about here

Hence people with longer duration of financial restrictions showed higher self-control. The result did not show significant effect of duration of financial restriction on choice of French fries over potato (λ^2 = .77; *p*=.37; Figure 4). Hence, in this study we could not replicate the findings with indulgence in the food domain (i.e. choice of unhealthy versus healthy option).

Insert figure 4 about here

In this study, we tested our predictions in an unrelated domain and supported our prediction that those who experience financial restrictions for a longer period are better at self-control compared with those who experience them for a shorter period. In this study, we used unplanned behavior and indulgence as two measures for self-control failure, in order to generalize our findings. While we found evidence for the unplanned behavior, the result for the indulgent behavior was not significant. In the next study, we investigate how being mindful might explain our results.

Study 3- Spillover Effect of Financial Restriction and The Role Of Mindfulness

The aim of study 3 is twofold; first, we aim to show the effect of duration of financial restriction on self-control in the eating domain. Second, we measure mindfulness to show when people have financial restrictions for the longer period of time, they are more likely to be more mindful and hence are able to exert higher self-control.

Participants. We posted the study on MTurk for one hundred and fifty participants in exchange for 10 cents. After one week of data collection, only one hundred and eleven participants completed the survey. Hence, we did all of the analyses with the one hundred and eleven completed studies (58 female, M_{age} = 37.41, SD = 13.15).

Procedure. Participants were first randomly assigned either to short-term or to long-term financial restriction conditions. Participants in the short-term (long-term) financial restrictions condition first read the following:

"Everyone might experience financial restrictions in life. There can be short-term (long-term) financial restrictions."

They were then asked to write down what they consider a short-term (long-term) financial restriction. Next, they were asked to write down five occasions when they felt financially restricted for a short period (long period). As the final task, they were asked to write down what they would experience if they had a short-term (long-term) financial restriction. They were specifically asked to write down how they would feel and what they would experience.

Next, participants were shown images of some healthy and non-healthy items. For each item, participants indicated the extent to which they liked each item on 7-point scales (1 = not at all and *7 = very much*). Healthy items included images of an apple, a banana, broccoli, cabbage, milk, a strawberry, and tomatoes. We summed the scores on these items to compose a health measure (α = .78). Unhealthy items included a piece of chocolate cake, potato chips, chocolate, French fries, gummy bears, and ice cream. We summed the scores on these items to compose an unhealthy measure (α = .77). To compose the self-control measure, we subtracted the unhealthy measure score from the healthy measure score; thus, higher scores indicate higher self-control.

Next, participants completed the Mindful Attention Awareness Scale (Brown and Ryan 2003). More specifically, participants completed the 15-items on 6-point scales (α = .94). The sample items include, "I find myself preoccupied with the future or the past," and "I find it difficult to stay focused on what's happening in the present". We averaged the score of all of the items and composed the mindfulness score, in which higher scores indicate higher levels of mindfulness (see Appendix B).

We then asked participants to indicate the extent to which they felt financially constrained on a 7-point scale (*1 = not at all* and *7 = very much*). They also indicated the extent

to which they thought about their financial restrictions when answering the questions on a 7-point scale (*1 = not at all* and *7 = very much*). Furthermore, we asked them to indicate the extent to which they feel as though they have had financial restrictions for a long period (*1 = not at all* and *7 = very much*). Participants then answered the demographics questions and were thanked.

Results and Discussion

Manipulation checks. As intended, participants in the short and long-term financial restriction conditions did not significantly differ on the extent to which they thought about their financial restrictions when they were answering the questions ($M_{shortterm}$ = 4.06, *SD* = 3.04 versus $M_{longterm}$ = 4.45, *SD* = 3.17, *t*(109) = -.65, *p* = .517) or on the extent to which they felt financially restricted ($M_{shortterm}$ = 5.34, *SD* = 2.10 versus $M_{longterm}$ = 5.08, *SD* = 2.09, *t*(109) = .641, *p* = .523). However, as intended, those who were in the long-term financial restrictions condition indicated that they felt as though they had experienced the financial restrictions for a longer period, compared with those who were in the short-term financial restrictions condition ($M_{shortterm}$ = 4.23, *SD* = 1.83 versus $M_{longterm}$ = 4.92, SD = 1.69, t(109) = -2.04, *p* = .043; Figure 5).

Insert figure 5 about here

Self-Control. We tested our prediction that those who have had long-term financial restrictions would be better at self-control compared to those who have had short-term financial restrictions. The result of ANOVA showed that participants in the long-term financial restriction

scored higher in self-control compared to those who were in the short-term financial restrictions condition, although the result was marginally significant *($M_{shortterm}$ = .1382, SD* = 1.80 versus $M_{longterm}$ = .6730, *SD* = 1.51, *t*(109) = -1.668, *p* = .098; Figure 6).

Insert figure 6 about here

We also further analyzed the result to show how duration of restriction might affect preference for healthy versus unhealthy food. The results showed that those who were in the long-term financial restrictions condition showed higher preference for healthy food compared to those were in the short-term financial restrictions condition *($M_{shortterm}$ = 4.52, SD* = 1.20 versus $M_{longterm}$ = 5.10, *SD* = 1.07, *t*(109) = 6.98, *p* = .009). However, the effect of duration of financial restriction were not significant on the preference for unhealthy food *($M_{shortterm}$ = 4.39, SD* = 1.25 versus $M_{longterm}$ = 4.43, *SD* = 1.27, *t*(109) = 0.03, *p* = .85).

Mindfulness. As predicted, those who were in the long-term financial restrictions condition scored higher on mindfulness compared to those who were in the short-term financial restrictions condition ($M_{shortterm}$ = 3.05, *SD* = 1.01 versus $M_{longterm}$ = 3.85, SD = 1.34, *t*(109) = -3.614 *p* < .001; Figure 7).

Insert figure 7 about here

Mindfulness as the Underlying Mechanism. We next tested whether mindfulness mediates the effect of duration of financial restrictions on self-control. We found marginally significant support for our prediction. We initially regressed self-control on duration of financial restrictions (β = .54, p = .098). We then regressed mindfulness on duration of financial restrictions (β = .803, p < .001). Finally, we regressed self-control on both duration of financial restrictions and mindfulness. Although the effect of the duration of the financial restrictions on self-control remained significant (β = .72, p = .035), the effect of mindfulness was marginally significant (β = -.23, p = .095). Because the results of our mediation analyses were marginally significant, we tested the proposed underlying process using bias-corrected bootstrapping to generate a 90% confidence interval around the indirect effect of mindfulness, in which mediation occurs if the confidence interval excludes zero (Hayes 2

009). The analysis revealed a significant indirect effect (ab = -.1855, 90% confidence interval [CI] = [-.43, -.04]). The indirect effect was not significant at the 95% confidence interval ([CI] = [-.48, .0005]). As we predicted, longer-duration financial restrictions increased mindfulness, which subsequently caused people to engage in better self-control.

Study 4 - Duration of Financial Restriction and Self-Control in the financial domain and unrelated domain- The Role of Mindfulness

The aim of this study is threefold. First, we aim to show the effect of duration of financial restriction on self-control in the financial domain by looking at the amount of spent money in a hypothetical shopping context. We expect to find that when people perceive that they have been

financially restricted for a longer period of time, they are more likely to exert higher self-control compared to those who have been financially restricted for a shorter period of time. Second, we aim to explore how duration of financial restriction might affect self-control in another domain. We expect to find the spillover effect. More specifically, we expect to find that people who feel financially restricted for a longer period of time, are more likely to show higher self-control in an unrelated domain (i.e. eating) compared to those who feel financially restricted for a shorter period of time. Third, we test the role of mindfulness in explaining the effect of duration of financial restrictions on self-control in a behavioral realm. In study 4, we experimentally manipulated mindfulness instead of measuring it to show the role of mindfulness (Pieters 2017). Specifically, we expected that the effect of duration of financial restrictions would be attenuated in the mindfulness condition compared to the control condition.

Participants. Ninety-eight students (62 female; M_{age} = 21.23, SD = 1.62) from a European university completed the study for course credit in the lab. One student did not complete more than half of the questions. Hence, we dropped the results of that student from the analyses and conducted the analyses with the remaining ninety-seven responses.

Procedure. This study has a 2 (duration of financial restrictions: short, long) x 2 (mindfulness: yes, no) between-subjects design. Upon arrival at the marketing lab of the university, participants were randomly assigned to the mindfulness or control conditions. Participants in the mindfulness condition were informed that they would meditate for approximately fifteen minutes as part of the study. Each session had a maximum of five participants to avoid overcrowding and lack of concentration. Separate yoga mats for each participant were provided in the room. When all participants were ready to start, the lights were switched off to create a relaxing ambience. Next, we started the 15-minute meditation session

using the *Mindfulness* application for iPhone and iPad. *The Mindfulness App* aims to help individuals to become more present in daily life activities by relaxing and concentrating on their feelings, their body, and their thoughts. The app provided a 15-minute guided session in English, during which participants were instructed by the app how to focus on their breathing (i.e. inhalation and exhalation), their thoughts, and their body sensations. The guided voice instructed participants to become aware and to investigate their interior (e.g. body and feelings) and exterior (e.g. sounds and lights) surroundings. Participants meditated for 15 minutes (the standard duration of the guided meditation session from *The Mindfulness App*). Thereafter, we switched on the lights and asked them to leave the yoga mats and accommodate themselves at one of the desks in the laboratory. Participants in the control condition did not do the meditation session and were randomly assigned to either short-term or long-term financial restriction conditions.

We adapted the scenarios that we used to manipulate short term and long-term financial restriction conditions from Spiller (2011). More specifically, participants in the short-term financial restrictions condition read the following:

> "Imagine that you are spending all day in Turin interviewing for summer internships. One interview session is scheduled from 9:00 am until 11:00 am, and a second session is scheduled from 2:30 p.m. until 4:30 p.m. You arrive in Turin at 8:20 a.m. without having had breakfast, and you plan to stick around Turin until at least 7:30 p.m. to avoid having to deal with rush-hour traffic as you go back to Milan.
>
> As you run into a local bar to get something to eat before your interview, you realize that you must have left your credit and debit cards at home. All you have with you is the 5€ you have in your wallet.

Below is the On-the-Move menu offered at the diner. What would you buy? Choose as many or as few items as you want."

Participants in the long-term financial restrictions condition read the following:

"Imagine that you are spending all day in Turin interviewing for summer internships. One interview session is scheduled from 9:00 am until 11:00 am, and a second session is scheduled from 2:30 p.m. until 4:30 p.m. You arrive in Turin at 8:20 a.m. without having had breakfast, and you plan to stick around Turin until at least 7:30 p.m. to avoid having to deal with rush-hour traffic as you go back to Milan.

As you run into a local bar to get something to eat before your interview, you get a call from the bank. They inform you that you have not been paying the installments of your tuition fee for the past three months. You already knew it as you have been living in these conditions for a long time. You also could not pay your rent for the past month. You enter the bar, but all you have with you is the 5€ you have in your wallet.

Below is the On-the-Move menu offered at the diner. What would you buy? Choose as many or as few items as you want."

In both conditions, to reinforce the duration of financial restriction (i.e., short-term versus long-term) manipulation, we asked participants to describe how they would feel about that situation, what they would do, and what their thoughts about the situation were.

Next, participants were shown the menu of the bar and were asked to choose the items that they would purchase. For each item, participants were provided with calories and cost information. The items in the menu were *Apple* (€0,80; 80 kCal); *Banana* (€1,00; 101 kCal); *Piece of cake* (€2,50; 235 kCal); *Brioche* (€1,00; 160 kCal); *Bottle of water* (€1,00; 0 kCal); and *Bottle of orange juice* (€2,50; 115 kCal).

After participants indicated their choices, they handed back their paper to the experimenter and started the second part of the study. In the second part of the study, participants completed the Mindful Attention Awareness Scale (Brown and Ryan 2003) as a check for the mindfulness manipulation as in study 4 (α = .76). Next, as a manipulation check, we asked participants to indicate for how long they have perceived themselves as financially restricted on a 7-point scale (1 = for a short period and 7 = for a long period) and the extent to which they thought about their current financial situation when answering these questions on a 7-point scale (1 = not at all and 7 = very much). Participants then indicated their age and gender. Finally, they were thanked.

Results and discussion

Manipulation checks. As intended, participants in the long-term financial restrictions condition indicated that they had felt financial restrictions for a longer period ($M_{longterm}$ = 4.12, *SD* = 1.56) compared with those in the short-term financial restrictions condition ($M_{shortterm}$ = 3.50, *SD* = 1.75; *t*(95) = -1.84, *p* = .069; Figure 8). Furthermore, participants in the long-term financial restrictions condition indicated that they answered the questions by thinking about their financial restrictions more than the participants in the short-term financial restrictions condition ($M_{shortterm}$ = 3.61, *SD* = 1.86 versus $M_{longterm}$ = 4.51, *SD* = 1.71; *t*(95) = -2.49, *p* = .015). As a check for mindfulness manipulation, participants in the meditation condition scored higher on the mindfulness scale compared with those in the control condition ($M_{meditate}$ = 3.92, *SD* = .61 versus $M_{control}$ = 3.57, *SD* = .66; *t*(95) = 2.74, *p* = .007; Figure 9).

Insert figure 8 and 9 about here

Money Spent. A 2 (mindfulness: meditation, control) x 2 (duration of financial restrictions: short-term, long-term) ANOVA on money spent revealed the predicted interaction ($F(1, 93) = 3.049$, $p = .084$). In the control condition, we replicated the key effect. Participants who had financial restrictions for a short-term (M = \$3.93, SD = 1.57) chose items that were more expensive compared with the participants who had financial restrictions for a long term (M =\$2.24, SD = 1.42; F (1, 93) = 17.32, $p < .001$). Meditating, however, attenuated the effect. In this case, there was no difference in the money spent ($M_{shortterm}$ = \$2.87, SD = 1.49 versus $M_{longterm}$ = \$2.20, SD = 1.19; F (1, 93) = 2.88, $p = .093$). Furthermore, as we intended, when the financial restrictions were short-term, meditation decreased the amount spent by the participants ($M_{meditation}$ = \$2.87, SD = 1.49 versus $M_{control}$ = \$3.93, SD = 1.57; $F(1, 93) = 6.28$, $p = .014$). There was no corresponding effect, however, in the long-term financial restrictions condition ($M_{meditation}$ = \$2.20, SD = 1.19 versus $M_{control}$ = \$2.24, SD = 1.42; $F(1, 93) = .011$, $p = .92$; Figure 10).

Insert figure 10 about here

Caloric Intake. A 2 (mindfulness: meditation, control) x 2 (duration of financial restrictions: short-term, long-term) ANOVA on caloric intake revealed the predicted interaction ($F(1, 93) = 5.47$, $p = .022$). In the control condition, we replicated the key effect. Participants who felt financial restrictions for a short time ($M = 312.70$, $SD = 144.18$) chose items with more calories compared with the participants who felt financial restrictions for a long time ($M = 139.56$, $SD = 119.56$; $F(1, 93) = 20.94$, $p < .001$). Meditating, however, attenuated the effect. In this case, there was no difference in the calories of the selected items ($M_{shortterm} = 237.70$, $SD = 138.51$ versus $M_{longterm} = 191.46$, $SD = 132.34$; $F(1,93) = 1.54$, $p = .218$). Furthermore, as we intended, when the financial restrictions were short-term, meditation decreased the caloric intake of the participants ($M_{meditation} = 237.70$, $SD = 139.51$ versus $M_{control} = 312.70$, $SD = 144.18$; $F(1, 93) = 3.64$, $p = .060$). As expected, there was no corresponding effect, however, in the long-term financial restrictions condition ($M_{meditation} = 191.46$, $SD = 132.34$ versus $M_{control} = 139.56$, $SD = 119.56$; $F(1, 93) = 2.10$, $p = .151$; Figure 11).

Insert figure 11 about here

In this study, we showed that longer duration of restriction would lead to higher self-control, in the financial domain (i.e. money spent on food items) and in an unrelated domain (i.e. calorie intake). The result of this study also showed mindfulness as the underlying mechanism for the effect of duration of financial restriction on self-control, through manipulating the mindfulness. One limitation in the design of this study was that both dependent variables (i.e.

calorie and price) were linked to each other such that some of the items with lower calorie were cheaper. This might have affected the findings of this study in the food domain since it might not be unrelated to the financial domain in this study due to the design of the stimuli. Hence further studies should test the effect of duration of financial restriction and the role of mindfulness in an unrelated domain.

General Discussion

Investigating issues related to self-control and financial restrictions have always been important for scholars and practitioners because both self-control behavior and financial restrictions have important behavioral consequences. In this paper, we tried to link the two important literatures and suggested a new approach to viewing how those who have financial restrictions engage in self-control behavior. The results of the studies that we report in this paper demonstrate a robust finding on the effect of duration of financial restrictions on self-control. We used archival datasets from Italy, laboratory and online experimental studies to support our predictions. In this research, we showed when people feel that they have been experiencing financial restriction for a longer period, they would become better at exerting self-control(i.e. saving money) in financial domain (study 1). We replicated this finding in the financial domain, by measuring self-control with the amount of spending money (study 4). We also extended the findings to the self-control in unrelated domains such as eating or watching movies (studies 2, 3, 4 and the pilot study), where we showed people with longer duration of financial restriction are better in self-control in the unrelated domains of food and movies. We demonstrated the generalizability of our findings by showing the effect of duration of financial restriction on

different types of self-control behavior; overriding an impulsive behavior (i.e. choosing a highbrow movie over a lowbrow movie in the pilot study), avoiding an unplanned behavior (i.e. sticking to the plan than ordering a tempting unplanned dessert in study 2) and avoiding indulgence (choosing a healthy food over an unhealthy option in studies 2, 3 and 4). We also showed that when people feel financially restricted for a longer period, it is more likely that they become more mindful and hence exert higher self-control in financial and unrelated domains (studies 3 and 4).

The results of this paper make several theoretical contributions. First, previous studies on financial restrictions investigate contexts in which the duration of financial restrictions is not known. Financial restrictions have been investigated by asking participants to think about financial restrictions that participants have experienced (Tully et al. 2015). There has been no distinction based on the duration of the financial restrictions. Current research filled this gap in the literature and heeded the call of Hamilton et al. (2018), by showing the effect of short-term versus long-term financial restriction on self-control. Second, by distinguishing between short-term and long-term financial restriction we reconciled among the previous conflicting findings on the effect of financial restriction and self-control. While some research suggested that people with financial restriction would be better at self-control (Spiller 2011; Fernbach, et al. 2015), another stream of research showed that they might be worst at self-control (Mani et al. 2013; Shah et al. 2012; Plantinga et al. 2018). In this research, we demonstrated that longer duration of financial restrictions might lead to higher self-control performance. Third, we tested the effect of duration of financial restriction on different forms of self-control behavior (i.e. indulgence, impulsivity and unplanned behavior) in both related and unrelated domains. Future research can build on this paper to further investigate the effects of duration of financial restrictions on other

behavior. Forth, we also contribute to research on mindfulness and self-control by showing how longer duration of the restriction (e.g. financial restriction) might lead to higher mindfulness and hence enhance self-control.

This research has also implications for managers and public-policy makers. One of the most important results of this research is that one should not provide identical solutions to those who have had financial restrictions for a short (vs. long) period. We believe that by segmenting individuals according to the stage of their financial restrictions, one can predict how they would engage in self-control behavior. Although banks usually do not prefer to grant loans to customers who have had financial restrictions for a longer period due to the risk that they bear, the results of this research suggested that the longer the duration of the financial restrictions, the better people are at self-control.

We also suggest that breaks from the thoughts about financial restrictions (e.g. meditation) might cause those who have financial restrictions for a short period to behave with more self-control. There could be a smartphone intervention to nudge self-control (Fishbach and Hofmann 2015). The results of an experiment testing a 1-week smartphone field intervention showed that when people are asked to anticipate temptation (i.e. obstacles) that might interfere with daily goal pursuits and to envision resolutions, participants report more successful pursuit of the daily goals for which they listed obstacles and planned resolutions than for their other goals. We tested for the role of breaks from the thoughts about financial restrictions (i.e. meditation). We suggest that similar self-control nudges can be used in the context of financial restrictions– particularly for those who experience financial restrictions for a short period.

Appendix A: Pilot Study

In this study, we used a decision-making scenario in which the participants were asked to evaluate highbrow and lowbrow videos to watch, as a measure for self-control (avoiding an impulsive choice). Previous research suggested that highbrow (e.g. depressing plot or with subtitles) movies can be viewed as virtues relative to the lowbrow (e.g. light comedy or action) movies because they typically provide less immediate pleasure but more long-term benefits in the form of educational or cultural enrichment. Lowbrow movies, on the other hand, are considered a vice category because they are fun to watch but forgettable and hence less long-term benefit (Read, Loewenstein, and Kalyanaraman 1999). Hence choosing a lowbrow movie indicates a more impulsive choice whereas choosing a highbrows movie shows higher self-control.

Participants. One hundred forty-four students (92 female; M_{age} = 21.56, *SD* = 1.08) from a major European university participated in the study in different sessions across a two-week period. Participants were randomly assigned to three (i.e., long-term financial restrictions, short-term financial restrictions, or control) conditions.

Procedure. Upon arrival in the laboratory, participants were first randomly assigned to duration (i.e. short versus long duration) of financial restrictions and control conditions. Participants in the short-term (long-term) financial restrictions condition read the following:

“Imagine that you have been experiencing financial restrictions recently (for a long time). For the past three months (in recent years), you started to feel that your financial condition restricted your consumption. Moreover, you could not pay your credit card in full for the past three months (for over a year now) and you have begun to receive calls from your bank. Please

write down how you would feel in such a condition, what you would experience, and what you would do when you started to feel financially restricted."

Participants in the control condition were asked to write down what they ate and drank in the past five days. Participants were then provided with a list of movies (see appendix C; Read et al. 1999) and were asked to indicate the movies that they would be willing to watch from the list. The order of highbrow and lowbrow movies was randomized between participants.

