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We are indeed grateful for you two, and it would be wonderful if we could stay in touch and work together one day again. Can we make that happen?

We hope you enjoy reading our last piece of work written as a student before we dive into the real world – more responsibilities, routines and but sweet paychecks (hopefully) every month, not to settle down but only to reinvent ourselves.

Thank you!

Best regards,
Yujin and Nhat

1. Abstract

Previous research has demonstrated that consumers frequently experience a health halo effect from "organic" claims when evaluating food products. This bias can be highly inaccurate, leading to unintended, unhealthy consumer choices (e.g. underestimation of the calorie content, higher willingness to forgo exercise). In contrary to previous studies, our paper aims to highlight the halo effect specifically pertaining to the estimation of physical efforts to burn calories. In Study 1, we replicated a previous finding on the underestimation of the calories but did not observe any statistically varying effect in estimating "minutes to walk" across conditions (conventional vs. organic). In Study 2, we modified a dependent variable from "minutes to walk" to "intensity of exercise" but no statistical significance has emerged. In Study 3, we added a high-calorie condition given the assumption that it would trigger the halo bias. Nonetheless, consistent with the two previous studies, we observed no such bias in our final study. To sum up, our finding indicates that estimating physical effort may hinder the halo effect when it comes to organic food consumption scenarios.

Keywords: halo effect, health halo, organic, food labeling, health claims, calorie estimation, physical effort estimation

2. Introduction

Last year on November 11, a popular Norwegian TV show "Folkeopplysningen" aired a controversial episode about organic food to debunk its mythical beliefs. That episode alone hit approximately 600,000 views nationwide, and heated discussions on social media have been transpired to tackle the overall validity of organic food products. To illustrate cognitive bias towards organic food, the show conducted a blind wine-tasting on the street with two types of wine, one labelled as organic and the other as non-organic. Not too surprisingly, participants rated the organic wine more highly in terms of its flavor, even though both were, in fact, non-organic wine. Similarly, the study conducted by Schuldt and Schwarz in 2010 found that people infer organic cookies are lower in calories and thus can be eaten more often. Moreover, forgoing exercise was perceived to be more acceptable with the choice of an organic dessert versus a

conventional one. These results reflect an "organic/natural"-"healthy" association that is capable of biasing everyday judgments about diet and exercise (Schuldt and Schwarz, 2010).

The underlying mechanism causing such biased perception can be explained by a psychological phenomenon called "halo effect". Initially coined by a psychologist Edward Thorndike, the term indicates a cognitive bias in which consumers might judge products with one positive attribute more favorably on other attributes, even when they are not substantively related (Schuldt and Schwarz, 2010). In terms of food evaluation contexts, the halo effect reflects the prominence of non-sensory attributes of food products such as the nutritional value, absence of food additives and residues, or the process through which a food is produced (Torjusen, Lieblein, Wandel, and Francis, 2001; Wilkins and Hillers, 1994). As such, the increased consumers' interest in organic food has been attributed among others to the growing demand for food free from pesticides and chemical residues (Childs and Polyzees, 1997; Zotos et al., 1999; Baltas, 2001; Fotopoulos and Krystallis, 2002).

Interestingly, "organic" is not synonymous with being completely "pesticide-free", as organic standards can also contain commercially manufactured pesticides that occur naturally in their origin. Even though this has been highlighted via mass media, the halo effect continues to perpetuate a partially unwarranted link with healthiness. Moreover, the halo effect is deemed prevalent even when heuristic attributes are relatively less relevant. More specifically, Schuldt et al. (2012) found that even social ethics claims on food packaging (e.g. Fairtrade) can drive the misperception that ethical food contains fewer calories. Because calorie estimation is such a cognitively demanding task (Wansink and Chandon, 2006b), perceivers might substitute the associatively related attribute as a means for simplifying complex calorie judgments (Kahneman and Frederick, 2002). Particularly, it appears valid even when the associative link is not so plausible (e.g. social ethical claim → fewer calories).