Insert table 2 about here

We composed a relative measure of preference for highbrow movies by counting the number of highbrow preferences and dividing the result by the total number of preferences for highbrow and lowbrow movies, in order to measure self-control. Higher number showed higher self-control (i.e. higher preference for highbrow movies). One limitation of this study is that we did not measure participant's perception of duration of financial restriction as our manipulation check at the end of the study. We included such measures in the main studies of the paper.

Results and Discussion

An ANOVA on relative preference for highbrow movies revealed the effect of duration of financial restrictions ($F(2,141) = 5.712$, $p = .004$). Those participants in the long-term financial restrictions condition did not significantly differ from the control condition in terms of their relative preferences for highbrow movies ($M_{LT} = .36$, SD = .19 versus $M_{CONTROL} = .40$, SD =

.18; t(141)=-1.15; p = .254). However, those under the short-term financial restrictions condition preferred significantly less highbrow movies (M_{ST} = .28, SD = .16) compared to those in both the long-term financial restrictions (t(141)=2.18; p = .032) and control (t(141)=-3.47; p = .001) conditions (Figure 12).

Insert figure 12 about here

The result of this study showed that shorter duration of financial restriction leads to more indulgence (i.e. higher preference for lowbrow movies) compared to longer duration of financial restriction.

Appendix B: Mindful Attention Awareness Scale (Brown and Ryan 2003)

Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

	1 = Almost always	2 = very frequently	3 = somewhat frequently	4 = somewhat infrequently	5 = very infrequently	6 = almost never
I could be experiencing some emotion and not be conscious of it until sometime later.						
I break or spill things because of carelessness, not paying attention, or thinking of something else.						
I find it difficult to stay focused on what's happening in the present.						
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.						
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.						
I forget a person's name almost as soon as I've been told it for the first time.						
It seems I am "running on automatic," without much awareness of what I'm doing.						

I rush through activities without being really attentive to them.						
I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.						
I do jobs or tasks automatically, without being aware of what I'm doing.						
I find myself listening to someone with one ear, doing something else at the same time.						
I drive places on 'automatic pilot' and then wonder why I went there.						
I find myself preoccupied with the future or the past.						
I find myself doing things without paying attention.						
I snack without being aware that I'm eating.						

Appendix C: Stimuli for the pilot study:

List of highbrow and lowbrow movies-Pilot study

Movies	0=No	1=Yes
The Breakfast Club Release Date: 1985 Cast:Emillo Estevez, Judd Nelson, Molly Ringwald Synopsis: Five high school students meet in Saturday detention and discover how they have a lot more in common than they thought.		
Blue (subtitled) Release Date: 1993 Cast: Derek Jarman, Tilda Swinton, John Quentin Synopsis: Against a plain, unchanging blue screen, a densely interwoven soundtrack of voices, sound effects and music attempt to convey a portrait of Derek Jarman's experiences with AIDS, both literally and allegorically, together with an exploration of the meanings associated with the colour blue.		
Clear and Present Danger Release Date: 1994 Cast: Harrison Ford, Willem Dafoe, Anne Archer Synopsis: CIA Analyst Jack Ryan is drawn into an illegal war fought by the US government against a Colombian drug cartel.		
Blue Sky (Oscar Winner) Release Date: 1994 Cast: Jessica Lange, Tommy Lee Jones, Powers Boothe Synopsis: Jessica Lange stars in a period drama about a family moving to a military base, and she quickly becomes part of a cover-up involving nuclear bomb tests.		
Groundhog Day Release Date: 1993 Cast: Bill Murray, Andie MacDowell, Chris Elliott Synopsis: A weatherman finds himself inexplicably living the same day over and over again.		
Hoop Dreams (documentary) Release Date: 1994 Cast: William Gates, Arthur Agee, Emma Gates Synopsis: A film following the lives of two inner-city Chicago boys who struggle to become college basketball players on the road to going professional.		

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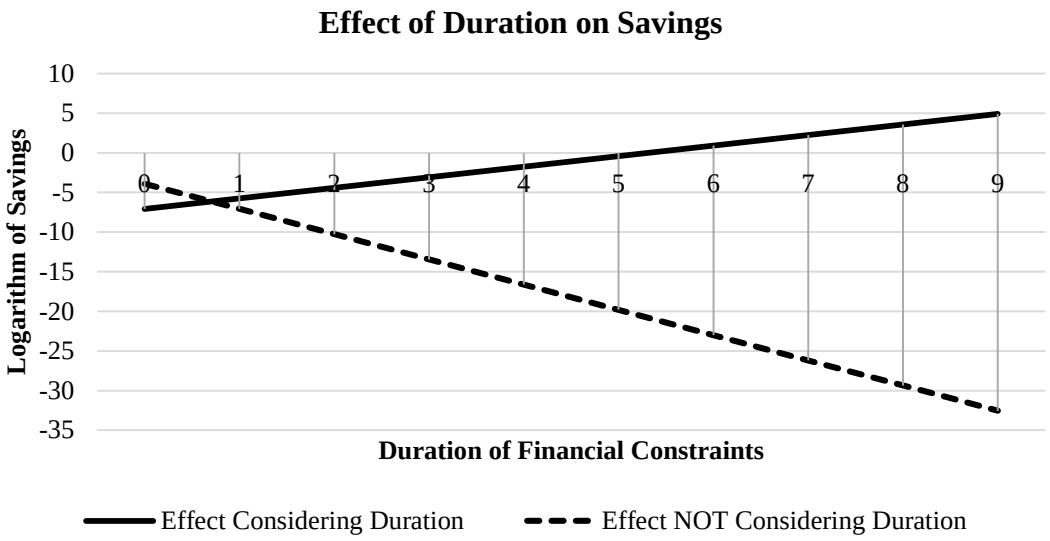

Figure 1: Effect of Duration of Financial Restrictions on Savings (Study 1)

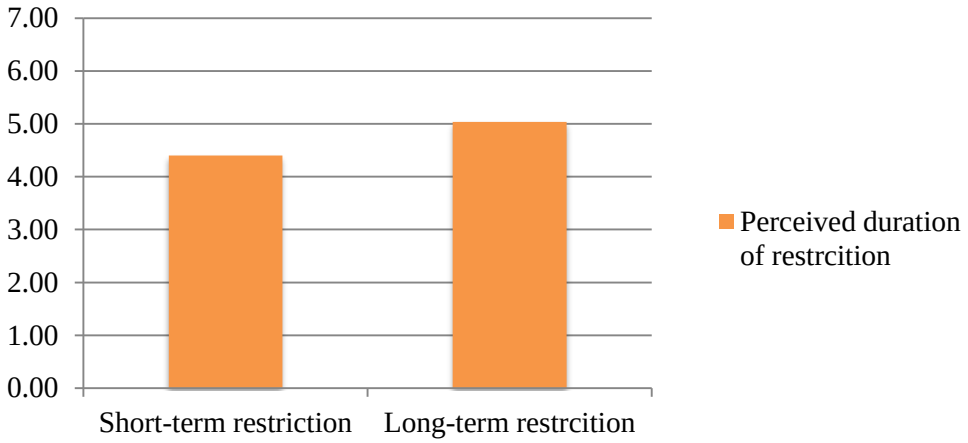

Figure 2: Perceived duration of financial restriction- Study 2

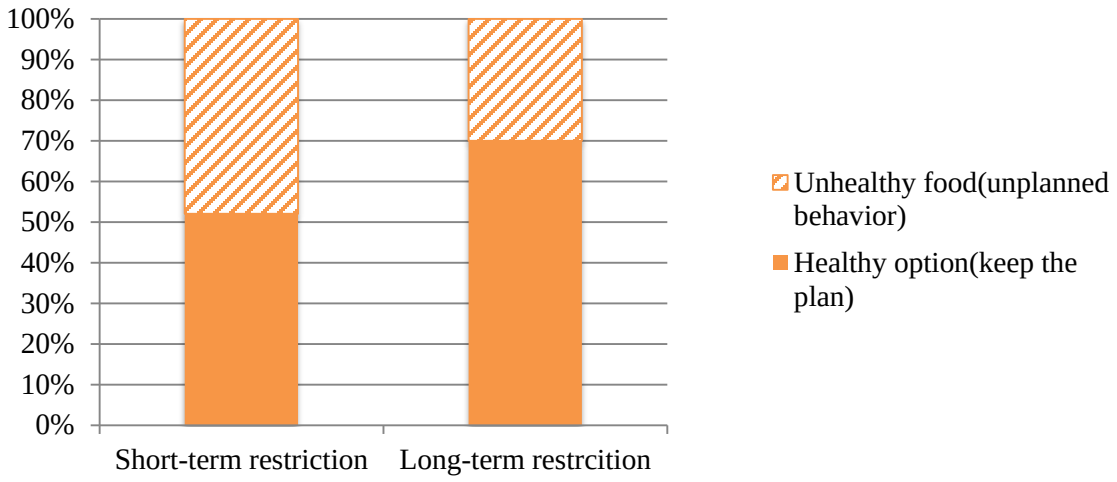

Figure 3: Effect of duration of financial restriction on unplanned behavior in food domain-Study 2

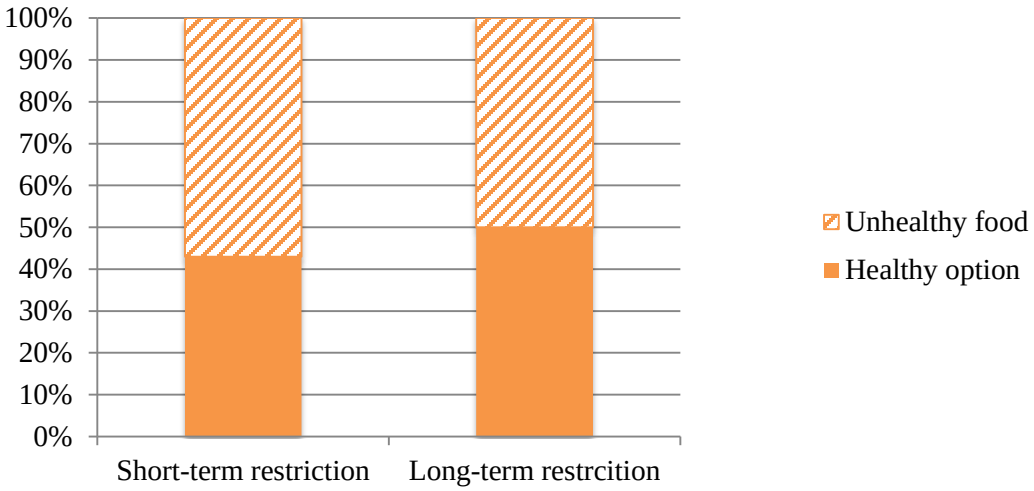

Figure 4: Effect of duration of financial restriction on indulgence in food domain-Study 2

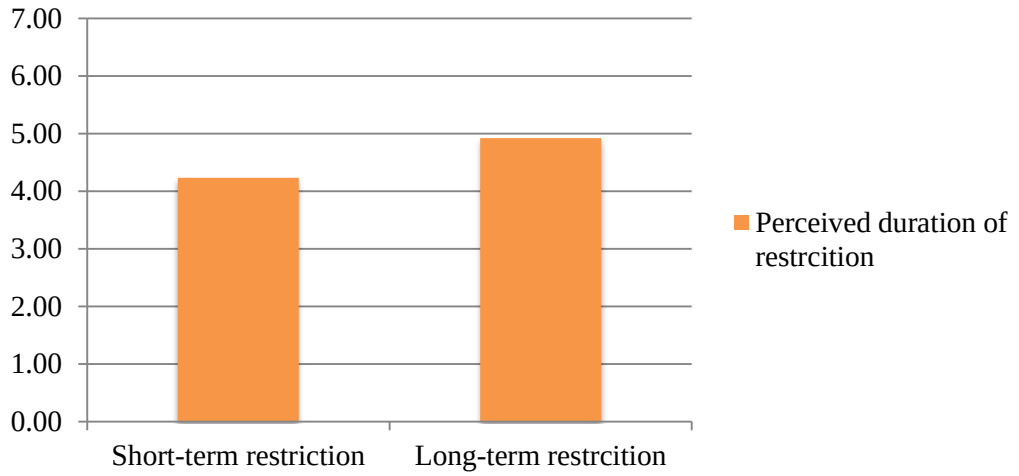

Figure 5: Perceived duration of financial restriction- Study 3

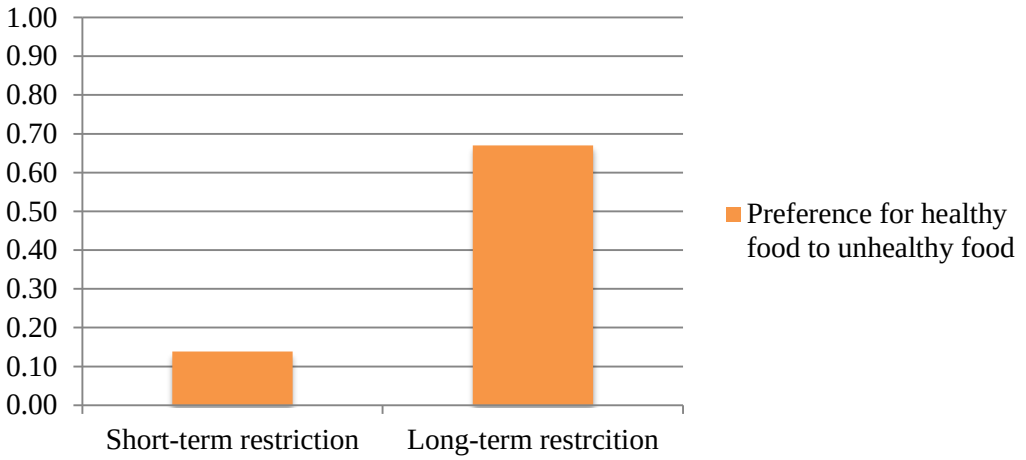

Figure 6: Effect of duration of financial restriction on self-control in food domain-Study 3

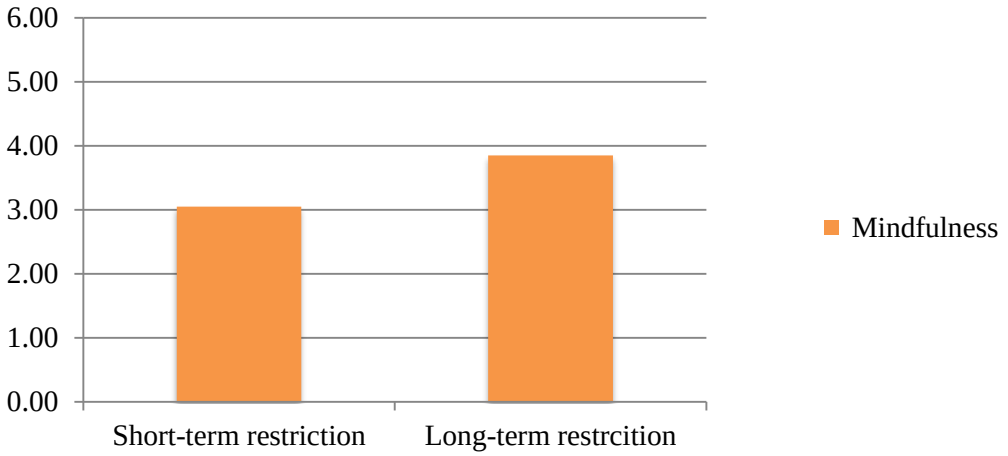

Figure 7: Effect of duration of financial restriction on mindfulness- Study 3

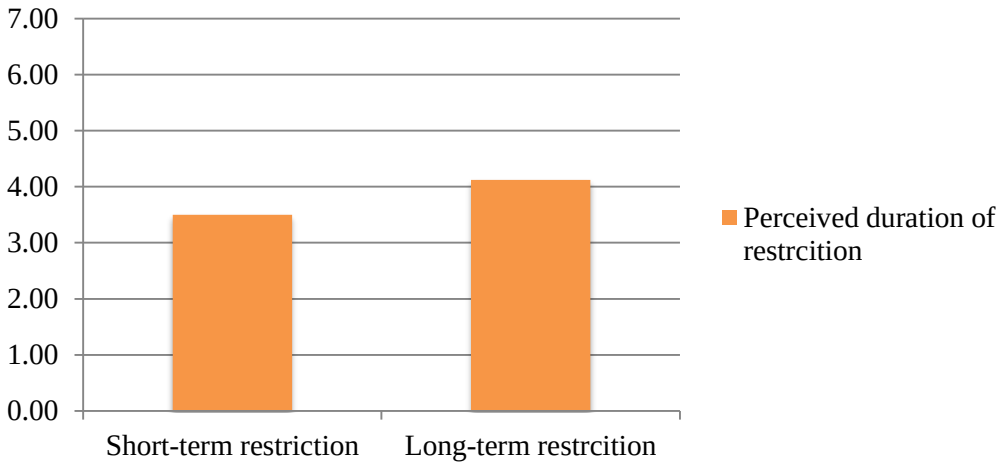

Figure 8: Perceived duration of financial restriction- Study 4

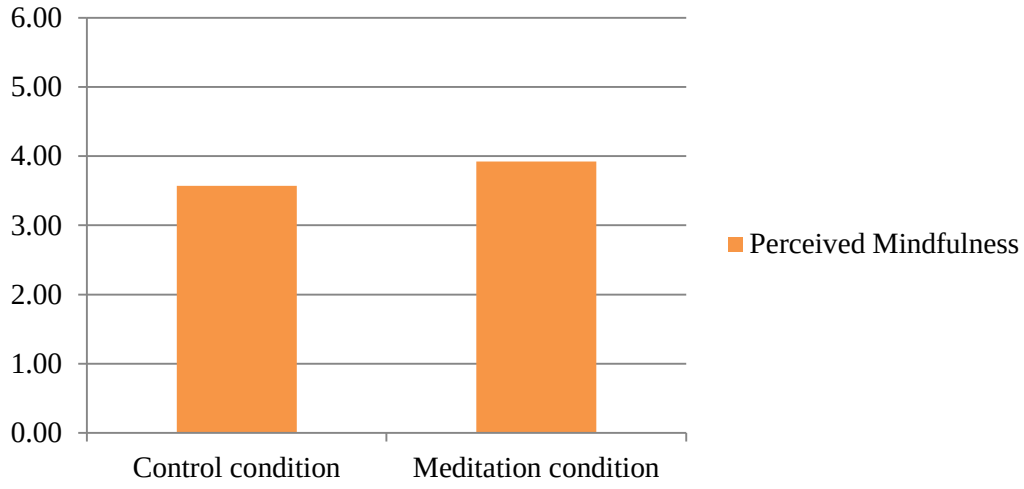

Figure 9: Perceived mindfulness –Study 4

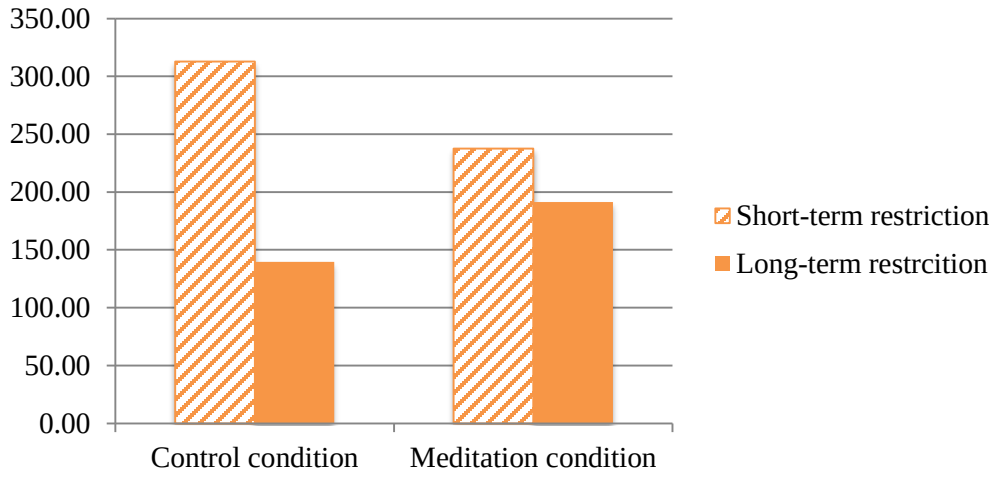

Figure 10: Effect of duration of financial restriction on calorie intake- Study 4

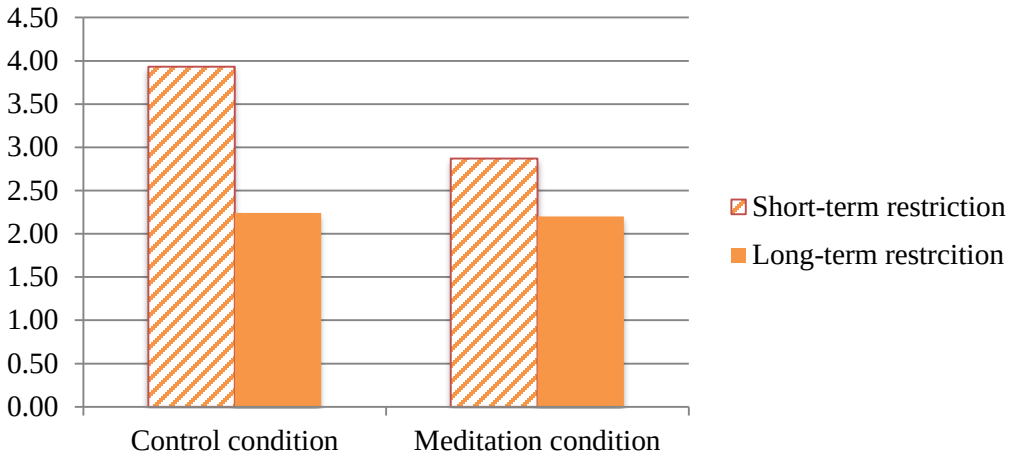

Figure 11: Effect of duration of financial restriction on money spent- Study 4

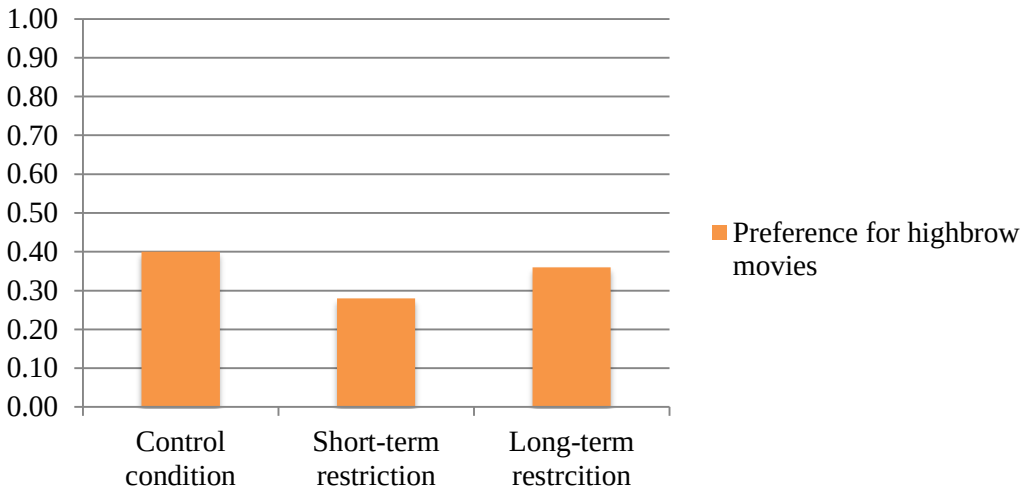

Figure 12: Effect of duration of financial restriction on self-control in movie domain-Pilot Study

Table 1: Effect of the Duration of Financial Restrictions on Savings-Study 1

Savings (log)	**Coef. (β)**	**Std. Error**	**t**	**P>|t|**	**[95% Conf. Interval]**	
Interaction FR*Duration	1.444	.150	9.61	0.000	1.149	1.739
Duration	1.653	.089	18.49	0.000	1.478	1.829
FR (dummy)	-1.75	.113	-15.39	0.000	-1.97	-1.527
FR Extent	1.069	.108	9.88	0.000	-.857	1.281
Liabilities (log)	-.051	.010	-4.98	0.000	-.071	-.031
Income (log)	-.186	.063	-2.96	0.003	-.310	-.063
_cons	3.622	.701	5.16	0.000	2.247	4.997

Evaluation Mode Affects Choice of Healthy and Unhealthy Food: The Role of Taste and Healthiness Attribute Evaluability

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ABSTRACT

Understanding determinants of healthy food choice is paramount to improve public health. We zoom in on the role of the evaluation mode (i.e., separate versus joint evaluation) in consumers' healthy food choice. In a series of 7 studies (N = 1724), we investigated the effect of evaluation mode on the choice share of healthy and unhealthy food. In line with earlier work in different domains, we demonstrate that joint evaluation of healthy and unhealthy food option improves consumers' decision-making through increasing (decreasing) the choice share of healthy (unhealthy) food. We also show that this relies on the simple fact that the health attribute is difficult to judge in isolation, certainly in comparison with the taste attribute. Indeed, when health becomes easy to evaluate, healthy choices become more frequent in separate evaluation as well. We distinguish our effect from ease of justification, self-signaling, and goal highlighting accounts. We discuss the theoretical contributions, the methodological implication for the self-control literature, and managerial implications of our research.

Keywords: consumer choice, preferences, evaluation mode, food, ease of evaluability of attributes, healthy food

Suppose Sophia saw an apple and a cake (i.e., joint evaluation) and wanted to decide which one to eat, whereas William saw just an apple or just a cake (i.e., separate evaluation) and in both cases wanted to decide whether to take it or not. Which one of them is more likely to select the healthier option? While deciding which alternative to choose, many consumers often fail to act in accordance with their long-term goals or the healthy diet recommendations. According to the report by the U.S. Department of Health and Human Services (HHS) and of the Agriculture department, the eating pattern of people in United States is low in fruits and vegetables and excessive in fat and sugar.[1] Shifting the dietary intakes from unhealthy food consumption to more healthy food is critical. This research explores how evaluation mode might affect the selection of healthy and unhealthy food.

Prior research in decision theory suggested a shift in preferences from separate evaluation of two options (i.e., evaluating one option at the time) to joint evaluation of both options (i.e., comparing two options together), as the sensitivity to the difference between the two options on a certain attribute changes between the two evaluation modes (Hsee, Loewenstein, Blount, and Bazerman 1999). In this research, we extend this to decision-making in the food domain for relative vice and relative virtue foods, which differ from each other along the dimensions of taste and healthiness. These two attributes, food taste and food healthiness, are among the most important attributes when people are deciding what to eat (Aggarwal, Rehm, Monsivais, and Drewnowski 2016).

We propose that people are more sensitive to taste than to health when evaluating a food item separately because taste of the food is more intuitive to assess than healthiness. This should lead to a relatively higher choice share of tasty (unhealthy) food. However, joint evaluation of

[1] https://health.gov/dietaryguidelines/2015/guidelines/chapter-2/current-eating-patterns-in-the-united-states/

two options makes the comparison on the health dimension easier compared to separate evaluation and hence the disadvantage (advantage) of unhealthy (healthy) food becomes more apparent. This shift in focus to healthiness should lead to lower (higher) choice share of unhealthy (healthy) food.

In what follows, we first discuss the effect of evaluation mode on consumer decision-making, and then present our studies. We first test the effect of evaluation mode on the preference for healthy and unhealthy food. Next, we test for the underlying mechanism of ease of evaluability of taste to healthiness of the food that leads to preference reversal between healthy and unhealthy food from separate to joint evaluation. We finally discuss the implications of our findings for the self-control literature (which are both substantial and methodological) and the managerial implication for those companies, retailers or public officers that are interested in promoting (reducing) consumption of healthy (unhealthy) food.

THEORETICAL DEVELOPMENT

The Effect of Evaluation Mode on Food Preference

Sometimes consumers might decide about an option in the separate evaluation mode, whereas at other times they might choose between options in the joint evaluation mode. The separate evaluation mode refers to situations in which one option is evaluated at a time, whereas joint evaluation refers to situations in which two options are presented simultaneously and people evaluate them at the same time (Bazerman, Loewenstein, and White 1992). Prior literature in decision theory has shown the effect of evaluation mode on the preference for two

options (for a review, see Hsee et al. 1999). When two products differ from each other on two attributes, one option might be selected based on the attractiveness of the more salient attribute in the separate evaluation mode. However, by comparing the options in the joint evaluation mode, the less salient attribute becomes relatively more influential; making the disadvantage of the selected option in the separate evaluation mode apparent and hence leads to preference reversal between the two options (Hsee and Leclerc 1998). Hsee et al. (1999) suggested that people rely on the easy-to-evaluate attribute when they are deciding in the separate evaluation mode, whereas they are more likely to indicate their preference for an option based on the difficult-to-evaluate attribute in the joint evaluation mode (i.e., evaluability hypothesis). That is the reason why we might observe preference reversal from the separate evaluation to the joint evaluation mode. For example, Hsee et al. (1999) showed that to choose a candidate for a job between candidate A with 4.9 GPA and 10 KY programs as working experience and candidate B with 3 GPA and 70 KY programs as working experience, people are more likely to rely on GPA in the separate evaluation mode, whereas they are more likely to decide based on the working experience in the joint evaluation. This is because people have a clearer idea about how good 4.9 or 3 is as GPA whereas it is not easy to evaluate how good 10 KY or 70 KY is in isolation. As a result, people might show higher preference for candidate A that has a higher GPA, when they evaluate the candidates separately. However, in the joint evaluation of the two candidates, they might shift their preference to candidate B, since the comparison allows them to realize the advantage of the candidate B with higher working experience. This implies that the shift in preferences from separate evaluation to joint evaluation only occurs when one attribute is easier to evaluate compared to the other one.

For much of the food choices that consumers make, there is a conflict between the

attributes of taste and healthiness of the food. Previous research has shown that taste and nutrition are the most important attributes (i.e., 77% of the respondents rated taste as the most important attribute and 59.9% rated nutrition as the most important attribute) among US adults when they want to purchase food products, by looking at the data from NHANES (2007-2010) survey. In addition, we ran a pretest to find the most important food attributes when people are shopping for food items with 100 participants on Amazon Mechanical Turk (48% female, M_{age} = 39.34). Among nutrition, taste, price, ease of preparation, production method and food appearance, participants perceived taste as the most important attribute, followed by price and nutrition (see appendix A, pretest 1). In this research, we focused on taste and nutrition since they are two conflicting attributes. While some food has a better taste compared to other, it might not be as healthy. In the present research, we argue that taste may be easier to evaluate than healthiness in most natural consumer choice situations, since evaluation of taste is more intuitive than the healthiness. As a result, we apply the evaluation mode reasoning to the food domain to investigate how taste and healthiness of a food item might affect consumer's decision in different evaluation modes. Hence, this research explores the role of two attributes of taste and healthiness in each evaluation mode (i.e., separate or joint evaluation mode) when consumers decide what to eat. Based on attribute evaluability account, we expect to see a shift in preferences towards a higher choice share of healthy food from separate evaluation to joint evaluation when taste of the food is easier to evaluate than the healthiness of the food.

We focused on the two conflicting food attributes (i.e., taste and healthiness) to investigate the shift in focus from taste to healthiness in different evaluation modes. We propose that when consumers are asked to indicate their preference for a single food item, it is more likely that the decision would be based on taste (i.e., easy to evaluate attribute) and show higher

preference for the tastier option. Whereas when they are asked to evaluate two items at the same time, they are more likely to shift their attention to healthiness of the food and hence show higher preference for healthier food. In sum we argue:

H1: The relative preference for healthy food compared to unhealthy food will be higher in the joint evaluation mode than in the separate evaluation mode.

H2: The relative impact of healthiness as compared to taste during food choice will be higher in the joint evaluation mode than in the separate evaluation mode.

In the next part, we review the alternative explanations for the shift in preferences between hedonic and utilitarian options from separate to joint evaluation modes.

The Unique Characteristics of the Evaluability Account

Our reasoning is based on the attribute evaluability account, however there are several other accounts that would predict similar patterns in many common circumstances. Yet these other accounts share the implication that the joint evaluation will invariably lead to a higher choice share for the healthy option. Our account suggests more flexibility, and that is why we think it is very important to set our account and the associated processes apart from the earlier work. This flexibility may also show novel avenues to use the evaluation mode to stimulate healthy food choice.

Three alternative accounts may lead to a similar prediction that preference for the utilitarian option might be higher in the joint evaluation, compared to separate evaluation mode. In her research on consumer choice of hedonic and utilitarian goods, Okada (2005) showed lower preference for the hedonic option in the joint evaluation mode, since it might be more

difficult for people to justify their choice of hedonic goods in the presence of utilitarian alternative, compared to separate evaluation mode. In a similar vein, Dhar and Wertenbroch (2012) suggested that consumers will receive lower utility if they choose a vice option from a mixed opportunity set (i.e., mix of relative vices and virtues) compared to a homogenous set. However, the utility will be higher if they choose a virtue from a mixed opportunity set than a homogenous set. They showed that choosing a virtue option in the presence of the tempting option provides consumers with a positive self-signaling utility. Hence, in the joint evaluation of a vice and a virtue, people are more likely to choose the virtue option compared to the vice alternative. A third alternative account comes from another research by Fishbach and Zhang (2008). They showed that for two items that are preferred equally in the separate evaluation mode, preferences might change in the joint evaluation mode depending on the presentation mode (i.e., two items in one image or in two separate images). They manipulated how a vice and virtue were presented: either integrated in one picture, or in two pictures side by side, which can be considered as two types of joint evaluation. They showed that when people see two options in two separate images side by side rather than integrated in one image, they are more likely to select the utilitarian option. They argued that viewing two separate images against each other might highlight the higher order goal and hence increase the preference for the goal-consistent (i.e., utilitarian) product, compared to viewing the two options next to each other in one image. In our studies, we have also presented two options in two separate images side by side in the joint evaluation mode. Hence in principle, this account could also explain the main effect of joint evaluation because presenting two conflicting options in two images side by side may activate the higher order goal rather than affecting attribute evaluability as we surmise.

We go beyond the justification, self-signaling, and goal highlighting arguments by

investigating the role of two conflicting attributes in the food domain and show how joint evaluation might lead to a more healthy decision. We claim it does so because the attribute that is harder to evaluate (i.e. healthiness) becomes more impactful in the joint evaluation mode as compared to the separate evaluation mode, and not because in the joint evaluation mode, the virtue choice is easier to justify, provides positive self-signaling utility, or activates the health goal. In sum, in this research, we test the implication that in choice situations where healthiness attribute is easier to assess than taste, joint evaluation would lead to *worse decision*, a finding that would not be in line with the justification account, self-signaling account or the goal account. Formally stated:

H3: When healthiness of the food is easier to evaluate than its taste, in the joint evaluation mode people are more likely to rely on taste of the food than its healthiness and show relatively higher preference for the unhealthy food to healthy alternative, compared to separate evaluation.

In our studies, we ruled out the three alternative explanations of ease of justification, self-signaling and salience of long-term goal to show the importance of ease of evaluability of taste to healthiness of the food in consumer decision in the separate and joint evaluation modes.

OVERVIEW OF THE STUDIES

In the studies that follow, we investigated the effect of evaluation mode on the choice of healthy compared to unhealthy food option (study 1a-b). We replicated the results with real choice behavior in a purchasing context (study 2). We extended our findings from choice to preference rating to measure preference and ruled out an alternative explanation that higher

preference for the healthy food in the joint evaluation mode is due to a stronger focus on the higher-order goal (study 3). In studies 4a, 4b, and 5, we use a moderation-of-process design approach to test our mechanism because measuring evaluability before choice is very likely to interfere with choice (Spencer, Zanna and Fong 2005). We manipulated the ease of evaluability of taste and healthiness directly and expected to flip the effect. We use this approach to show the role of attribute evaluability on the effect of evaluation mode on choice of healthy and unhealthy food (Pieters 2017). Specifically, we expected that when healthiness becomes easier to evaluate than taste, which deviates from the most common consumer decision situation, joint evaluation would lead to relatively *less* healthy choices. In these studies and by virtue of this flipped effect, we also ruled out three alternative explanations; first, that higher choice of unhealthy food in the separate evaluation mode might be due to ease of justification in the absence of the healthy alternative; second, that higher choice of healthy food in the joint evaluation mode might be due to the positive self-signaling; and third, that higher preference for the healthy food in the joint evaluation mode might be due to higher focus on the goal, by showing that when healthiness becomes easier to evaluate than taste, joint evaluation would lead to lower (higher) choice of healthy (unhealthy) food.

We have summarized the participants, procedure and the results of all the studies in table 1. We analyzed the data with and without the excluded participants for each study. However, data exclusion did not affect the results. For brevity, we reported the analysis with all the participants in the paper for all the studies. We have received the ethical approval from a major European University for all the studies in this paper.

Insert table 1 about here

STUDY 1A

The aim of this study was to show the effect of evaluation mode on the choice of healthy and unhealthy food items. We expected to find higher (lower) preference for unhealthy (healthy) food in the separate evaluation compared to the joint evaluation.

Participants. One hundred and eighty one participants (63%female, M_{age} = 37.93) were recruited from Amazon MTurk[2] to participate in this study. The study included an attention check question as a criterion for data exclusion. Twenty-four participants failed to pass the attention check.

Procedure. This study has a 3 (evaluation modes: JE, SE of healthy option, SE of unhealthy option) between subject design. Participants were randomly assigned to one of the three conditions. In the separate evaluation mode (SE), participants saw either a healthy option or an unhealthy option and were asked to make the decision if they wanted to take the food or nothing. In the joint evaluation mode (JE), they saw both healthy and unhealthy food together and were asked to choose the healthy food, the unhealthy food or nothing. We used pictorial stimuli in this study with explicit information about the two attributes of taste and healthiness of each food. More specifically, we used an image of granola bar for the healthy option and an

[2] To improve the quality of the collected data, in all the MTurk studies in this paper, we recruited those participants who qualify the following criteria: 1) have more than 500 hits, 2) live in US (English mother tongue) 3) have response rate of greater than 95% (Peer, Vosgerau and Acquisti 2014).

image of chocolate bar for the unhealthy option (see appendix B). As shown in the picture, the taste of granola bar was indicated as 3-star, whereas the taste of chocolate bar was indicated as 4-star. For the healthiness, the total amount of sugar was indicated for each food option with lower amount of sugar for granola bar (i.e., 17% sugar) compared to chocolate bar (i.e., 46% sugar). The reason behind our choices of information formats (rating vs. percentage of sugar) was to keep them similar to what we can find in real life, where we have review information as star rating to show taste perception and percentage for nutrition information of a food product.

After participants made their decision, they were asked to indicate their opinion about the evaluability of the taste and healthiness of each food. We used an adapted version of evaluability items from Hsee and Leclerc (1998) to measure evaluability of taste and healthiness for each food options (see appendix C). Next, participants in all conditions were asked to indicate their opinion about the taste and healthiness of the two food options in order to measure their perception of the food items. At the end of the survey, participants responded to demographics questions and they were thanked.

Results and Discussion

Manipulation check. We checked if participants' perceptions of the two food options matched with the given information about taste and healthiness of both options, by looking at their ratings for taste and healthiness of the each food. As planned, the result showed that participants perceived granola bar as less tasty but healthier compared to chocolate bar (see table 2; Table 2 summarized the result of manipulation checks of perception of taste and healthiness of the stimuli for all the studies).

Insert table 2 about here

The result of paired sample t-Test for the evaluability measure also confirmed our assumption that taste ($M_{\text{taste evaluability}} = 4.07$, $SD_{\text{taste evaluability}} = .82$) was significantly easier to evaluate compared to healthiness ($M_{\text{healthiness evaluability}} = 3.77$, $SD_{\text{healthiness evaluability}} = .88$; $t(180) = 5.92$, $p < .0001$). Further analysis showed no significant effect of evaluation mode on the ease of evaluability of taste to healthiness, as expected (see table 3).

Insert table 3 about here

Choice. We conducted a binary logistic regression to compare the choice of healthy (unhealthy) food in the JE versus SE. The result of binary logistic regression for the choice of healthy food showed that people were more likely to choose the granola bar in JE (62%) compared to SE (53%), however the difference was not significant (X^2 (1, 120) = .85, $p = .35$). The result of binary logistic regression for the choice of unhealthy food showed that people were significantly more likely to choose the chocolate bar in SE (82%) compared to JE (35%) (X^2 (1, 121) = 24.70, $p < .0001$).

We also conducted further analysis to investigate how the preference between the two options might change in each evaluation mode. The result of the chi-square analysis revealed that the number of people who selected the chocolate bar (82%) was significantly higher than those who selected the granola bar (62%) in SE (X^2 (1, 121) = 6.12, p = .013). In contrast, the number of people who selected the granola bar (53%) was significantly higher than those who selected the chocolate bar (35%) in JE (X^2 (1, 120) = 4.04, p = .04; see figure 1), as expected.

Insert figure 1 about here

This study provided support for our hypothesis that people are more likely to prefer the tasty-unhealthy food in SE, and show higher preference for the healthier option in JE. The result suggested that JE can lead to better decisions in the food domain. In this study, taste of the food was perceived as easier to evaluate than its healthiness, as expected. Hence, preference for healthy (unhealthy) food increases (decreases) from SE to JE. These findings are consistent with the evaluability hypothesis that suggests the difficult-to-evaluate attribute plays a more important role in JE (Hsee et al. 1999).

STUDY 1B

The aim of this study was to replicate the previous finding, using other stimuli. We expected to find higher (lower) preference for the healthy (unhealthy) option in JE compared to SE.

Participants. One hundred and eighty participants (65% female, M_{age} = 38.55) were recruited from Amazon MTurk to participate in this study. The study included an attention check question as a criterion for data exclusion. Twenty-seven participants failed to pass the attention check.

Procedure. This study followed the exact similar procedure to study 1a except for the stimuli used. The stimuli were low fat milk as a healthy less tasty option and whole milk as an unhealthy tastier option in this study (see appendix B). In this study, we provided participants with caloric information for healthiness attribute instead of a nutrition information (e.g., sugar) in study 1a.

Results and Discussion

Manipulation check. As planned, participants perceived low fat milk as less tasty but healthier than whole milk (see table 2).

The result of paired sample t-test for the evaluability measure also confirmed our assumption that taste ($M_{\text{taste evaluability}}$ = 4.33, $SD_{\text{taste evaluability}}$ = .83) was easier to evaluate compared to healthiness ($M_{\text{healthiness evaluability}}$ = 4.02, $SD_{\text{healthiness evaluability}}$ = .93; $t(179) = 5.99$, $p < .0001$). Further analysis showed no significant effect of evaluation mode on the ease of evaluability of taste to healthiness, as expected (see table 4).

Insert table 4 about here

Choice. The result of binary logistic regression for the choice of unhealthy food showed that people were more likely to choose whole milk (55%) in SE, compared to JE (34%) (X^2(1, 120) = 5.42, p = .02). The effect of evaluation mode on choice share of healthy option (low fat milk) was not significant, similar to previous study (X^2 (1, 122) = .032, p = .80).

Further analysis showed that the number of people who selected whole milk (55%) was not significantly different from those who selected low fat milk (50%) in SE (X^2 (1, 118) = .29, p = .58). Also the number of people who selected low fat milk (48%) was higher but not significantly so than those who selected whole milk (34%) in JE (X^2 (1, 124) = 2.49, p = .11; see figure 2).

Insert figure 2 about here

The result of study 1a-b suggested that joint evaluation mode leads to consumers' wellbeing. Although the choice share of healthy option did not differ significantly from SE to JE mode, the choice share of unhealthy food decreased significantly in the JE compared to SE. The study design for study 1a-b followed similar procedure to the work of Hsee (1996a), where we randomly assigned participants to three conditions, such that participants only saw one product in SE condition and saw both options in the JE condition. That is why in the next study we changed the study design such that participants were able to see both options in both SE and JE conditions.

STUDY 2

The previous studies showed the proposed effect in hypothetical situations. The aim of study 2 is to replicate previous findings with real behavior. In this study, people decide about purchasing real food items in the lab that they can consume after the study.