Building on these findings, we aimed to validate the breadth of the halo effect by adopting an extended dependent variable in our first study. We reasoned that if the calorie estimation is a cognitively demanding task and thus nudges perceivers into

inferencing heuristic cues, so should be the estimation of physical efforts. To be more specific, in the aforementioned study from 2010, they found that participants in the organic condition were more lenient about forgoing exercise than were those in a conventional condition. It indicates that eating organic food is perceived as a substitute for other weight-loss promoting behaviors such as physical exercise. Based on this, in Study 1, we predicted that "minutes to walk" to burn off calories would be underestimated when participants are placed in the organic condition. However, while participants underestimated the calorie content of organic food, they did not convert such underestimation into fewer minutes to walk.

Upon investigating our data from Study 1, we decided to deviate our main dependent variable to reflect a more realistic decision-making condition. We assumed that precisely asking "minutes to walk" might have inflicted high cognitive load on the participants, thereby putting them into a highly calculative mindset. Hence, in Study 2, we introduced "the intensity of exercise" as a new dependent variable along with some other changes in the design. Despite these core adjustments, however, we still did not observe any statistical correlation between our dependent and independent variables. In Study 3, finally, we tested whether setting a high-calorie condition would lower a ceiling to bring back the bias. However, contrary to our expectation, the calorie underestimation has not been translated into the lower exercise intensity even under the high-calorie condition. Therefore, our aim for this paper is to explore and conclude possible explanations for this contradictory outcome with both empirical and theoretical perspectives. We will then discuss general implications of our findings for both academia and marketing practitioners promoting organic food products. Finally, we will outline limitations of our findings and future study recommendations.

3. Literature Review

3.1. Organic Food

The growing demand for organic products has driven researchers to investigate various aspects of organic food and its consumers. Essoussi and Zahaf (2008) provide a clear definition of organic produce with the focus on the production process; "organic food is minimally processed to maintain the integrity of the food without artificial

ingredients, preservatives or irradiation". The term "organic" is rooted in "bio" from Greek, meaning life or way of living. Organic and natural food in general are commonly viewed as promoting a healthier lifestyle well adopted by a demographic segment called Lifestyles of Health and Sustainability (LOHAS). An important characteristic of organic product is that it is a credence good; consumers may not detect the presence or absence of organic characteristics even after purchase and use (Giannakas, 2002). As a result, consumers can identify whether the product is organic only when they are informed by the non-sensory attributes, such as labels.

Consumer Awareness and Knowledge about Organic Food: While Chryssochoidis (2000) indicates that consumers have a lack of knowledge on organic food; Lo and Matthews (2002) show that consumers do have general awareness about organic products, but there is inconsistency in their interpretation of what is "organic". This is partly due to variations in inspection criteria and certification requirements among organic certifiers. Moreover, though consumers typically understand the broad matter of organic food, many do not understand the complexities of organic farming practices and its quality attributes, making them feel incapable of making a good choice and less likely to purchase (Hill and Lynchehaun, 2002). Besides the lack of knowledge, uncertainty regarding the true attributes of organic, and skepticism about organic labels may also impede consumers' purchase (Giannakas, 2002; Wang et al., 1997; Demeritt, 2002). For example, Giannakas (2002) points out that deception in the form of mislabeling raises consumers' doubt of the labeling process and thus, can have detrimental impacts on the general acceptance of organic products.

Organic Consumer Attitudes and Preferences*:* Overall, most studies report that consumers purchase organic food because they perceive organic products as safer, healthier and more environmentally friendly than conventional alternatives. In a study that explores health-related determinants of organic food, participants cite wholesomeness, no chemicals, environment friendliness, and a better taste as main reasons to buy organic food (Schifferstein et al., 1998). The authors indicate that organic food consumption is perceived to be a way of life, resulting from an ideology, connected to a value system, that affects personality measures, attitudes, and consumption behavior. Goldman and Clancy (1991) points out that consumers who

usually purchase organic food have higher levels of concern about food safety, and are less concerned about insects and surface blemishes on produce.