Participants. Ninety-six participants (67%female, M_{age} = 25.58) from the university subject pool participated in this study in the lab, in exchange for 2 Euros[3].

Procedure. This study has a 2(evaluation modes: JE, SE) between subject design. Participants were randomly assigned to either joint or separate evaluation of two food options. One limitation of our previous design was that the participants in the SE condition were only able to see one option, while in JE condition they were shown two options. In this study, all participants in both evaluation modes were shown both options. In SE condition, participants saw the options sequentially and were asked to make the choice about both options separately whether or not they wanted to take the food item. The order of showing the stimuli was randomized between participants. In the JE condition, participants saw both options at the same time and they were asked to choose the healthy food, the unhealthy food, both options or nothing. The change in the design of this study allowed participants in both evaluation modes to see and select both options. At the beginning of the study, participants were notified that they were going to see some food items in the study and that they could choose what they preferred. In order to make the experiment incentive compatible, we told them that for each item they select, they would pay 50 cents (i.e., similar to the market price) from their participation fee. We

[3] This study took around 5 minutes, and it was followed by a filler task for 5 minutes and another experiment for 20 minutes. Overall, participation fee for the lab session was 6 Euros for 30 minutes.

used an image of granola bar for the healthy option and an image of chocolate bar for the unhealthy option similar to study 1a, the only the difference was that we did not provide participants with the attribute information (see appendix B).

After they decided on the food items, participants in all conditions were asked to indicate the choice difficulty on the scale from 1(not at all difficult) to 5(very difficult). Next, they rated the perceived similarity between the granola bar and chocolate bar on the scale from 1(not similar) to 7(similar). Next, similar to previous studies, we asked participants for their opinion about the evaluability and goodness of taste and healthiness of the two food options. At the end of the survey, participants responded to demographics questions and they were thanked. This study was followed by some filler tasks.

Results and Discussion

Manipulation check. Similar to previous studies our manipulation of taste and healthiness worked successfully (see table 2). The result of a paired sample t-Test for the evaluability measure also confirmed our assumption that taste ($M_{\text{taste evaluability}} = 4.16$, $SD_{\text{taste evaluability}} = .79$) was perceived significantly easier to evaluate compared to healthiness ($M_{\text{healthiness evaluability}} = 3.51$, $SD_{\text{healthiness evaluability}} = .90$; $t(95) = 8.19$, $p < .0001$). Further analysis showed no significant effect of evaluation mode on the ease of evaluability of taste to healthiness, as expected (see table 5).

Insert table 5 about here

Choice. The result of binary logistic regression for the choice of healthy food showed that people were significantly more likely to choose the granola bar in JE (45%) compared to SE (23%) (X^2 (1, 96) = 4.78, p = .029). The result of binary logistic regression for the choice of unhealthy food also showed that people were significantly more likely to choose the chocolate bar in SE (42%) compared to SE (18%) (X^2 (1, 96) = 6.36, p = .012).

The result of chi-square analysis revealed that the number of people who selected the chocolate bar (42%) was higher than those who selected the granola bar (23%) in SE (X^2 (1, 47) = 3.82, p = .05). However, the effect was only marginally significant. In contrast, the number of people who selected the granola bar (45%) was significantly higher than those who selected the chocolate bar (18%) in JE (X^2 (1, 49) = 8.19, p = .004; see figure 3).

Insert figure 3 about here

In this study, we also measured the perceived similarity between the chocolate bar and the granola bar and choice difficulty in both conditions. The result of a one-way ANOVA showed that perceived similarity between the two food items was not significantly different when they were evaluated jointly ($M_{\text{similarity}}$ = 3.12, $SD_{\text{similarity}}$ = 1.28) compared to when they were evaluated one at the time ($M_{\text{similarity}}$ = 3.45, $SD_{\text{similarity}}$ = 1.62; F(1, 95) = 1.18, p = .28). In addition, the result of one-way ANOVA revealed no significant effect of evaluation mode on choice difficulty when participants were deciding to purchase the food item ($M_{\text{separate evaluation}}$ = 2.80, $SD_{\text{separate evaluation}}$ = 1.34; $M_{\text{joint evaluation}}$ = 2.75, $SD_{\text{joint evaluation}}$ = 1.49; F(1, 95) = .22, p = .88).

The result of this study provided support for our hypothesis with real purchasing behavior. As expected, preferences for healthy and unhealthy food shifted from SE to JE. We showed that JE might lead to consumers' wellbeing through increasing (decreasing) the healthy (unhealthy) food choice share. The results of studies 1 and 2 revealed a shift in preferences from unhealthy to healthy food from SE to JE by measuring participant's choice. In study 3, we extended this finding by measuring preference ratings using a 7-point scale.

STUDY 3

The aim of study 3 was twofold; first, we sought to extend the previous findings of studies 1 and 2 by using a different method to measure preference for healthy and unhealthy food. In previous studies, participants indicated their preference for healthy and unhealthy food through indicating their choices (i.e., whether they want to take the food or not). In this study, we asked participants to indicate their preference through a rating scale. We expected to replicate previous findings and show that JE would lead to higher (lower) preference for healthy (unhealthy) food, compared to SE. Second, we aimed to rule out an alternative explanation that suggests that JE of vice and virtue might highlight the health goal and therefore increase the preference for the goal-consistent option (Fishbach and Zhang 2008). In order to test this account, we manipulated participants' health goal. Based on this account, we should expect that the effect of evaluation mode would be attenuated in the health goal condition, as JE mode is just another way to activate the health goal. Hence, we should see higher (lower) preference for healthy (unhealthy) food in SE, when people think about their health goal, similar to the preferences in JE. However, based on the attribute evaluability account that we put forward, we expected no significant effect of goal manipulation on the effect size of evaluation mode on

preference for healthy and unhealthy food as per our account, the evaluation mode effect does not depend on goals

Participants. Three hundred sixty two participants (59% female, M_{age} = 40.20) were recruited from Amazon MTurk to participate in this study. The study included an attention check question as a criterion for data exclusion. Twenty-four participants failed to pass the attention check.

Procedure. This study has a 3 (evaluation modes: JE, SE of healthy option, SE of unhealthy option) x 2(goal: health goal, control) between subject design. First, participants were randomly assigned to either the goal or the control condition. In the goal condition, we asked participants to write about a health goal they might have whereas in the control condition they were asked to describe the room that they were in. In a separate pretest with 122 participants on Amazon MTurk (44.26% female, M_{age} = 39.72), we randomly assigned participants to either the goal condition in which we asked them to write about their health goal or the control condition in which we asked them to describe the room that they were in. Next they did a fillier task and then indicated the extent to which they were thinking about their health goal during the study. The results showed that when people wrote about their health goal, they are more likely to think about their health goal throughout the study, compared to the control condition (M_{goal} = 5.28, SD_{goal} = 1.82, $M_{contorl}$ = 3.32, $SD_{control}$ = 2.07; $t(120)$ =5.54, $p < .0001$). Next, participants in each goal and control condition were randomly assigned to one of the three evaluation modes. In SE condition, participants saw either a healthy food or an unhealthy food and were asked to indicate to what extend they prefer the food item on the scale from 1(Not at all) to 7(Very much). In JE condition, they saw both healthy and unhealthy food at the same time and were asked to

indicate their preference for both options on the scale from 1(Not at all) to 7(Very much). We used pictorial stimuli in this study identical to study 1A (see appendix B).

After participants indicated their preferences, they were asked to indicate their opinion about the evaluability of the taste and healthiness of each food. Next, participants in all conditions were asked to indicate their opinion about the taste and healthiness of the two food options in order to measure their perception of the food items. At the end of the survey, participants responded to demographics questions and they were thanked.

Results and Discussion

Manipulation check. Similar to previous studies our manipulation of taste and healthiness worked successfully (see table 2). The result of a paired sample t-Test for the evaluability measure also confirmed our assumption that taste ($M_{\text{taste evaluability}} = 4.20$, $SD_{\text{taste evaluability}} = .79$) was significantly easier to evaluate compared to healthiness ($M_{\text{healthiness evaluability}} = 3.89$, $SD_{\text{healthiness evaluability}} = .90$; $t(361) = 8.44$, $p < .0001$). As expected, the effect of evaluation mode on ease of evaluability of both taste ($F(1, 356) = 3.87$, $p = .50$) and healthiness ($F(1, 356) = 2.37$, $p = .12$) were not significant. In addition, the effect of goal on ease of evaluability of taste ($F(1, 356) = 1.33$, $p = .25$) and healthiness ($F(1, 356) = 2.80$, $p = .09$) and the interaction effects ($F(3, 356) = .25$, $p = .61$; $F(3, 356) = .27$, $p = .60$) were not significant (see table 6).

Insert table 6 about here

Preference ratings. The result of an ANOVA showed the significant effect of evaluation mode on the preference for healthy food (M_{SE} = 3.26, SD_{SE} = 1.72, M_{JE} = 5.01, SD_{JE} = 1.70; F(1, 234) = 62.70, p < .0001). However, the effect of goal on the preference for healthy food (M_{goal} = 3.86, SD_{goal} = 2.04, $M_{contorl}$ = 4.34, $SD_{control}$ = 1.78; F(1, 234) = 3.18, p = .08) and the interaction effect were not significant (F(3,231) = 2.93, p = .09). Note that this marginally significant interaction is not in line with the goal account because the effect of goal activation tends to suppress the rating of the healthy option in the separate condition. The result of the ANOVA showed no significant effect of evaluation mode on the preference for unhealthy food (M_{SE} = 3.58, SD_{SE} = 1.99, M_{JE} = 3.99, SD_{JE} = 2.17; F(1, 235) = 2.10, p = .15). The effect of goal on the preference for unhealthy food (M_{goal} = 3.97, SD_{goal} = 2.08, $M_{contorl}$ = 3.57, $SD_{control}$ = 2.09; F(1, 235) = 2.04, p = .15) and the interaction effect were not significant (F(3, 232) = .10, p = .75; see table 7).

Insert table 7 about here

Further analysis showed that preference for unhealthy food was not significantly lower than that for healthy food in SE ($M_{unhealthy\ food}$ = 3.58, $SD_{unhealthy\ food}$ = 1.99, $M_{healthy\ food}$ = 3.26, $SD_{unhealthy\ food}$ = 1.72; t(239) = 1.33, p = .18). However, preference for the unhealthy food was significantly lower than preference for the healthy food in JE, as expected ($M_{unhealthy\ food}$ = 3.99, $SD_{unhealthy\ food}$ = 2.17, $M_{healthy\ food}$ = 5.01, $SD_{healthy\ food}$ = 1.7; t(114) = 3.67, p < .0001; see figure 4).

Insert figure 4 about here

This study provided support for our hypothesis that people are more likely to make better decisions in JE. We also ruled out the alternative explanation of goal highlight, since the effect of evaluation mode was not attenuated in the health goal condition. In studies 1-3 we showed that joint evaluation mode, leads to a healthier choice than separate evaluation mode. In studies 1-3, we measured the evaluability of taste and healthiness and confirmed our assumption (i.e., taste is perceived as easier to evaluate compared to healthiness), and hence the pattern of data is consistent with our hypothesis 1 and 2 that the preference shift relies on the increased sensitivity to difference inhealthiness of the two food options (i.e., difficult to evaluate attribute) in JE compared to SE. In the next study, we aim to experimentally flip the ease of evaluation of taste and healthiness to test the process in terms of attribute evaluability.

STUDY 4

The aim of this study was twofold. First, we aim to show the role of shifting the focus from taste in SE to healthiness of the food in JE through manipulating ease of evaluability of taste to healthiness. We expected to replicate our previous finding that when taste of the food is easier to evaluate than healthiness of the food item, it is more likely that people decide based on taste of the food in SE and prefer the tasty option more than the healthy. In contrast, in JE, people shift their focus from taste to healthiness, and hence would show higher preference for the

healthier option. On the other hand, we expected to find that, when the healthiness of the food is easier to evaluate than the taste, people are more likely to decide based on the healthiness and hence show higher preference for healthy option compared to the tasty alternative in SE. In contrast, we expected them to be more likely to decide based on taste of food and hence show higher preference for the tasty food compared to the healthy alternative in JE. Second, by showing that JE might lead to a lower preference for healthy option, we aim to rule out two alternative explanations, namely ease of justification and self-signaling. Based on the justification account the mere presence of the relative virtue should lead to lower preference for the vice option (Okada 2005), and based on the self-signaling account, the mere presence of the vice should lead to higher preference for the virtue option (Dhar and Wertenbroch 2012). As a result, we should observe higher preference for the healthy food and lower preference for the unhealthy option in JE. However, we expected to find lower(higher) preference for the healthy(unhealthy) food, because here the healthiness attribute is easier to evaluate than taste.

In study 4a, we used the amount of information available about the attributes (i.e., incomplete vs. complete review information) to manipulate their ease of evaluability. In study 4b, we used different information formats (i.e., easy-to-evaluate or difficult-to-evaluate formats) to manipulate the ease of evaluability of the taste and healthiness. In studies 4a-b, our manipulation was successful in the condition in which participants perceived healthiness as easier to evaluate than taste, where we showed how JE might lead to worst decisions, compared to SE. Therefore, we pre-registered study 4c at aspredicted.org, before we ran the study to show when healthiness is perceived as easier to evaluate attribute compare to taste, people decide based on healthiness in SE and shift their focus to taste in JE.

STUDY 4A

Participants. Three hundred and sixty four participants (65%female, M_{age} = 40.26) were recruited from Amazon MTurk to participate in this study. The study included an attention check question as a criterion for data exclusion. Thirty-seven participants failed to pass the attention check.

Procedure. This study has a 3(evaluation modes: JE, SE of unhealthy food, SE of healthy food) x 2(ease of evaluability of taste compared to healthiness: low vs. high) between subject design. Participants were first randomly assigned to one of the three evaluation modes. Prior to run study 4a, we tested the effect of familiarity of the flavor and two information formats in pretest 2 on ease of evaluability of the two attributes (see appendix A, pretest 2). The result of this pretest showed that the unfamiliar flavor led to lower ease of evaluability of taste to a larger extent than the two information formats that we provided. Based on the insights from pretest 2, we removed the name of the flavor to remove any clue about the taste of the food. We provided participants with some review information in each condition in order to manipulate the ease of evaluation of taste to healthiness. More specifically, we told participants to imagine they went to an ice cream shop to have some ice cream and they saw that the shop added two ice creams with two new flavors. Next, to make taste more difficult to evaluate than healthiness, we provided them with incomplete review information on taste and descriptive information about the healthiness in one condition. In contrast, in the other condition, to make healthiness more difficult than taste, we kept the information about healthiness similar to previous studies (i.e., indicated in percentage) and provided complete review information on taste information (see appendix B).

Next, similar to previous studies, participants in all conditions were asked to indicate their opinion about the evaluability and goodness of the taste and healthiness of each food. At the end of the survey, participants responded to demographics questions and they were thanked.

Results and Discussion

Manipulation check. Our manipulation for taste and healthiness of items were successful (see table 2).

The result of an ANOVA showed no significant effect of review information on the ease of evaluability of taste ($F(1, 362) = .32$, $p = .57$) and healthiness ($F(1, 362) = .34$, $p = .56$). In both conditions, people perceived taste as more difficult to evaluate than healthiness (see table 8).

Insert table 8 about here

Similar to the pretest study, the unknown flavor had a stronger effect on ease of evaluability of taste than the amount of information that we provided and hence we were not successful to manipulate ease of evaluability of taste to healthiness in condition 1. In this condition, participants perceived taste as more difficult to evaluate than healthiness ($M_{taste} = 2.97$, $SD_{taste} = 1.18$; $M_{healthiness} = 3.45$, $SD_{healthiness} = 1.00$; $t(181) = -5.72$, $p = .18$) unlike what we expected. As a result, we reported the results for preferences only for the second condition where healthiness was perceived as easier to evaluate than taste as expected ($M_{taste} = 3.04$, $SD_{taste} =$

1.21; $M_{healthiness}$ = 3.38, $SD_{healthiness}$ = 1.13; $t(182) = -4.72$, $p < .0001$). This condition is very useful to test our hypothesis even though we did not successfully produce the benchmark condition because it is the first study where healthiness was easier to evaluate than taste.

Choice. The result of binary logistic regression for the choice of unhealthy food showed that, when taste was more difficult to evaluate than healthiness, there was no significant effect of evaluation mode on the choice of unhealthy food (X^2 (1, 121) = 1.39, p = .24). However, people were significantly more likely to choose the healthy option in SE (57%) compared to the JE (33%) (X^2 (1, 121) = 6.90, p = .009; figure 5).

Insert figure 5 about here

We also conducted further analysis to explore how the preference between the two options might change in each of the evaluation mode. The result of chi-square analysis revealed that the number of people who selected the unhealthy option (52%) was significantly higher than those who selected the healthy option (33%) in JE (X^2 (1,118) = 4.35, p = .037), as expected. However, the number of people who selected the healthy option (57%) was not significantly different than those who selected the unhealthy option (62%) in SE (X^2 (1,121) = .31 p = .58). So in sum, in line with our attribute evaluability account, JE can reduce healthy choice in the specific situation where healthiness is easier to evaluate than taste.

STUDY 4B

In this study, we manipulated the information format on reviews for taste and healthiness of a new ice cream to manipulate ease of evaluability of the two attributes.

Participants**.** Three hundred and sixty two participants (52.4% female, M_{age} = 38.43) were recruited from Amazon MTurk to participate in this study. The study included an attention check question as a criterion for data exclusion. Eighteen participants failed to pass the attention check.

Procedure. This study has a 3(evaluation modes: JE, SE of healthy option, SE of unhealthy option) x 2(ease of evaluability of taste compared to healthiness: low, high) between subject design. To select easy and difficult information formats for taste and healthiness, we conducted pretest 2 (see appendix A). The result of pretest 2 revealed that a point system with absolute numbers was the most difficult and a bar chart was the easiest format to evaluate for taste, while percentage was the most difficult and nutri-score was the easiest format to evaluate for healthiness. Similar to study 4a, we asked participants to imagine that they went to an ice cream shop to get ice cream and saw the shop provided some information about taste and healthiness of the new ice cream it added. First, they were randomly assigned to one of the three evaluation modes condition. Participants either saw a bar chart showing information about taste together with the percentage of sugar to show information about healthiness (i.e., taste is easier to evaluate than healthiness condition, in other words the benchmark situation), or number of points to show information about taste together with the nutri-score to show information about healthiness of the ice cream (i.e., healthiness is easier to evaluate than taste condition). Similar to previous studies, in SE, they saw either ice cream 1 with information that showed high taste and low healthiness (i.e., unhealthy option) or ice cream 2 with information that showed low taste and high healthiness (i.e., healthy option)and were asked to indicate their choice (i.e., whether

they take the ice cream or not). In the joint evaluation, they saw both options and were asked to choose ice cream 1, ice cream 2 or nothing (see appendix B).

Next, similar to the previous studies, participants in all conditions were asked to indicate their opinion about the evaluability and goodness of the taste and healthiness of each food. At the end of the survey, participants responded to demographics questions and they were thanked.

Results and Discussion

Manipulation check. Our manipulation for taste and healthiness of items were successful (see table 2). The effect of information format on ease of evaluability of taste of the ice cream was significant. Participants perceived the bar chart ($M_{\text{ease of evaluability}}$ = 3.34, $SD_{\text{ease of evaluability}}$ = 1.09) as significantly easier to evaluate than the point score ($M_{\text{ease of evaluability}}$ = 2.95, $SD_{\text{ease of evaluability}}$ = 1.26; $F(1, 360) = 9.65$, $p = .002$) for taste. However, unlike the findings of pretest they did not perceive nutri-score format ($M_{\text{ease of evaluability}}$ = 3.44, $SD_{\text{ease of evaluability}}$ = 1.09) as easier to evaluate than the percentage format score ($M_{\text{ease of evaluability}}$ = 3.56, $SD_{\text{ease of evaluability}}$ = 1.06; $F(1, 360) = 1.15$, $p = .28$) for healthiness.

More importantly, participants perceived point score for taste ($M_{\text{ease of evaluability}}$ = 2.95, $SD_{\text{ease of evaluability}}$ = 1.26), as less easy to evaluate compared to nutri-score for healthiness ($M_{\text{ease of evaluability}}$ = 3.44, $SD_{\text{ease of evaluability}}$ = 1.09; $t(180) = -5.89$, $p < .0001$). However, unlike what we expected, they did not perceive the bar chart for taste ($M_{\text{ease of evaluability}}$ = 3.34, $SD_{\text{ease of evaluability}}$ = 1.09) as easier to evaluate compared to percentage for healthiness ($M_{\text{ease of evaluability}}$ = 3.56, $SD_{\text{ease of evaluability}}$ = 1.06; $t(180) = -2.53$, $p = .01$; see table 9). Hence, similar to study 4a, our manipulation was only partly successful. We only report the results for the condition where our

manipulation worked successfully (i.e., healthiness was perceived easier to evaluate than taste), which again is the most relevant condition to test our hypothesis.

Insert table 9 about here

Choice. We conducted a binary logistic regression to find the effect of evaluation mode on choice of healthy (unhealthy) food. The result of the binary logistic regression for the choice of healthy food showed that people were significantly more likely to prefer ice cream 2 (i.e., the healthy ice cream) in SE (84%) compared to JE (23%) (X^2 (1,119) = 37.58, $p < .0001$), as expected. The result of the binary logistic regression for the choice of unhealthy food also showed that people were significantly more likely to prefer ice cream 1 (i.e., tasty unhealthy ice cream) in JE (74%) compared to SE (45%) (X^2 (1,119) = 9.62, $p = .002$), as expected (see figure 6).