Schifferstein et al., 1998 and Goldman and Clancy (1991) report health and food safety as the number one quality attribute considered by organic buyers, followed by concern for the environment (Gregory, 2000; Estes et al., 1994). Empirical evidence, on the other hand, supports a hypothesis that product quality characteristics affect consumers' preferences for organic food, with the most important attributes including: nutritive value; economic value; freshness; flavor or taste; and general appearance, especially for fruits and vegetables (Wolf, 2002; Demeritt, 2002; Klonsky and Tourte, 1998; Goldman and Clancy, 1991; Buzby and Skees, 1994). Wolf (2002), for example, shows that specific positive environmental factors (e.g. free of pesticides, safe for the workers, earth friendly, environmentally safe, grown in a way that is good for groundwater) are more desirable than the organic designation itself.

Profile of Organic Consumers: Most researches in the literature report that income is not a significant explanatory variable in the different purchasing behaviors of buyers and non-buyers of organic products (Jolly, 1991). However, Hutchins and Greenhalgh, (1997) and Ekelund (1989) suggest a positive correlation between income and willingness to buy an organic product because organic products usually charge a premium price which only shoppers above a certain income level can afford. It is also found that most organic food buyers tend to be women (O'Donovan and McCarthy, 2002; Buzby and Skees, 1994; Roddy, Cowan and Hutchinson, 1996) partly because they are usually in charge of purchasing groceries in families and thus are more likely to be informed about nutrition and food safety than men.

Some other studies report that younger consumers are more likely to purchase organic products, because of their preference for chemical-free products and interest in environmental quality (Hay, 1989; Buzby and Skees, 1994). Moreover, Hamzaoui and Zahaf (2006) provide a general description of typical organic products consumers (TOPC). They, as the article described, are usually vegetarian/vegans, concerned about the environment, health-conscious, tend to support local farmers, do not trust big corporations, and are willing to pay a premium price to purchase organic food product.

3.2. Health and Nutrition Claims

Research in the eating behavior domain has suggested that food choice and consumption decisions are largely influenced by contextual cues (Cohen and Babey, 2012). The authors suggest that because five senses are beyond people's full control, they cannot ignore the surrounding environment and produce automatic responses to contextual food cues without even realizing it. Even when people are aware of many contextual factors, they often do not realize how the contextual cues affect their food choices and the amount they consume. These risk factors coming from external environment, in combination with many choices made without conscious awareness but by consumers' automatic processes, can lead to increased caloric consumption and poor dietary choices. Such cues can include marketing practices like communication, packaging, and especially health and nutrition claims.

In recent years, marketers have increasingly made use of nutrition claims (such as "low fat" or "high fiber"), function claims ("calcium is essential for growth"), health claims ("vitamin C supports immunity"), vague unregulated claims (including "smart choice" or "good for you"), or the use of third-party certifications (e.g. "kosher", "halal" and "organic"). Some of these claims can improve brand evaluation and sales, although these effects are simultaneously influenced by competitors' practices and their influence on taste expectations (Kiesel et al., 2011; Kozup et al., 2003). Riis and Ratner (2010) and Andrews et al. (2011) also show that simpler and more prescriptive health claims, such as color-coded traffic lights (green for "healthy", yellow for "less healthy", and red for "unhealthy" food) could yield more noticeable outcome.

A field experiment by Thorndike et al. (2012) find that simple traffic light color coding of cafeteria food boosts sales of green products and reduces sales of red ones. To investigate consumers' responses to different nutrient labels, Kiesel and Boas manipulated three nutrient labels (no trans-fat, low calorie, low fat) on microwave popcorn and displayed them either only once or multiple times to see how it affects product sales. They conclude that "no trans-fats" and "low calorie" labels yield higher purchases, while "low fat" labels are associated with a decline in sales, partly because "low fat" may have activated consumers' concerns about taste. In addition, displaying

claims multiple times performs poorer in comparison with a single nutrient claim in use (Kiesel and Boas, 2008; Kiesel and Boas, 2009).

3.3. Health Halo

Halo effect refers to a cognitive bias in which an observer's overall impression of a person, company, brand, or product influences the observer's feelings and thoughts about that entity's character or properties. Grounded in the classic literature on the halo effect (Thorndike, 1920; Asch, 1946), various halo-based food researches have focused on how learning about one positive attribute of a food company or food product promotes other unmentioned evaluations. This bias is generally referred to as health halo (Chandon and Wansink, 2007). Previous researches have demonstrated that mere inclusion of certain words in products' design may be enough to bias healthiness judgments.