Insert figure 6 about here

In addition, the result of chi-square analysis revealed that the number of people who selected the unhealthy option (74%) was significantly higher than those who selected the healthy option (23%) in JE (X^2 (1,114) = 29.4205, $p < .0001$). The number of people who selected the unhealthy option (45%) was significantly lower than those who selected the healthy alternative

(84%) in SE (X^2 (1,121) = 19.80, $p < .0001$). In this study, we again showed that when healthiness was easier to evaluate compared to the taste of the ice cream, people were more likely to decide based on healthiness (i.e., easy to evaluate attribute) and show higher (lower) preference for the healthier (tasty) option in SE, whereas they were more likely to shift their attention to taste (i.e., the more difficult to evaluate attribute) in JE and hence show lower (higher) preference for the healthy (tasty) option.

STUDY 4C

The result of studies 4a-b showed that removing the name of the flavor of the food reduced ease of evaluability of taste, regardless of the format or amount of provided review information. For new or unfamiliar food, people might not have a clear idea how good it might taste, although they might see how others rated the food. These findings might be in line with our assumption that taste is more intuitive and hence is an easy-to-evaluate attribute. As a result, we concluded that it is not easy to experimentally make taste easier to evaluate without providing people with the name of the flavor. Therefore, in this study, we removed the condition where taste is perceived as easier to evaluate and only kept the condition that healthiness is perceived as easier to evaluate. Because this condition is crucial for us to demonstrate how we can flip the effect, when healthiness becomes easier to evaluate than taste. We expected to find that, when the healthiness of the food is easier to evaluate than the taste, people are more likely to decide based on the healthiness and hence show higher preference for the healthy option compared to the tasty alternative in SE. In contrast, we expected them to be more likely to decide based on taste of food and hence show higher preference for the tasty food compared to the healthy alternative in JE.

Participants. One hundred seventy nine participants (47.5%female, M_{age} = 36.79) were recruited from Amazon MTurk to participate in this study.[4]

Procedure. This study has a 3 (evaluation modes: JE, SE of unhealthy food, SE of healthy food) between subject design. Participants were randomly assigned to one of the three evaluation modes. We used the same scenario as studies 4a-b. In studies 1-3, we have used star rating to provide information about taste attribute of the food, whereas we have used percentages of fat or sugar (e.g., 42 % sugar for the unhealthy stimulus vs.17% sugar for the healthy alternative) to provide information on healthiness of the stimuli. In these studies, as expected, participants perceived taste as easier to evaluate than healthiness. However, in this study, to manipulate the ease of evaluability of taste to healthiness, we flipped the information formats that we have used previously, between the attributes. More specifically, to make taste more difficult to evaluate, we used numbers as a point system (i.e., 17 points for healthy less tasty food vs. 42 points for the unhealthy tastier option), and to make healthiness easier to evaluate, we used star ratings (i.e., 2 out of 5 stars for the unhealthy stimulus vs. 4 out of 5 stars for the healthy stimulus). We expected that using the numbers would make it difficult for participants to evaluate the taste, and using star rating for healthiness would make it easier to evaluate than taste (see appendix B).

Next, similar to the previous studies, participants in all conditions were asked to indicate their opinion about the evaluability and goodness of the taste and healthiness of each food. At the end of the survey, participants responded to demographics questions and they were thanked.

Results and Discussion

[4] The study should have included the attention check question similar to previous studies but unfortunately missed the attention check question by accident.

Manipulation check. The ratings for perception of taste and healthiness of each option is reported in table 2. The results of t-test analysis showed that in SE, the perception of the taste for the two options were not significantly different (see table 2). We think this might be due to the low ease of evaluability of taste in this study, it might have been difficult for people to indicate their opinion on taste of each stimuli when we used only an absolute numbers for taste attribute in isolation.

The result of paired sample t-Test showed that participants perceived healthiness ($M_{\text{healthiness evaluability}} = 3.57$, $SD_{\text{healthiness evaluability}} = 1.05$), as easier to evaluate than taste ($M_{\text{taste evaluability}} = 3.08$, $SD_{\text{taste evaluability}} = 1.25$; $t(178) = 5.62$, $p < .0001$), as expected (see table 10).

Insert table 10 about here

Choice. The result of binary logistic regression for the choice of unhealthy food showed that people were significantly more likely to choose the unhealthy option in JE (69%) compared to SE (48%) ($X^2(1,119) = 4.56$, $p = .033$). However, they were significantly less likely to choose the healthy option in JE (27%) compared to SE (68%) ($X^2(1,119) = 18.98$, $p < .0001$; see figure 7).

Insert figure 7 about here

We also conducted further analysis to explore how the preference between the two options might change in each of the evaluation mode. The result of chi-square analysis revealed that the number of people who selected the unhealthy option (69%) was significantly higher than those who selected the healthy option (27%) in JE (X^2 (1,118) = 20.67, $p < .0001$), as expected. However, the number of people who selected the healthy option (68%) was higher than those who selected the unhealthy option (48%) in SE (X^2 (1,120) = 4.88, $p = .027$), as expected. So in sum, in line with our attribute evaluability account, JE can reduce healthy choice in the specific situation where healthiness is easier to evaluate than taste. This finding is not in line with the justification (Okada 2005) and self-signaling accounts (Dhar and Wertenbroch 2012). Ease of justification account suggests that JE would lead to higher preference for the healthier food option, since it would not be easy to justify choice of the unhealthy food in the presence of alternative. Self-signaling account also suggests that people are more likely to show higher preference for the healthier food in JE, since the utility of self-signaling is higher when the choice is from a heterogeneous set in the presence of an unhealthier option. However the result of study 4 showed that the shift in preference for healthy and unhealthy food from SE to JE depend on the ease of evaluability of taste to healthiness.

GENERAL DISCUSSION

In this research, we investigated the role of evaluation mode on the choice share of healthy and unhealthy food. We showed that JE might enhance consumers' wellbeing through lower preference for unhealthy food compared to the healthy option, when taste of the food is easier to evaluate compared to the healthiness information, compared to SE (studies 1a-1b). These experiments were conducted in hypothetical situations. We replicated the effect in a lab study with real choice behavior in the purchasing context (study 2) and with preference ratings instead of choice in an online study (study 3). We ruled out the possibility that this finding is due to the higher focus on a higher order goal in JE (study 3). We showed, when taste of the food is not easier to evaluate compared to healthiness, the preference for healthy to unhealthy food does not change from SE to JE (studies 4a-c). We ruled out the possibility that this finding is due to ease of justification in SE (i.e., when the healthier alternative is not present) or self-signaling, and instead we showed that our results can be explained by ease of evaluability of taste to healthiness (studies 4a-c). We showed that when taste is more difficult to evaluate than healthiness of the food, people are *more* (less) likely to choose *healthier* (unhealthier) option in SE compared to JE (studies 4a-c).

THEORETICAL IMPLICATIONS

We contribute to the previous research in several ways. First, we contribute to the existing literature on decision making by showing when joint evaluation of healthy and unhealthy food options would lead to better decisions (i.e. healthier choices) in the food domain.

Although our results are related to the findings made in the context of the evaluability hypothesis (Hsee et al. 1999), we further demonstrated how ease of evaluability of taste to healthiness might explain our result, by showing when we flip the ease of evaluability of taste to healthiness, we might flip the effect of evaluation mode on preference for healthy and unhealthy food. Hence, we contribute to this stream of research by showing when joint evaluation of healthy and unhealthy food options would lead to better (worst) decision.

Second, we integrate the research on attribute evaluability with self-control literature to show how self-control might change from SE to JE in the food domain, by focusing on the two conflicting attributes of taste and healthiness. Self-control refers to the conflict between short-term and long-term benefit (Hoch and Loewenstein 1991). We argue that the short-term benefit is related to taste attribute of the food that is a more immediate and intuitive response, whereas the long-term benefit is related to healthiness of the food. As a result, we further assume that in many circumstances the immediacy of the pleasure that is received from the taste of the food, makes it easier for people to evaluate taste of the food compared to its healthiness. As a result, people are more likely to decide based on the short-term benefit (i.e., taste) in SE whereas they are more likely to decide based on the long-term benefit (i.e., healthiness) in JE. We suggest joint evaluation might enhance self-control in the food domain by helping people to decide based on the long-term benefit (i.e., healthiness) instead of attending to the short-term benefit (i.e., taste) that each option might provide. By comparing the healthiness of the food items, the advantage of healthy option becomes clearer and hence it would be more likely for individuals to choose the healthy option in JE, compared to SE.

Third, our finding have some methodological implications for the research on self-control by showing the role of evaluation mode in choice share of vice versus virtue. Previous research

on self-control has measured self-control through measuring preference for vice or virtue in both SE and JE, even within a single research. In some studies, self-control is measured through choice between vice and virtue, such as choice between fruit salad and chocolate cake (May and Irmak 2018; Ferraro, Shiv, and Bettman 2005; Mukhopadhyay, Sengupta, and Ramanathan 2008; Shiv and Fedorikhin 1999; Klesse, Levav, and Goukens 2015; Siddiqui, May, and Monga 2017), while in some other studies, it is measured by looking at the preference for an indulgent option such as an expensive product (May and Irmak 2018; Mukhopadhyay, Sengupta, and Ramanathan 2008; Siddiqui, May, and Monga 2016), or the preference for a virtue such as a socially conscious consumer behavior (Ferraro, Shiv and Bettman 2005; Mukhopadhyay, Sengupta, and Ramanathan 2008; Siddiqui, May, and Monga 2016). However, our findings suggest that there might be systematic differences in the choice shares of healthy and unhealthy food from separate to joint evaluation. We call for a careful re-analysis of the self-control literature to assess to what extent sets of findings using joint evaluation could be extended to separate evaluation situations (in the real world) and vice versa. The exact implication of this finding for the validity of some of the findings in the self-control literature remains to be assessed and will depend on whether or not evaluation mode interacts with factors that have been shown to affect self-control.

PRACTICAL IMPLICATIONS

This research also provides several practical implications for both consumers and marketers. In this research, we showed the effect of evaluation mode and the role of the difficulty to assess the taste and health attribute on consumer's decision. Our results suggest that making

the alternative option explicit (i.e., JE vs. SE) can help consumers choose the healthier option in the joint evaluation mode. For instance, when a consumer wants to choose whether to have a chocolate bar or not, it is more likely that the decision is based on taste, which is also consistent with system 1 thinking process (Kahneman 2003). Although the consumer would see the healthiness information about the chocolate bar on the package, it might not be easy for her to evaluate the information. On the other hand, joint evaluation of the option in the presence of an alternative option makes it easier for the consumer to evaluate the healthiness of the food through comparison. As a result, it is more likely that the preference for the unhealthy option decreases in the joint evaluation, compared to the separate evaluation mode.

We also showed how the format of provided information on healthiness of the food item might affect the ease of evaluability of this attribute. Although companies in the food industry evolve towards providing more healthiness information, it is not clear how effective it might be to trump the strong appeal of taste and in this way nudge healthy eating. Hence using easier to evaluate information formats such as nutri-score for healthiness would help consumers to make their decisions based on healthiness of the food, even when they evaluate the product separately.

In addition, these findings have some implications for retailers to help consumers improve their choice of food products. For those products that taste is easier to evaluate than healthiness, presenting the healthy and unhealthy on the same shelf would allow consumers to compare healthiness of the options in the joint evaluation mode. However, when health information of the food is provided in an easier to evaluate format by companies (e.g., nutri-score or traffic lights), presenting them separately would help consumers to show higher self-control.

LIMITATIONS AND FUTURE RESEARCH

One concern that might arise is to what extent the set of stimuli and specific differences in taste and healthiness between items in each pair that we used might explain our findings. Further research is required in order to investigate the effect of a different set of differences in taste and healthiness of the food on the choice share in the different evaluation modes. We expect to find similar findings when one option is higher in taste and the other is higher in healthiness (i.e., options with conflicting attributes). Another concern with respect to generalizability of the findings might be how absence of any relevant information on taste and healthiness might affect our results. Further research is required to investigate the effect of cognitive effort in the presence of any relevant information that might be the reason why evaluability of the attributes play a role in the decision making process. It would also be interesting to study a possible implication of evaluation mode on the amount that consumers might eat. In the self-control literature, the taste test has been widely used to assess self-control and has relied on the amount of consumed food (Bruyneel, Dewitte, Vohs, and Warlop 2006; Mukhopadhyay, Sengupta, and Ramanathan 2008; Morewedge, Huh and Vosgerau 2010; Haws and Redden 2013). In that literature, most studies using the taste test methodology used one vice product or two similar versions of it, which is similar to a SE evaluation mode.

Appendix A: Supplementary studies

Pretest 1

The aim of this pretest was to find the most important food attributes when people are shopping for food items.

Participants. We ran this study on Amazon MTurk with 100 participants (48% female, M_{age} = 39.34).

Procedure. We asked participant to indicate their opinion about some food attributes (i.e., nutrition, taste, price, ease of preparation, production method and food appearance) when they go shopping for the food. More specifically, we asked them to indicate to what extent each attribute is important for them when they are shopping for food. The order of showing the attributes was randomized between subjects.

Results and discussion

Among the attributes, participants perceived taste as the most important attribute, followed by price and nutrition. Table 11 summarized the result of this study.

Insert table 11 about here

Pretest 2

The aim of this study is to pretest the effect of unfamiliarity of the flavor and information formats (i.e., point vs. star ratings for taste and percentage vs. descriptive rating for healthiness of the food) on the ease of evaluability of taste compared to healthiness of the food.

Participants. One hundred and sixty participants (47.5% female, M_{age} = 39.48) recruited from Amazon MTurk to participate in this study. The study included an attention check question as a criterion for data exclusion. Twelve participants failed to pass the attention check.

Procedure. In this study participants randomly saw two out of four flavors of ice cream (i.e., two unfamiliar flavor: orange blossom and saffron vs. two familiar flavors: chocolate and caramel; counterbalanced); one flavor with the information in the condition where taste is easier to evaluate than healthiness and one flavor with information in the condition where taste is more difficult to evaluate than healthiness. By providing participants with information in the format of the star ratings for taste and percentage for healthiness we intended to have taste easier to evaluate than healthiness, similar to previous studies. Whereas by providing participants with information in the format of points for taste and descriptive ratings for healthiness, we intended to make healthiness easier to evaluate than taste. For each ice cream participants saw, they were asked to indicate their opinion about ease of evaluability of taste and healthiness and rate the taste and healthiness of the ice cream.

Results and discussion

Manipulation check. The provided information did not affect participants perception about the taste of the ice creams. However, our manipulation for healthiness of the items was successful (see table 2).

Evaluability measure. The result of paired sample t-Test for the evaluability measure showed that when the flavor of the ice cream is familiar, taste ($M_{\text{taste evaluability}}$ = 4.16, $SD_{\text{taste evaluability}}$ = 1.01) was significantly easier to evaluate compared to healthiness ($M_{\text{healthiness evaluability}}$ = 3.77, $SD_{\text{healthiness evaluability}}$ = 1; $t(122) = 4.77$, $p < .0001$). Whereas when flavor is unfamiliar,

healthiness ($M_{\text{healthiness evaluability}}$ = 2.97, $SD_{\text{healthiness evaluability}}$ = 1.14) became easier to evaluate than taste ($M_{\text{taste evaluability}}$ = 2.42, $SD_{\text{taste evaluability}}$ = 1.18; $t(121) = 5.77$, $p < .0001$; see table 12).

Insert table 12 about here

In the condition where taste is easier to evaluate than healthiness, participants perceived taste as easier to evaluate than healthiness but only when the flavor was familiar ($t(80) = 5.78$, $p < .0001$). In the condition where healthiness is easier to evaluate than taste, participants perceived healthiness as easier to evaluate to taste but only when the taste is unfamiliar ($t(79) = -5.36$, $p < .0001$; see table 12). This result might be due to a reason that unknown flavor had a stronger effect on ease of evaluability of taste than the amount of information that we provided. That is why in the study 4a, we did not provide participants with the flavor but changed the amount of information available to manipulate ease of evaluability of taste and healthiness.

Pretest 3

We ran pretest 2 with different information formats for taste and healthiness labels such that we can identify the easiest (most difficult) to evaluate healthiness (taste) information formats.

Participants. We ran the pretest with 100 (30% female, M_{age} = 35.3) participants on Amazon MTurk that took around 15 minutes in exchange for 1 Euro. 32 people failed the attention check question.

Procedure. The pretest had 7(information formats) within subject x 2(good versus bad taste or healthiness) between subject design. In this pretest, we told participants that an ice cream shop added seven new ice cream flavors and provided some information about the taste and healthiness of these new ice creams. We showed participants four different information formats (i.e., bar chart, table with percentage, point system with absolute number and words) for taste and 3 different information formats (i.e., percentage, words and nutri-score) for healthiness of the ice creams. The order of showing these seven ice creams was randomized between participants. For each ice cream, we asked participants to indicate their opinion about the ease of evaluability of the information on taste or healthiness, using a similar scale as the previous studies. Next, we also measured participant's comprehension (i.e., how is the ice cream rated?) and ease of use of the information format (i.e., is the information informative?, Is the information helpful?, Is the information easy to understand?) on the scale from 1(not at all) to 7(very much). We also asked participants their opinion about the taste or healthiness of the food similar to previous studies. At the end of the study, participants responded to demographics questions and were thanked.

Results and Discussion

Manipulation check. The result of a one way ANOVA showed that people rated the ice cream lower in taste and healthiness when they saw the information for the worse taste or healthiness ice cream compared to when the saw the information for the better taste or healthiness ice cream, for all the information formats except two formats of point score for taste and percentage for healthiness information (see table 13).

Insert table 13 about here

Evaluability measure. The result of a repeated measure ANOVA showed that participants perceived the point system as significantly more difficult to evaluate, less helpful, less informative, more difficult to understand compared to other formats of taste information. The other formats were not significantly different from each other (see table 14).

Insert table 14 about here

The result of repeated measure ANOVA showed that participants perceived the nutri-score as significantly more helpful, more informative, easier to understand compared to other formats of healthiness information (see table 15). The results of ease of evaluability for healthiness were not significant between different information formats. However, further analysis revealed that the nutri-score was significantly easier to evaluate than the point system for taste ($t(99) = 4.43$, $p < .0001$).

Insert table 15 about here

This pretest revealed that using point systems with absolute numbers was the most difficult format to evaluate for taste of the food, and using nutri-score system was the easiest format for the healthiness label of the food.

Appendix B: Stimuli used in the studies

Stimuli used in study 1a and 3:

Stimuli used in study 1b:

Stimuli used in study 2:

Stimuli used in study 4a:

Condition 1: Taste is easier to evaluate than healthiness, where we used complete review information for taste, percentage of fat for healthiness

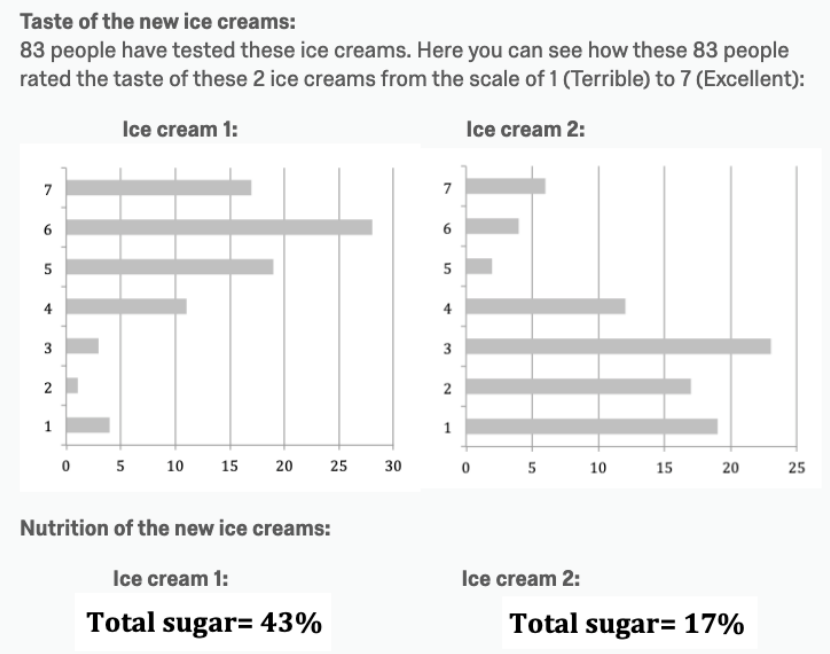
Flavor 1	Flavor 2
Taste: 16 out of 20 people liked it.	Taste: 11 out of 20 people liked it.
Fat: 42%	Fat: 17%

Condition 2: Healthiness is easier to evaluate than taste, where we used incomplete review information for taste, descriptive information for healthiness

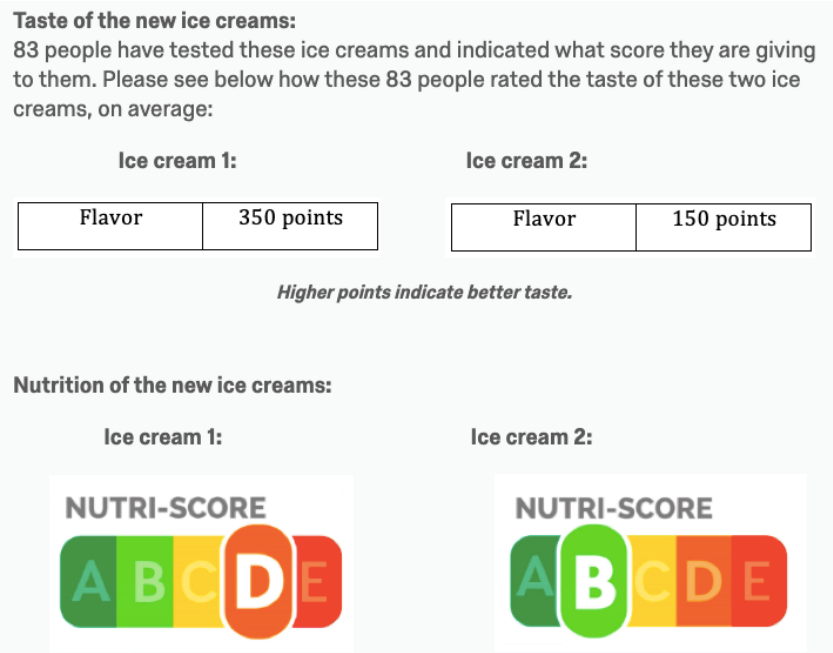
Flavor 1	Flavor 2
Taste: 16 people liked it. 3 people did not like it. The rest gave it average rating.	Taste: 11 people liked it. 3 people did not like it. The rest gave it average rating.
Fat: HIGH	Fat: LOW

Stimuli used in study 4b:

Condition 1: Taste is easier to evaluate than healthiness where we used bar char for taste and percentage for healthiness.



Condition 2: Healthiness is easier to evaluate than taste, where we used point score for taste and nutria-score for healthiness:



Stimuli used in Study 4c:

Ice cream 1

Taste= 42 points

Higher points indicate better taste.

Healthiness= 

Ice cream 2

Taste= 17 points

Higher points indicate better taste.

Healthiness= 

Appendix C: Evaluability Measure

On the scale from 1 (not at all) to 5 (Very much), please answer some questions about the taste and healthiness of each of the food items below.

- I have a clear idea how this food taste.
- I have a clear idea about the healthiness of this food.

In order to increase the reliability of this scale we added more items to the scale:

- I am certain about my opinion about the taste of this food.
- I am certain about my opinion about the healthiness of this food.

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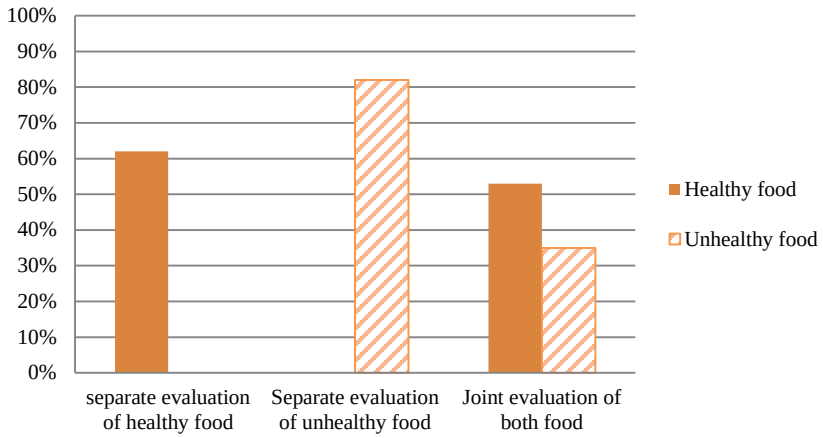

Figure 2: Effect of evaluation mode on preference for food items-Study 1a

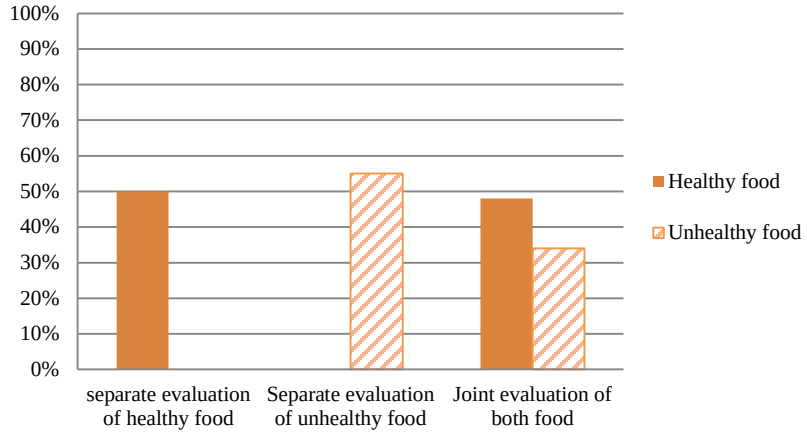

Figure 3: Effect of evaluation mode on preference for food items-Study 1b

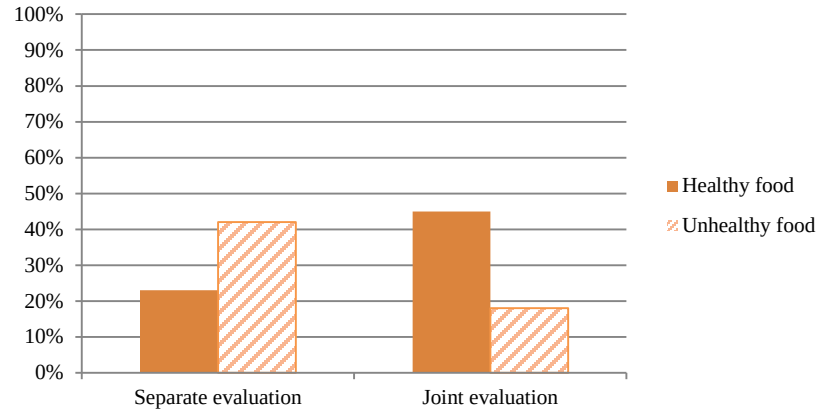

Figure 4: Effect of evaluation mode on preference for food items-Study 2

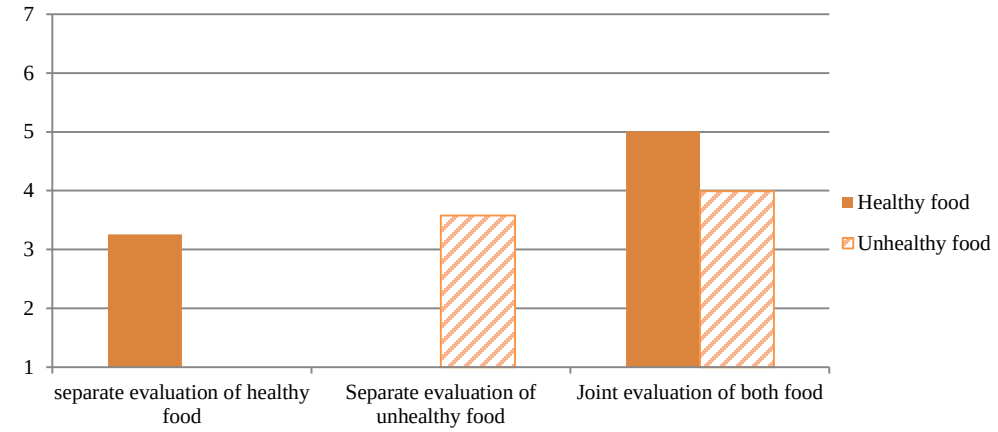

Figure 4: Effect of evaluation mode on preference rating of food items-Study 3

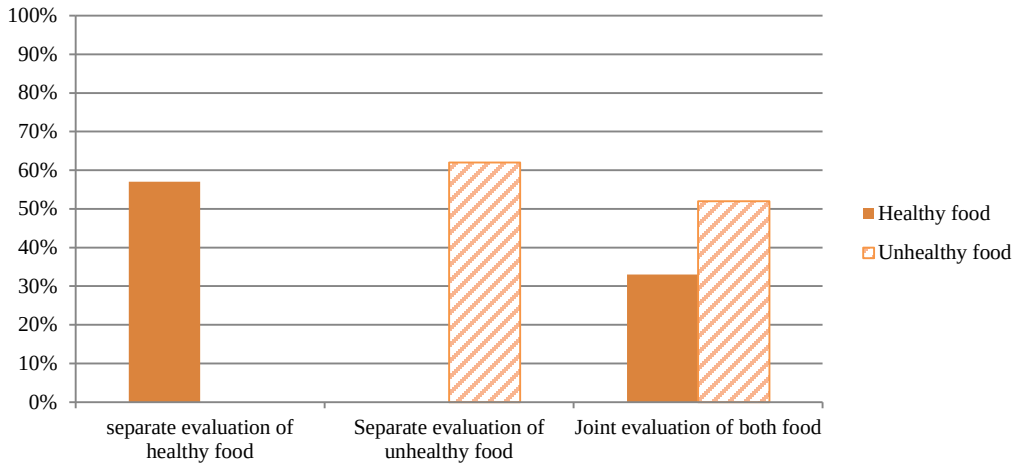

Figure 5: Effect of evaluation mode on choice share of food items -Study 4a

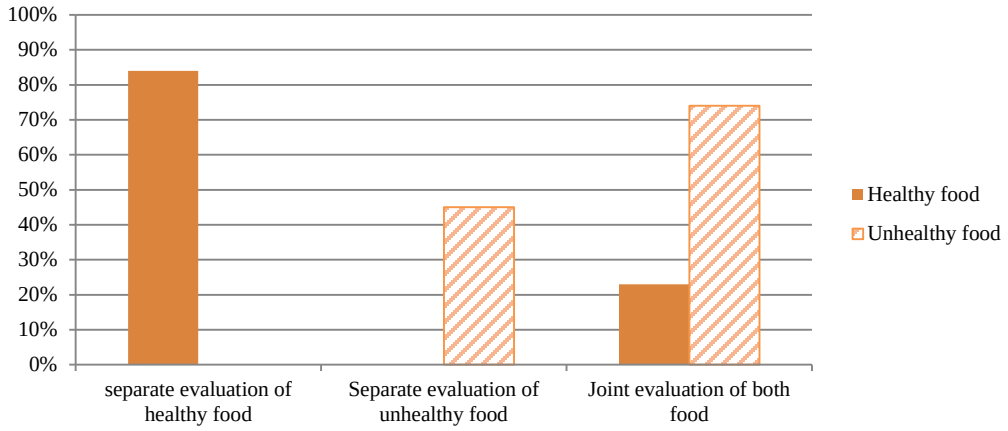

Figure 6: Effect of evaluation mode on preference for food items-Study 4b

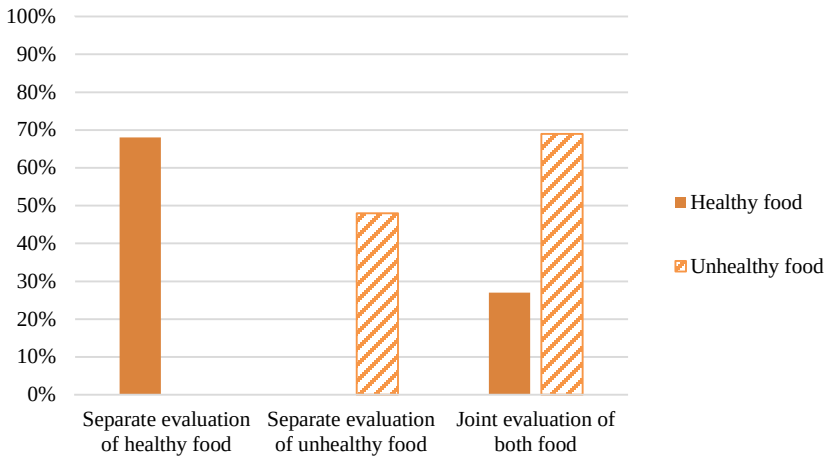

Figure 7: Effect of evaluation mode on choice share of food items-Study 4c

Table 1: Preference for healthy and unhealthy food in separate and joint evaluation modes, participants and stimuli for all the studies

		Choice share for healthy food			Choice share for unhealthy food				
Study	N	SE	JE	Significance test	SE	JE	Significance test	Stimuli	Key point
1a	181	53%	62%	X^2 (1, 120) = .85, p = .35	82%	35%	X^2 (1, 121) = 24.70, p < .0001	Granola bar versus chocolate bar	Taste of the food was significantly easier to evaluate than healthiness.
1b	180	50%	48%	X^2 (1, 122) = .03, p = .8	55%	34%	X^2 (1, 120) = 5.42, p = .02	Low fat milk versus chocolate bar	Taste of the food was significantly easier to evaluate than healthiness.
2	96	23%	45%	X^2 (1, 96) = 4.78, p = .029	41%	18%	X^2 (1, 96) = 6.36, p = .012	Granola bar versus chocolate bar- Purchase each item for 50 cents	Incentive compatible- Taste of the food was significantly easier to evaluate than healthiness.
3	362	3.26 (1.72)	5.01 (1.7)	F(1, 234) = 62.70, p < .0001	3.58 (1.99)	3.99 (2.17)	F(1, 235) = 2.10, p = .15	Granola bar versus chocolate bar	Preference is measured with rating instead of choice.
4a	364	57%	33%	X^2 (1,121) = 6.90, p = .009	62%	52%	X^2 (1,121) = 1.39, p = .24	Changing amount of information for taste	Healthiness is easier to evaluate than taste.
4b	362	84%	23%	X^2 (1,119) = 37.58, p < .0001	45%	74%	X^2 (1,119) = 9.62, p = .002	Use of information formats (nutri-score, point score)	Healthiness is easier to evaluate than taste.
4c	179	68%	48%	X^2 (1,118) = 4.56, p = .033	27%	69%	X^2 (1,118) = 18.98, p < .0001	Use of star rating for healthiness and numbers for taste	Healthiness is easier to evaluate than taste.

Table 2: Participants' perception of taste and healthiness for all studies

	Taste (*M*, *SD*)			Healthiness (*M*, *SD*)			
Study	Option 1	Option 2	Significance test	Option 1	Option 2	Significance test	Stimuli (option 1 vs. option 2)
1a	3.64 (.82)	4.12 (.88)	$t(180) = -6.12$, $p < .0001$	3.51 (1.00)	2.40 (1.04)	$t(180) = 12.16$, $p < .0001$	Granola vs. Chocolate bar
1b	3.27 (1.17)	3.69 (1.18)	$t(179) = -4.39$, $p < .0001$	3.84 (1.08)	3.42 (.98)	$t(179) = 4.46$, $p < .0001$	Low fat milk vs. Whole milk
2	3.44 (.79)	3.89 (.98)	$t(95) = -3.81$, $p < .0001$	3.09 (.88)	1.92 (.91)	$t(95) = 11.02$, $p < .0001$	Granola vs. Chocolate bar
3	3.49 (.91)	4.10 (.88)	$t(359) = -10.20$, $p < .0001$	3.45 (1.03)	2.19 (1.07)	$t(359) = 19.60$, $p < .0001$	Granola vs. chocolate bar
Pretest 2	3.53 (.93)	3.28 (1.37)	$t(42) = 1.45$, $p = .15$	2.37 (.95)	2.14 (.97)	$t(42) = 2.03$, $p = .049$	Ice creams: Low fat-3 stars taste vs. High fat-4 stars taste
4a-JE condition	3.39 (.77)	3.91 (.85)	$t(118) = -5.30$, $p < .0001$	3.23 (1.01)	2.79 (1.08)	$t(118) = 4.15$, $p < .0001$	Ice cream
4a-SE condition	3.24 (.78)	3.59 (.78)	$t(243) = -3.48$, $p < .001$	2.84 (.87)	2.44 (.96)	$t(243) = 3.46$, $p < .001$	Ice cream
4b-JE condition	2.96 (1.08)	3.90 (.94)	$t(116) = -6.45$, $p < .0001$	3.44 (0.96)	2.66 (1.19)	$t(116) = 5.16$, $p < .0001$	Ice cream
4b-SE condition	3.04 (.91)	3.50 (.76)	$t(243) = -4.29$, $p < .0001$	3.20 (0.84)	2.44 (0.96)	$t(243) = 6.54.$, $p < .0001$	Ice cream
4c-JE	3.97 (.87)	2.86 (1.11)	$t(59) = 5.04$, $p < .0001$	2.80 (1.13)	3.51 (.92)	$t(59) = -3.29$, $p = .002$	Ice cream
4c-SE	3.18 (.93)	3.32 (0.83)	$t(118) = -.83$, $p = .41$	2.72 (1.01)	3.68 (.79)	$t(118) = -5.83$, $p < .0001$	Ice cream

In studies 4a-c, participants only rated what they see based on the condition they were in, and hence we have conducted paired sample t-Test to compare the means for ratings in JE condition and contrast test in one-way ANOVA to compare the means for ratings in SE condition.

Table 3: Ease of evaluability of taste and healthiness-Study 1a

Condition	Separate evaluation	Joint evaluation	Significance test
Ease of evaluability of taste (α = .888)	4.02 (.88)	4.16 (.69)	$t(179) = 1.09$, $p = .28$
Ease of evaluability of healthiness (α = .856)	3.70 (.89)	3.90 (.86)	$t(179) = 1.46$, $p = .14$
Significance test	$t(120) = 4.99$, $p < .0001$	$t(59) = 3.18$, $p = .002$	

Table 4: Ease of evaluability of taste and healthiness-Study 1b

Condition	Separate evaluation	Joint evaluation	Significance test
Ease of evaluability of taste (α = .901)	4.32 (.82)	4.35 (.87)	$t(178) = .04$, $p = .84$
Ease of evaluability of healthiness (α = .934)	3.95 (.93)	4.15 (.92)	$t(178) = 1.38$, $p = .17$
Significance test	$t(117) = 5.55$, $p < .0001$	$t(61) = 2.49$, $p = .016$	

Table 5: Ease of evaluability of taste and healthiness-Study 2

Condition	Separate evaluation	Joint evaluation	Significance test
Ease of evaluability of taste (α = .841)	4.13 (.76)	4.19 (.83)	$t(94) = .38$, $p = .71$
Ease of evaluability of healthiness (α = .863)	3.59 (.83)	3.43 (.96)	$t(94) = .82$, $p = .41$
Significance test	$t(46) = 4.89$, $p < .0001$	$t(48) = 6.70$, $p < .0001$	

Table 6: Ease of evaluability of taste and healthiness-Study 3

	Ease of evaluability of taste	
Condition	Control condition	Goal condition
Separate evaluation	4.12 (.80)	4.18 (.87)
Joint evaluation	4.25 (.71)	4.39 (.67)
	Ease of evaluability of healthiness	
Condition	Control condition	Goal condition
Separate evaluation	3.78 (.81)	3.89 (.92)
Joint evaluation	3.88 (1.01)	4.10 (.86)

Table 7: Preference rating for healthy and unhealthy food-study 3

	Preference rating for healthy item (*M, SD*)	
Condition	Control condition	Goal condition
Separate evaluation	3.64 (1.61)	2.86 (1.76)
Joint evaluation	5.02 (1.69)	5 (1.73)
	Preference rating for unhealthy item (*M, SD*)	
Condition	Control condition	Goal condition
Separate evaluation	3.73 (1.89)	3.42 (2.10)
Joint evaluation	4.21 (2.24)	3.73 (2.08)

Table 8: Ease of evaluability of taste and healthiness-Study 4a

Conditions	Ease of evaluability	Separate evaluation	Joint evaluation	Total
Condition 1: Taste is easier than healthiness	Ease of evaluability of taste	2.84 (1.17)	3.22 (1.16)	2.97 (1.18)
	Ease of evaluability of healthiness	3.37 (1.01)	3.60 (.96)	3.45 (.96)
Condition 2: Healthiness is easier to evaluate than taste	Ease of evaluability of taste	2.89 (1.13)	3.34 (1.33)	3.00 (1.21)
	Ease of evaluability of healthiness	3.28 (1.15)	3.58 (1.09)	3.38 (1.13)

Table 9: Ease of evaluability of taste and healthiness- Study 4b

Conditions	Ease of evaluability	Separate evaluation	Joint evaluation	Total
Condition 1: Taste is easier than healthiness	Ease of evaluability of taste	3.18 (1.11)	3.67 (.97)	3.34 (1.09)
	Ease of evaluability of healthiness	3.37 (1.08)	3.94 (.93)	3.56 (1.06)
Condition 2: Healthiness is easier to evaluate than taste	Ease of evaluability of taste	2.73 (1.25)	3.44 (1.13)	2.96 (1.26)
	Ease of evaluability of healthiness	3.29 (1.11)	3.78 (.99)	3.44 (1.10)

Table 10: Ease of evaluability of taste and healthiness- Study 4c

Conditions	Separate evaluation	Joint evaluation	Significance test
Ease of evaluability of taste (α = .87)	2.86 (1.29)	3.52 (1.06)	$t(177) = -3.44$, $p = .007$
Ease of evaluability of healthiness (α = .81)	3.52 (1.08)	3.65 (.98)	$t(177) = -.76$, $p = .44$
Significance test	$t(119) = -6.35$, $p < .0001$	$t(58) = -.87$, $p = .38$	

Table 11: Importance of food attributes- Pretest 1

Food attribute	M(SD)	Taste	Nutrition	Price	Food appearance	Ease of preparation	Production method
Taste	4.40 (.75)	-	$p = .005$	$p = .27$	$p < .0001$	$p < .0001$	$p < .0001$
Nutrition	4.13 (.84)	$p = .005$	-	$p = .14$	$p = .008$	$p < .0001$	$p < .0001$
Price	4.29 (.91)	$p = .27$	$p = .14$	-	$p < .0001$	$p < .0001$	$p < .0001$
Food appearance	3.79 (1.05)	$p < .0001$	$p = .008$	$p < .0001$	-	$P = .027$	$p < .0001$
Ease of preparation	3.49 (1.02)	$p < .0001$	$p < .0001$	$p < .0001$	$P = .027$	-	$P = .034$
Production method	*3.18 (1.09)*	$p < .0001$	$p < .0001$	$p < .0001$	$p < .0001$	$P = .034$	-

Table 12: Ease of evaluability of taste and healthiness- Pretest 2

Condition	Ease of evaluability	Familiar flavor	Unfamiliar flavor	Total
Taste is easier than healthiness (i.e., taste:star rating, healthiness:percentage)	Ease of evaluability of taste	4.44 (.72)	2.45 (1.2)	3.46 (1.4)
	Ease of evaluability of healthiness	3.88 (.89)	2.75 (1.21)	3.32 (1.2)
Healthiness is easier to evaluate than taste (i.e., taste: Point, healthiness: Low/high)	Ease of evaluability of taste	3.93 (1.21)	2.43 (1.20)	3.18 (1.42)
	Ease of evaluability of healthiness	3.71 (1.13)	3.11 (1.08)	3.40 (1.14)

Table 13: Taste and healthiness ratings for each information format- Pretest 3

Taste rating	Chart bar			Words			Point system			Table with percentage		
Condition	Bad taste	Good taste	t-test	Bad taste	Good taste	t-test	Bad taste	Good taste	t-test	Bad taste	Good taste	t-test
Participants rating	4.41 (1.67)	5.65 (1.15)	$t(98) = 17.55$ $p < .0001$	3.44 (2.09)	5.74 (.90)	$t(98) = 51.04$ $p < .0001$	5.14 (1.37)	4.90 (2.82)	$t(98) = .18$ $p = .37$	4.64 (1.88)	5.28 (1.07)	$t(98) = 4.37$ $p = .04$