For example, margarine advertised as "no cholesterol" and "healthy" is judged as also lower in fat (Andrews et al., 1998). A product labeled with "fruit sugar" is perceived as more healthful than just "sugar" (Sütterlin and Siegrist, 2015). Similarly, "free-from" products are considered more healthful in comparison with conventional ones, even if it is a made-up ingredient, such as MUI-free in the study context (Baum et al., 2015). Sundar and Kardes (2015) find that when consumers lack information about some attributes, the health halo effect and perceived attribute variability will work together to affect consumer inferences, choices and consumption rates. As such, if a missing attribute is high in perceived variability, uncertainty increases and consumers tend to be more conservative about the product but the health halo effect can help reduce their overall conservative judgment. The logic is that positive labels on the package such as "organic", "zero sugar", "trans-fat free" and "cholesterol free" lead to an overall favorable attitude that afterwards guides their inferences about missing or unknown attributes.

A recent stream of literature shows that such an effect also extends to organic claims. It is interesting because the organic claim only informs consumers of lower levels of conventional pesticides and synthetic additives in food (USDA, 2010), but is silent on

the calorie content. Schuldt and Schwarz (2010) find that organic claims create certain bias, which leads to the underestimation of the calorie content and lower need for physical exercise after consumption. Similarly, Lee et al. (2013) find that food with organic labels induce lower caloric estimations, higher willingness-to-pay (WTP), and more positive nutritional evaluations (e.g. lower in fat, more fiber) than conventional ones. Notably, these effects are typically more robust among individuals with high pro-environmentalism, who already have more favorable attitude towards "organic" products (Schuldt and Schwarz, 2010) or the ones having more knowledge of organic food and consuming it more frequently (Prada et al., 2017).

In addition, Schuldt and Hannahan (2013) investigated whether the goals and contexts differently influence the bias created by organic claims. Their results suggest that though perceived as more healthful in common contexts, organic food could be biased as less tasty and less effective in tackling malnourishment. Prada et al. (2016) focuses on the boundary of the halo effect induced by the organic claim on leniency toward forgoing exercise (i.e. the effect is significant only when the fictitious character "intentionally" chooses the organic meal). It suggests licensing effect as the underlying mechanism accountable for the bias on leniency judgments. While processed organic food has not received much attention from researchers, a recent study by Prada et al. (2017) has investigated it in comparison with whole organic food and conventional ones on three dimensions, such as perceived healthiness, taste and calorie content. Interestingly, processed organic food is evaluated as tastier, more healthful but more caloric than conventional alternatives. This suggests that characteristics of processed food might have moderated the effect of organic labels.

Because natural food nowadays tends to be considered as inherently good and healthy (Rozin et al., 2004), "organic" halos seem predictable given the natural process of organic production. Surprisingly, however, the health halo effect is not just limited to organic products, which is related to health, but also to products with Fairtrade claims (Schuldt et al., 2012), corporate-level CSR message (Peloza et al., 2015) or brand positioning (Chandon and Wansink, 2007). Schuldt et al. (2012) provide evidence that when the product is described as Fairtrade, or when the company is known to treat its workers ethically, it creates the misperception that their food contains fewer calories.

Similarly, four studies by Peloza et al. (2015) show that consumers underestimate calorie content when they evaluate food products from firms with strong CSR reputations. The article by Chandon and Wansink (2007), which combined both field and lab studies, shows that people are more likely to underestimate the calorie content of sandwiches from fast food restaurants that are marketed as healthy (e.g. Subway).

4. Theoretical Background and Hypotheses

4.1. Theoretical Background

The psychological processes that can explain why people are under the influence of the health halo effect include, but not limited to, dual processing theory, automaticity and heuristic-based decision-making and bounded rationality. We further go into details of these theories in this section.