Healthiness rating	Percentage of sugar			Words			Nutri-score		
Condition	Unhealthy	Healthy	t-test	Unhealthy	Healthy	t-test	Unhealthy	Healthy	t-test
Participants rating	4.65 (1.78)	4.06 (1.58)	$t(98) = 3.07$ $p = .08$	3.60 (2.08)	5.04 (1.48)	$t(98) = 15.88$ $p < .0001$	3.92 (2.01)	5.12 (1.11)	$t(98) = 13.81$ $p < .0001$

Table 14: Comparison of different information formats for taste attribute- Pretest 3

Descriptive Statistics				Significance Test
Measure	Information formats	Mean	Std. Deviation	Contrast analysis of point system with other formats
Helpful	Chart bar	5.65	1.19	Mean difference = -1.14 $p < .0001$

	Words	5.57	1.41	Mean difference = -1.06 $p < .0001$
	Point system	4.51	1.98	-
	Table	5.56	1.44	Mean difference = -1.05 $p < .0001$
	Chart bar	5.77	1.25	Mean difference = -1.28 $p < .0001$
Informative	Words	5.50	1.54	Mean difference = -1.01 $p < .0001$
	Point system	4.49	1.98	-
	Table	5.55	1.37	Mean difference = -1.06 $p < .0001$
	Chart bar	5.84	1.16	Mean difference = -1.11 $p < .0001$
Easy to understand	Words	5.85	1.27	Mean difference = -1.12 $p < .0001$
	Point system	4.73	1.99	-
	Table	5.52	1.50	Mean difference = -.79 $p = .001$
	Chart bar	3.68	1.04	Mean difference = -.51 $p < .0001$
Ease of evaluability	Words	3.63	1.05	Mean difference = -.46 $p < .0001$
	Point system	3.17	1.27	-
	Table	3.67	1.05	Mean difference = -.49 $p < .0001$

Table 15: Comparison of different information formats for healthiness attribute- Pretest 3

	Descriptive Statistics			Significance Test
Measure	Information formats	Mean	Std. Deviation	Contrast analysis of nutri-score with other formats
Helpful	Percentage	5.04	1.61	Mean difference = .40 $p = .013$

	Words	5.06	1.72	Mean difference = .38 v
	Nutir-score	5.44	1.34	-
	Percentage	5.11	1.54	Mean difference = .45 *P* = .006
Informative	Words	4.97	1.89	Mean difference = .59 *p* < .0001
	Nutir-score	5.56	1.43	-
	Percentage	5.34	1.43	Mean difference = .36 *p*= .032
Easy to understand	Words	5.39	1.57	Mean difference = .31 *p* = .020
	Nutir-score	5.70	1.28	-
	Percentage	3.54	.98	Mean difference = .16 *p* = .09
Ease of evaluability	Words	3.60	1.13	Mean difference = -.11 *p* = .34
	Nutir-score	3.70	.91	-

Duration of Restrictions Influences Information Processing: The Role of Perception of Control

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ABSTRACT

Many people live with restrictions in their daily life. This paper investigates how the duration of these restrictions influences information processing. We distinguished between temporary and permanent restrictions to show how duration of restriction might affect information processing. With four studies in the field with people who have either temporary or permanent restrictions, we tested our predictions in different contexts and demonstrated that people with permanent restrictions process information more abstractly compared to those with temporary restrictions. Furthermore, we identify a theoretically derived mediator: perception of control. Those with permanent restrictions perceive more control than those with temporary restrictions, which explains their more abstract mind-set.

Keywords: restrictions, information processing, perception of control, construal level

Restrictions are constraints that limit or confine individual choices (Botti et al. 2008). People live with many kinds of restrictions. For example, some people have dietary restrictions such that they eat only gluten-free, lactose-free, vegan, or vegetarian-friendly food. Numbers show that for gluten-free products, the U.S. market alone accounts for approximately $2.7 billion in 2018, and this market increases every year be more than double in 2025[5]. Other restrictions pertain to physical disabilities. For example, some people have broken legs or arms, and some are confined to wheelchairs. In 2014, according to a U.S. Census Bureau Report on people with disabilities, 55.2 million people in the United States were reported to have some kind of disability (Taylor 2018). Moreover, according to the American Community Survey (ACS) in 2016, the overall percentage of people with disabilities in the US was 12.8%. However, not all restrictions are related to the individual per se; they can also be related to external things, such as parking restrictions. It is not unusual to encounter temporal restrictions, such that parking is only permitted between certain periods of time, or spatial restrictions, such that it is permitted only in a certain area.

In the current research, we investigate the psychological consequences of such restrictions. We propose the novel idea that duration of restriction (i.e. temporary versus permanent restriction) might affect people's construal level (i.e. concrete versus abstract mindset) and we explore its effect on consumer decisions and judgments. Most of the previous studies focused on restrictions of limited duration (Karau and Kelly 1992; Aarts, Dijksterhuis, and De Vries 2001; Polivy 1996). Little previous research addresses how people process information when they have permanent restrictions (Mani, Mullainathan, Shafir, and Zhao 2013).

[5] https://www.prnewswire.com/news-releases/the-us-gluten-free-food-market-2019-2025---valued-at-approx-2-7-billion-in-2018-and-is-projected-to-more-than-double-by-2025--300818488.html

Hence, we contribute to the research on restrictions by distinguishing between temporary and permanent restrictions and showing their effect on consumer behavior.

Extant research supports the idea that the same event or object can be construed at higher or lower levels (Liberman and Trope 1998; Trope and Liberman 2010). Research also shows that these different levels of mental representation enable abstract and concrete thinking, respectively (Trope and Liberman 2010). Prior research extensively demonstrates that different construals can influence how consumers process information and behave (Dhar and Kim 2007; Thomas, Chandran, and Trope 2006). Hence studying differences in how consumers process information is important, since it affects consumers' preferences and decision-making. In this research, we investigate how duration of restriction (i.e. temporary versus permanent restrictions) might affect consumers information processing (i.e. levels of construal). Temporary restrictions are those that last for a certain period of time (e.g. dieting to lose a specific amount of weight, parking restriction for a certain period of time). In contrast, permanent restrictions last forever (e.g. having celiac disease, having diabetes). We argue that those who have temporary restrictions focus on the psychologically proximal situation of having a temporary restriction, and hence are more likely to process information with a concrete mind-set. In contrast, those who have permanent restrictions expand their mental horizons to think about psychologically far-away objects or events, and hence are more likely to process information with a more abstract mind-set.

We suggest that the underlying mechanism is the control that people might perceive due to the duration restriction: People with temporary restriction might feel uncomfortable and out of control in their situation, whereas people with permanent restrictions might master their situation and perceive greater control, and therefore, they tend to have a more abstract mind-set about

restriction-related object or events. This is also consistent with what has been show previously in the literature that when a situation is challenging, unsafe or threatening, people are more likely to construe more concrete mindset, since it is important to pay attention to all the details to overcome such situations (Hansen, Kutzner and Wanke 2013). We have conducted series of field studies, using various measurements for construal level from previous research, to show the effect of duration of restriction (i.e. temporary versus permanent restriction) on construal level (i.e. concrete versus abstract mindsets) and consumer judgments in several domains (i.e. eating and physical restrictions). Next, we discuss the implications for retailers.

THEORETICAL BACKGROUND

Restrictions

Previous research suggested that restrictions come in all sizes and shapes. Botti et al. (2008) conceptualized restrictions focusing on their source (i.e. externally or internally imposed), object (i.e. target of the restriction), characteristics (i.e. time frame), and presentation (i.e. whether the restriction has been presented as a loss or a gain). Furthermore, restrictions can have cognitive (e.g. identifying alternatives), emotional (e.g. basic affect), or behavioral responses.

Because of the importance and salience of restrictions in everyday life, researchers in economics, psychology, and consumer behavior have extensively investigated the antecedents and consequences of having restrictions (Mullainathan and Shafir 2013; Sharma and Alter, 2012; Tully, Hersfield, and Meyvis 2015). Most research to date has focused on the emotional and behavioral consequences of having restrictions. For example, when people have financial restrictions such as significant debt, they are more likely to report health problems (AP-AOL

2008; Chou, Parmar, and Galinsky 2016). Among people reporting high debt stress in an AP poll, 27% had ulcers or digestive tract problems, compared with 8% with low levels of debt stress. In addition, 29% of people with significant debt suffered severe anxiety, compared with 4% of people with low debt stress. Polivy (1996) investigated the emotional consequences of dietary restrictions and demonstrates that people with restraints on their eating exhibited heightened affective responsiveness: they responded more strongly than those without restraint to emotion-eliciting slides and audiotapes and fear-inducing situations. Moreover, they were more neurotic than unrestrained eaters on personality measures (e.g. anxiety measures, self-esteem scales, narcissism scales). More recently, Shah, Mullainathan, and Shafir (2012) found that having scarce resources can influence how people allocate attention (i.e. more attention to the restricted resources).

Other research showed that people with dietary restrictions are more likely to focus on food- and drink-related cues (Aarts et al. 2001). People who have time restrictions respond to deadlines with greater attention to the task at hand (Karau and Kelly 1992). However, most of these studies, though not explicitly stated, focus on restrictions of limited duration (i.e. temporary restrictions). Little previous research has addressed how people process information when they have permanent restrictions.

Time Frame of Restrictions and Loss of Control

Although consumer behavior research lacks empirical evidence to distinguish the cognitive and behavioral responses of people with temporary versus permanent restrictions, social and clinical psychology research addressed how people with temporary or permanent restrictions in the form of disabilities might behave. In this context, temporary disabilities are

those from which a person can recover, whereas permanent disabilities are those from which a person cannot recover (McDevitt 1998).

Previous research demonstrated that those with permanent restrictions are more self-accepting and less neurotic compared to those with marginal restrictions (Colman 1971). People with chronic illnesses have to deal with uncertainties about their situation and its accompanying symptoms as well as the ambiguities about the future course of their illness. Research showed that one way in which these feelings of vulnerability and helplessness can be offset is by generating a sense of personal control over the chronic illness, its accompanying effects, and life more generally (Taylor 1983). Schulz and Decker (1985), using a sample of participants with permanent restrictions such as cancer and paralysis caused by spinal cord injuries, noted that participants with such restrictions viewed themselves as better off than most participants with no restrictions and made favorable social comparisons with others not necessarily less fortunate than themselves. The authors explained these results by noting that the permanently disabled participants focused on attributes that made them appear advantaged. For example, those people were more likely to use standards of adjustment based on attributes that can show them as superior, such as their relationships, their behavior towards others' needs, and their intellectual abilities.

We suggest that when people with permanent restrictions perceive control over their lives, they focus less on their restrictions. As a result, they are more likely to have a more abstract mind-set and pay less attention to the details related to their restrictions. Higher level of construal help people surpass the particular details of their current situation (Ledgerwood, Trope, and Liberman 2010) to be able to feel in control and less threatened by their restriction. In contrast, we suggest that people with temporary restrictions are more likely to perceive a loss of

control due to their restriction. Because the restriction is temporary, something that they have not experienced over a long time, they might not know how to cope with it, and loss of control is more salient. As a result, they are more likely to consider all the information relevant to their condition, paying more attention to the details and, hence having a more concrete mind-set.

Previous research showed that when people have a concrete mindset (i.e. lower level of construal) they are more likely to attend to, secondary than primary attribute of the product or event, construct higher number of categories, focus on how thing are done, compared to when people have an abstract mindset (i.e. higher level of construal) (Trope and Liberman 2010). This is also consistent with what Mullainathan and Shafir (2013) suggested that scarcity causes people to focus single-mindedly on managing the scarcity at hand. Scarcity creates a powerful goal that inhibits other goals and considerations and alters how people view things. We suggest that when people have temporary restrictions, they think concretely by focusing on their restrictions. Formally stated:

H1a: People with temporary restriction are more likely to construe restriction-related events and objects at lower level (i.e. concrete mindset) compared to the people with no restriction.

H1b: People with permanent restriction are more likely to construe restriction-related events and objects at higher level (i.e. abstract mindset) compared to the people with no restriction.

H2: People with permanent restriction are more likely to perceive higher control that will lead to more abstract mind-set compared to those with temporary restriction.

OVERVIEW OF THE STUDIES

We tested our predictions in four studies, all conducted in the field with people having either temporary or permanent restrictions, using several measures of construal level. The first study examines whether those who have temporary restrictions (i.e. broken arm or leg) have a more contracted mind-set than those with no temporary restrictions, by measuring level of action identification. The second study tested whether those who have permanent restrictions (i.e. those who use wheelchair) have a more abstract mind-set than those with no permanent restrictions. We tested our prediction in the field, specifically, in a supermarket, by measuring construal of categories. The third study had a similar aim to replicate our previous finding in another context. Patients of a diabetes clinic and clients of a diet store indicated their preferences for different descriptions of the same brand in five product categories. We inferred participants' mind-sets from their preferences for brand-product category information or brand-product attribute information. Study 4 investigated the information processing of people with permanent and temporary restrictions by testing their preferences for product shelves in retail settings. We compared people who have celiac disease (i.e. a gluten allergy) and people who were on a diet to lose a specific amount of weight. We predicted that the dieters are more likely to prefer to have dietary products on special, unique shelves than those with celiac disease. Study 4 also tested for the underlying mechanism of perceived control.

STUDY 1

Study 1 tested the relationship between having a temporary physical restriction and construal level. We predicted that those who have a temporary physical restriction would construe events more concretely compared to those who do not have any physical restrictions.

We tested this prediction in one of the major orthopedic clinics in one of the major European countries.

Participants. Seventy (35 male) people, visiting one of the major orthopedics clinics of a major European city participated the study voluntarily. All participants indicated that they were between 16 and 90 years of age, with mean age being 49.55 (M_{age} = 49.55, SD_{age} = 17.32). Statistical power (1-β = .998) was calculated post hoc using G*Power 3.1 and it was greater than the threshold of .80 (Faul, Erdfelder, Lang, and Buchner 2007). Seven participants did not complete the study and hence were removed form the analysis.

Procedure. We collected the data in an orthopedic clinic of one of the major clinics in one of the major European cities. Participants were told that the researchers were collecting data for their theses. We approached the participants who had a broken arm or broken leg to be in the temporary restriction condition, and those who accompanied them to be in the control condition.

Participants completed the Behavior Identification Form (BIF; Vallacher and Wegner 1987), which is a questionnaire to measure individual differences in action identification, in order to measure the level of construal. Each item presented a target behavior (e.g. “locking a door”) and asked participants which of two alternate descriptions they preferred: one describing the behavior in terms of its means (how it is performed; e.g. “putting a key in the lock”) and one describing it in terms of its ends (why it is performed; e.g. “securing the house”) (see Appendix A). Preference for the low-level identification for any item was coded as 0, whereas preference for the high-level identification was coded as 1. These item scores were then summed to create an index of level of action identification, where higher scores indicated stronger preferences for

high-level action identification (i.e. abstract construal). Finally, participants completed age and gender questions and were thanked.

Results and Discussion

We tested the hypothesis that participants who have temporary physical restrictions would construe events more concretely compared to those who do not have temporary restrictions. Consistent with our prediction, participants who had temporary restriction (i.e. broken leg or broken arm) scored lower ($M_{\text{temporary restriction}}$ = 6.83, $SD_{\text{temporary restriction}}$= 2.38) on BIF compared to those in the control condition ($M_{\text{no restriction}}$ = 8.10, $SD_{\text{no restriction}}$ = 1.96; $t(61)$ = 2.12, $p < .04$, Cohen's D = .58) (Figure 1).

Insert figure 1 about here

Furthermore, BIF score was not significantly correlated with age (R = -.09, p = .50) or gender (R = .11, p = .38).

Study 1 provided initial support for the hypothesis on the simple effect of temporary restriction on construal level. The result showed that those who have temporary restrictions would construe things more concretely compared to those with no restriction. However, the context of this study only allowed us to include participants with temporary restriction. That is why in the next study our sample included those with permanent restriction (i.e. physical disability).

STUDY 2

In study 2, we tested the effect of having permanent restrictions on information processing. We predicted that people with permanent restrictions would construe events with at higher level than those with no restrictions. To test this prediction, we conducted the study in supermarkets in a major European city, where we approached people who had permanent physical restrictions (e.g. being in a wheelchair or having mobility restriction). We measured participants' level of construal (i.e. concrete or abstract mind-set) by asking them to list the items they were planning to buy from the supermarket on their shopping trip. Previous research demonstrated that those who construe events with an abstract mind-set use larger categories to classify objects (Liberman, Sagristano, and Trope 2002). For example, Wakslak et al. (2006) demonstrate that when people imagine the objects in a distant future scenario they group objects into broader and fewer categories than people that imagine the objects in a near future scenario. In line with this research stream, we predicted that those who have permanent restrictions would have fewer items on their shopping list than those with no restrictions.

Participants. Sixty (31 male) adults visiting large supermarkets in a major European city participated in the study voluntarily. All participants indicated they were between 16 and 85 years of age (M_{age} = 42.83, SD_{age} = 19.68). Statistical power (1-β = .986) was calculated post hoc using G*Power 3.1 and it was greater than the threshold of .80 (Faul et al. 2007).

Procedure. The study took place over four days. For the permanent-restriction condition, we approached people who visited the supermarket with a wheelchair. In the no-restriction condition, we approached people who had no visible physical restrictions. Participants were told that the researchers were collecting data for their theses and were looking for volunteers.

Participants were asked to list the items they were planning to purchase during their shopping trip. We counted the number of items that they listed and used it as a proxy for processing information with a concrete or abstract mind-set (M = 4.12; SD = 3.62). We then asked participants to indicate their age and gender.

Results and Discussion

We predicted that participants with a permanent restriction would construe events more abstractly and with an expanded mind-set, and thus, they would have fewer items on their shopping list than those in the no-restriction condition. As predicted, we observed a significant effect of having a permanent restriction on information processing. Participants in the permanent-restriction condition listed fewer items ($M_{\text{permanent restriction}}$ = 3.14, $SD_{\text{permanent restriction}}$ = 1.94) than those in the no-restrictions condition ($M_{\text{no-restriction}}$ = 5.03, $SD_{\text{no-restriction}}$ = 4.53; $t(58) = -2.08$, $p < .05$, Cohen's D = .544) (Figure 2).

Insert figure 2 about here

This study provided support for our prediction that having a permanent restriction influences the way people process information and leads to higher construal level. One limitation is that those in the no-restriction condition might have restrictions that were not visible (e.g. dietary restrictions). Moreover, another explanation for the findings of this study can be that due

to the restriction people might have limitations or difficulties to carry more items and so listed fewer items. Therefore, in the next studies, we limited our restriction conditions to dietary restrictions only and investigate whether having permanent or temporary dietary restrictions might influence people's mind-sets. Another limitation of the studies 1 and 2 is that they tested the effect of either temporary or permanent restriction separately. However, we overcome this limitation in the studies that follow, by testing the effect of temporary versus permanent restriction on the construal level.

STUDY 3

The aim of study 3 is to replicate previous finding on the effect of having a temporary or permanent restriction on information processing in another context. We expected to find when people are in the permanent restriction condition, they might have a more abstract mindset compared to those in the temporary restriction condition.

Participants. Seventy-two (61 female) adults participated in the study voluntarily, of whom 33 were diabetes patients and 39 were diet center clients. None of the participants in the diet center were diagnosed with diabetes. All participants indicated they were between 19 and 80 years of age (M_{age} = 46.69 years (SD_{age} = 15.80). Statistical power (1-β = .991) was calculated post hoc using G*Power 3.1 and it was greater than the threshold of .80 (Faul et al. 2007).

Procedure. We recruited diabetes patients of a major European hospital for the permanent-restriction condition and clients of a major European diet center for the temporary-restriction condition. In the diabetes condition, we controlled for the time participants had been diagnosed for diabetes. In the temporary-restriction condition, we controlled for the time participants had been dieting and how long they were expecting to diet. To measure the level of

construal, we asked participants to choose one of the two options we provided them in five product categories (see Appendix B).

In both conditions, we provided participants with a set of choices involving two descriptions of brands in five product categories. Thus, for each brand, participants read two types of product information: the first described the product category to which the brand belonged, and the second described brand's product attributes. The sample included brands from the beverage, snack, chocolate chip cookies, marmalade, and ice cream categories. For example, the beverage brand was described either in terms of its corresponding superordinate product category or as possessing subordinate product attributes: "CEY—A beverage to control your glucose level" (category–brand association) and "CEY has nutrition to control your glucose level" (brand–attribute association). In line with prior research, we predicted that participants in the permanent-restriction condition would construe concepts abstractly and be more likely to focus on brand–product category information than those in the temporary-restriction condition, who would construe events concretely. We counted the number of choices of category–brand association (i.e. abstract construal) as our dependent variable ($\alpha = .75$). They then indicated their age and gender and were thanked.

Results and Discussion

We predicted that people with permanent restrictions would have a more abstract mind-set and prefer product descriptions with brand–category information to a greater extent than people with temporary restrictions. As predicted, participants who had diabetes preferred descriptions that included brand–category information ($M_{\text{diabetes}} = 3.61$, $SD_{\text{diabetes}} = 1.43$) more

than those who were temporarily dieting ($M_{dieting}$ = 2.90, $SD_{dieting}$ = 1.31; $t(70) = 2.19$, $p < .04$, Cohen's D = .518; Figure 3).

Insert figure 3 about here

As expected, age and gender did not significantly interact with the experimental conditions (Although we measured age and gender in all studies, they did not interact significantly with experimental factors. For the sake of brevity, we do not discuss the non-effects of age and gender further. Details are available from the authors).

Study 3 thus offers additional support for the hypothesis that duration of restrictions influence information processing. Across various product categories, we observed a consistent effect (robust alpha level, indicating consistency in participants' reactions across individual products). This finding suggests that the effect is not specific to a certain product type.

STUDY 4

Studies 2 and 3 demonstrated that people with permanent restrictions have more abstract mind-sets than those with no restrictions and those with temporary restrictions. In study 4, we investigated the underlying mechanism of perceived control in explaining our results. We expected that when people have a concrete mind-set (i.e. temporary diet), they focus more on details and product features, and hence are more likely to prefer shelf formats that contain only gluten-free products. In contrast, when people have an abstract mind-set (i.e. celiac disease), they

have a broader perspective, and hence they are more likely to show higher preference for shelf formats that contain mixture of gluten-free and non–gluten-free products.

Participants. Sixty-five adults (29 women) participated in the study in two different places. Thirty-five participants were approached in a specialized store in a major European city that sold only gluten-free products. The remaining participants were approached in a store that sold dietary weight-loss products in a major European city.

All participants indicated that they were aged between 16 and 68 years (M_{age} = 31.66 years, SD_{age} = 11.40). Statistical power (1-β = .999) was calculated post hoc using G*Power 3.1 and it was greater than the threshold of .80 (Faul et al. 2007).

Procedure. Participants in permanent-restriction condition had celiac disease (i.e. a gluten allergy), and participants in the temporary-restriction condition were dieting to lose a specific amount of weight.

In the permanent-restriction condition, participants read the following:

> "Recent reports state that the gluten-free market in the United States is $4.2 billion and on the rise all around the world. In this study, we try to elicit your preferences when you shop for gluten-free products."

In the temporary-restriction condition, participants read:

> "Recent reports state that the gluten-free market in the United States is $4.2 billion and on the rise all around the world. Recent studies also show that gluten-free products help to lose weight. In this study, we try to elicit your preferences when you shop for gluten-free products."

Next, we asked them to indicate their preferences for different supermarket shelf formats. Participants viewed two different shelf formats for each of six product categories (pasta, snacks,

beer, biscuits, bread, and chocolate). One option showed a shelf containing only gluten-free products. In the other option, the shelf contained products that included both gluten-free and non–gluten-free products (see Appendix C). We asked participants to indicate their preferences for one of the shelf formats for each of the six product categories. We coded a preference for only gluten-free products as 0 and a preference for shelves that contain a mixture as 1. We summed the preferences to create mind-set scores (α = .74). Higher scores indicated a more expansive mind-set.

Participants then completed a state version of the perception of control scale (Pearlin and Schooler 1978). The scale included seven items (e.g. “I have little control over the things that happen to me”, “There is little I can do to change many of the important things in my life”) (see Appendix D). Finally, participants indicated their age and gender.

Results and Discussion

Shelf preference. Consistent with our prediction and findings from the previous studies, participants in the permanent-restriction condition preferred shelves that contain mixed products more than participants in the temporary-restriction condition ($M_{\text{permanent restriction}}$ = 3.67, $SD_{\text{permanent restriction}}$ = 1.27 vs. $M_{\text{temporary restriction}}$ = 2.70, $SD_{\text{temporary restriction}}$ = 1.74; $t(63) = 2.53$, $p < .02$, Cohen’s D = .637; Figure 4).

Insert figure 4 about here

Perception of control. Also as predicted, participants in the temporary restrictions condition perceived less control than those in the permanent-restriction condition ($M_{\text{permanent restriction}}$ = 4.26, $SD_{\text{permanent restriction}}$ = 1.19 vs. $M_{\text{temporary restriction}}$ = 3.64, $SD_{\text{temporary restriction}}$ = .95; $t(63)$ = 2.31, $p < .03$, Cohen's D = .576; Figure 5).

Insert figure 5 about here

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Initially, we regressed our dependent variable –level of construal – on the permanent versus temporary restriction condition. The results suggested that being under permanent restrictions resulted into a more abstract mindset, compared to being under temporary restrictions (β = .968, p = .032). Then, we regressed perception of control (i.e. our proposed mediator) on the permanent versus temporary restriction condition. The results suggested that being under permanent restrictions increased perception of control, compared to being under temporary restrictions (β = .623, p = .024). Next, we regressed shelf preference (our proxy for level of construal) on perception of control. The results suggested that a greater perception of control was linked to a more expansive mindset (β = .536, p = .007). When we regressed the level of construal on both the independent variable (i.e. temporary versus permanent restriction conditions) and the mediator (i.e. perception of control), the effect of the independent variable on the construal level was not significant anymore (p = .135), while the effect of the mediator on the dependent variable was significant and positive again (β = .448, p = .028; Figure 6).

Moreover, as a further test for mediation, we followed Preacher and Hayes's (2004) recommended bootstrapping procedure to compute a confidence interval around the indirect effect. We tested this using the Process Procedure for SPSS 3.1, with 10000 iterations. The results revealed a significant indirect effect via perceptions of control (β = .293, 95% *CI*: [–.662, –.023]).

Insert figure 6 about here

Study 4 provided further evidence that duration of restrictions influences information processing and supported our theory by providing mediation evidence. In this study, we observed that greater perceptions of control result in higher construal level (i.e. more abstract mind-set) for participants with permanent restrictions.

GENERAL DISCUSSION

Individuals throughout the world must live with restrictions that can range from permanent to temporary. Previous research has extensively investigated how people with restrictions behave in the marketplace. We contributed to this stream of research by demonstrating that duration of restrictions influences information processing. We showed people with permanent restrictions have a more abstract mind-set compared to those with temporary restriction.

Evidence for this effect was robust across different types of restrictions ranging from physical disability (studies 1 and 2) to eating restriction (studies 3 and 4). We assessed the resulting differences in information processing using convergent dependent measures, including level of action identification (study 1), construal of categories (study 2), choice (study 3) and preference ratings (study 4). We also found evidence in support of mediation (study 4) that having permanent restrictions led people to perceive more control than those with temporary restrictions, and the extent of this effect predicted their information processing. This result speaks to the specificity and novelty of the effects documented here.

This research contributes to the growing body of research on how consumers with restrictions behave (Hamilton et al. 2018). Previous research on scarcity suggested that people with scarce resources adopt a scarcity mind-set, in which they focus on their scarce resources (Mullainathan and Shafir 2013). Research on financial restrictions demonstrates that people with financial restrictions prefer material goods over experiential consumption because of the longevity of the material goods (Tully et al. 2015). Moreover, research on financial restrictions demonstrates that financial restrictions lead people to prefer scarce goods, to mitigate the effects of financial restrictions (Sharma and Alter 2012). Further research demonstrates the consumption behavior of people with financial restrictions; for example, financially constrained consumers reduce their overall spending (Karlsson et al. 2004) and are more value and price conscious than less financially constrained consumers (Ailawadi, Neslin, and Gedenk 2001). Although prior research extensively investigates how consumers with restrictions behave, it is limited in demonstrating whether the duration of restrictions influences information processing. The current research contributes to this research gap by first distinguishing between permanent and

temporary restrictions and then demonstrating that people with permanent restrictions tend to process information more abstractly than those with temporary restrictions.

By demonstrating that perceptions of control lead people with permanent restrictions to have abstract mind-set and consequently engage in abstract information processing, this research also contributes to extant literature on construal level theory (Liberman and Trope 1998). Previous construal level theory research demonstrates that different construals can lead to different consumption experiences. Our work furthers this research, in that it is among the first to investigate how perceptions of control can lead to different construals. As study 4 demonstrates, perceiving high levels of control tends to lead to abstract construals, and perceiving low levels of control tends to lead to concrete construals.

Moreover, this research contributes to extant literature on construal level theory and individual behavior by demonstrating that various construals can lead to different shelf order preferences. Previous work has demonstrated how various construals might lead to different preferences for feasible versus desirable products (Todorov, Goren, and Trope 2007) and emphases on central versus peripheral features (Trope and Liberman 2000). In contrast, this research demonstrates how various construals can lead to different organization preferences. Specifically, study 4 shows that people who construe information more abstractly (i.e. who have permanent restrictions) prefer shelf organizations that include a mixture of different products. In contrast, those who construe information more concretely (i.e. with temporary restrictions) prefer shelf organizations that include only a specific type of products.

One limitation of the methodology used in this paper is lack of random assignment in the field studies, due to the nature of the research question (i.e. permanent versus temporary restriction). This research also has managerial implications for specialty retailers (e.g. gluten-free

stores and restaurants). Moreover, it is not unusual to have gluten-free or diabetic product sections in supermarkets. The results of this research demonstrate that those who have permanent restrictions (e.g. those who have celiac disease, those with diabetes) are less likely to prefer specific areas for the products that they seek. Conversely, specific stores devoted to diet foods might be more preferable for those who have temporary restrictions (e.g. people dieting for a specific period of time).

In conclusion, this research is among the first to distinguish between temporary and permanent restrictions and demonstrate how the duration of restrictions can influence information processing. One promising avenue for future research is to investigate how the duration of restrictions might influence consumers' motivations in the marketplace. For example, if people with permanent restrictions have a more abstract mind-set than people with temporary restrictions, they might also be more motivated to set higher-order personal goals and be better able to achieve them.

Appendix A – BIF questionnaire for study 1

For each action, please choose the description that expresses the action better than the other

1.Making a list:
a. getting organized
b. writing things down

2. Reading a book
a. gaining knowledge
b. following lines of print

3. Washing clothes
a. removing odors from clothes
b. putting clothes into the machine

4. Picking an apple
a. getting something to eat
b. pulling an apple off a branch

5. Chopping down a tree
a. getting firewood
b. wielding an axe

6. Measuring a room for carpeting
a. getting ready to remodel
b. using a yardstick

7. Cleaning the house
a. restore cleanliness
b. vacuuming the floor

8. Painting the room
a. making the room look fresh
b. applying brush strokes

9. Paying the rent
a. maintaining a place to live
b. paying the bill

10. Caring for houseplants
a. making the room look nice
b. watering plants

11. Locking a door
a. securing the house
b. putting a key in the lock

12. Voting
a. influencing the election
b. marking a ballot

13. Climbing a tree
a. getting a good view
b. holding on to branches

14. Filling out a personality test
a. revealing what you're like
b. answering questions

15. Brushing teeth
a. preventing tooth decay
b. moving a brush around one's mouth

16. Taking a test
a. showing one's knowledge
b. answering questions

17. Greeting someone
a. showing friendliness
b. saying hello

18. Resisting temptation
a. showing moral courage
b. saying "no"

19. Eating
a. getting nutrition
b. chewing and swallowing

20. Growing a garden
a. getting fresh vegetables
b. planting seeds

21. Driving by car
a. traveling to a destination
b. steering and changing gears

22. Having cavity filled

a. protecting the teeth
b. going to the dentist

23. Talking to a child
a. teaching a child something
b. using simple words

24. Pushing a doorbell
a. seeing if someone is home
b. pressing a button

Appendix B – Stimuli Used in Study 3

NIL

An ice-cream

That does not raise your blood sugar

NIL

Has low amounts of carbohydrates

That do not raise your blood sugar

Appendix C – Stimuli Used in Study 4

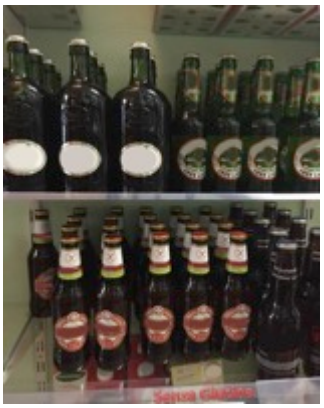
Only Gluten-Free

Mixed with Other Products

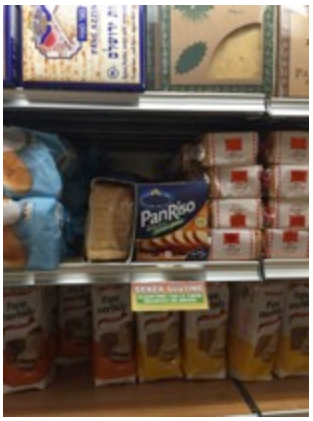
Pasta

Biscuits

Bear



Bread



Chocolate

Snacks

Appendix D: Perceived Control scale adapted from Pearlin and Schooler (1978)

- I would need no help to find the products that I want to purchase
- I would have control over how I can find products in the supermarket
- I would feel helpless to find the products that I want to purchase
- If I want to purchase a product, I can easily find it
- I would know where to find the products that I need to purchase
- I usually do not look at the isle information for the products that I want to purchase
- It would be hard for me to find the products that I want to purchase if they are all mixed up

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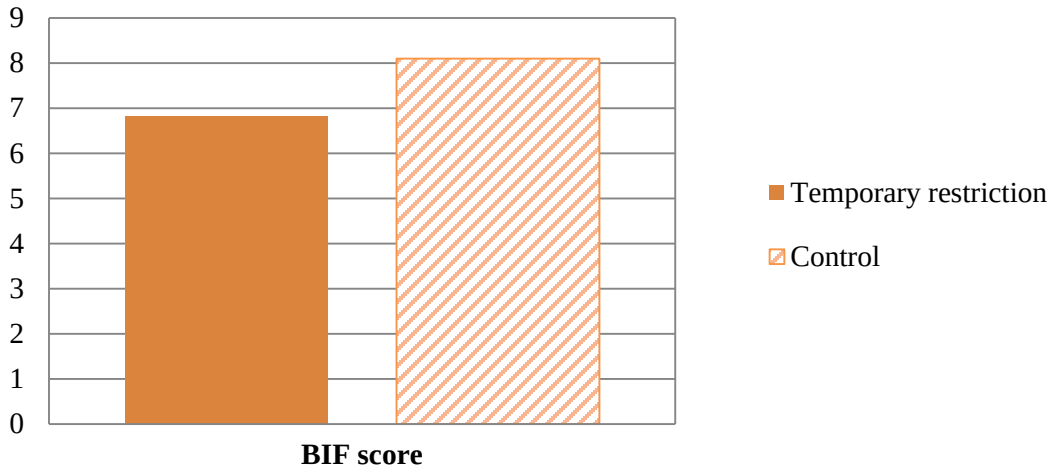


Figure 1: Effect of temporary restriction on construal level (BIF score)- Study 1

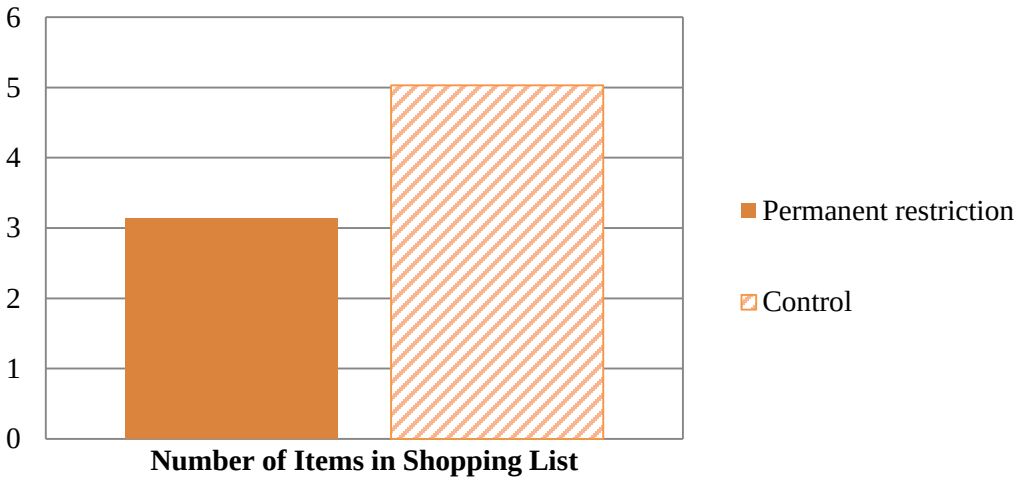


Figure 2: Effect of permanent restriction on construal level (product categorization)- Study 2

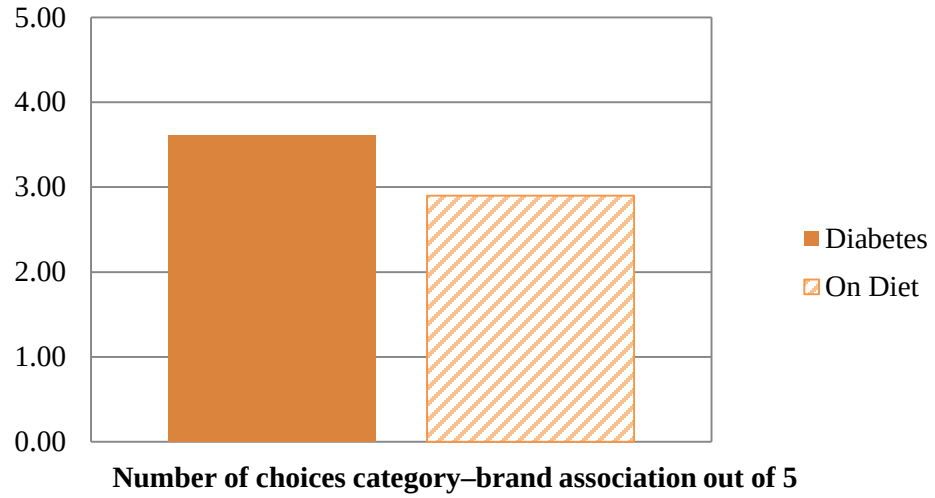


Figure 3: Effect of permanent vs. temporary restriction on construal level (product information)- Study 3

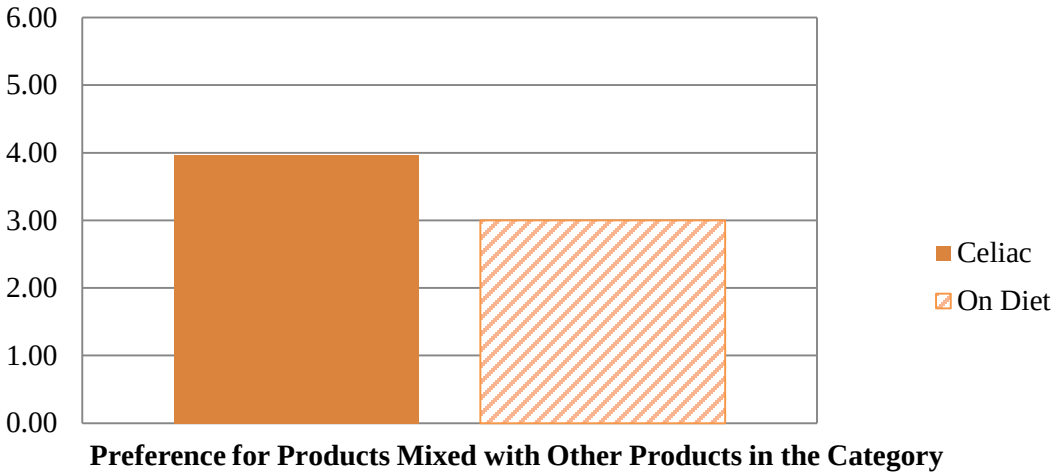


Figure 4: Effect of permanent vs. temporary restriction on construal level (shelf preference)- Study 4

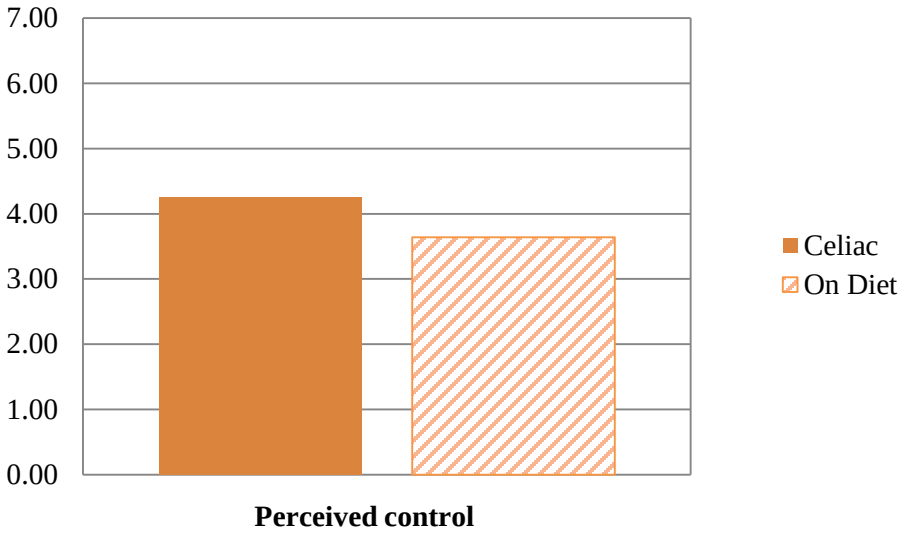
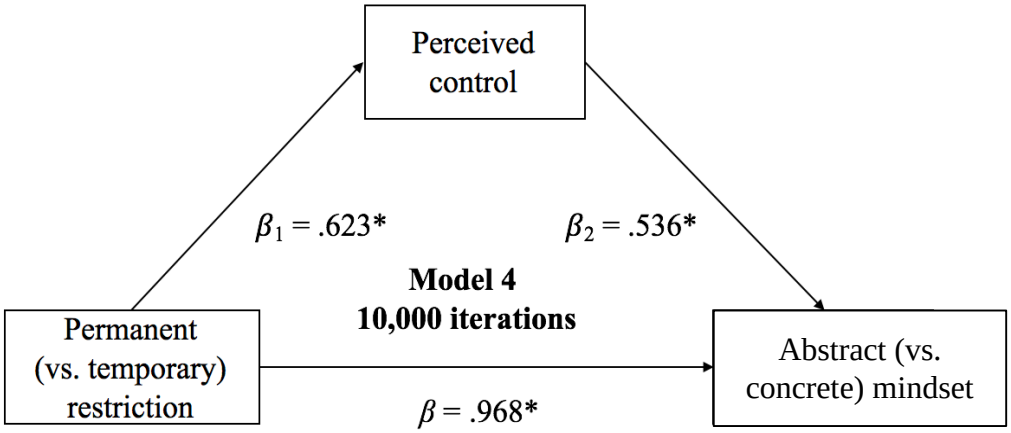


Figure 5: Effect of permanent vs. temporary restriction on perception of control - Study 4



Index of mediation = β = .293, 95% CI: [–.662, –.023]
*p < .05

Figure 6: Mediating effect of perceived control on the effect of duration of restrictions on construal level