Dual processing theory hypothesizes that people utilize one of the two distinct systems to process information and make decisions – cognitive (System 2) and non-cognitive (System 1) (Kahneman, 2003). Cognitive processing implies careful, effortful and slow decision-making in which an individual consciously weighs the pros and cons, compares among alternatives, and arrives at what seems to be the best option given the circumstances. Non-cognitive processing implies a quick efficient automatic response that uses heuristics to guide decisions. Baumeister, Bratslavsky and Tice in their research have built a decision-making model and discovered that self-control, like a muscle, can fatigue under certain circumstances (Baumeister et al., 1998; Baumeister et al., 2000).

Self-control can also be depleted by the very act of making a decision, which requires cognitive resources to make thoughtful choices (Vohs et al., 2008). For example, when we stand in front of a shelf space that offers 30 different types of jams and do not know what to choose, this overwhelming information depletes our self-control because careful consideration of each jam and comparison among 30 types will leave us exhausted. Thus, we are likely to resort to the non-cognitive decision-making path. Similarly, since the calorie estimation is a cognitively demanding task, people might use an associatively related cue like nutrition or health claim as heuristics to simplify

the complex decision (Kahneman and Frederick, 2002). The impact might be strong and significant, especially when people need to decide on what food to buy and how much to eat several times per day. Although many different mechanisms work to maintain energy balance in our bodies, such as physiological signals of satiety, cognitive factors can prevail metabolic adaptations. Cognitive depletion is considered the primary reason why dieters fail to sustain diets and weight loss goal in the long run (Vohs et al., 2008; Baumeister et al., 2000).

Another potential underlying mechanism is automaticity. Automaticity refers to processes that occur without conscious direction, without effort, without control, and without intent (Bargh, 1994). The human brain is designed to allow automaticity under certain circumstances, often as a protective measure: the neurons transmitting signals from our senses to the brain are directly connected to motor neurons, so people can respond reflexively, without having to make a conscious decision (Libet et al., 1991). For example, if people touch something very hot, they will withdraw their hands immediately, even before their conscious minds decide so. Many of human behaviors are not driven by conscious intentions, but by factors in the surrounding environment that operate outside of conscious awareness (Bargh, 1999).

Our senses operate automatically: for example, if we see or hear a sound, we first automatically orient toward that sound, and our perceptions can then alert the part of our brain that is responsible for conscious awareness. Nevertheless, we can respond to contextual cues without our conscious awareness ever being involved (Chartrand, 2005 and Dijksterhuis et al., 2005). Habits exemplify this phenomenon; they are specific behaviors initiated automatically by contextual cues that were previously congruent with the performance of the behavior (Orbell and Verplanken, 2010). In the light of this theory, we can argue that consumers tend to automatically succumb to heuristic cues like an organic label as part of their shopping and eating habits and thus, pick up an organic product thinking that it contains fewer calories and allow themselves to consume more or exercise less afterwards.

Due to automaticity and heuristic-based decision making, human can make food choices very fast. In a study with a laboratory setting by Milosavljevic, Koch and

Rangel (2011), it was found that participants chose between two snacks in just less than 313 milliseconds. Even outside of a lab setting, such as a take-away store, researchers found that people make food choices very quickly without considering much of the consequences. When it comes to food choices, people weigh several attributes like price, sensory appeal, convenience, familiarity, etc. as well as concerns about health. Heuristics like labels, familiar pictures, shapes, sizes, logos, brands and prices assist people in making a rapid decision when it becomes a daunting task.

Though making use of heuristic cues may lead to poorer and less healthful choices, people tend to turn to it for the sake of saving cognitive currency, operating efficiently and freeing efforts for other demanding tasks in life. In a modeling study by Scheibehenne, Miesler and Todd (2007), heuristic processing is proved to produce comparable outcome to the normal route when we make actual meal choices. To be more specific, the normal route considers 38 attributes while the heuristic one is based on only one distinguishing characteristic. Subsequently, models of both routes generate the same predictive value, suggesting that the result we get from heuristic processing is on average the same as the one from a more complex process.

"Bounded rationality", a popular concept in psychology and behavioral economics, refers to human beings' limited capacity to make wise choices, leading to less than optimal decision-making (Kahneman, 2003). Even when people have all the information necessary to make good decisions, they are often subject to bias and make poor choices. Even though people know that the bias exists, they often cannot help having such bias (Kahneman, 2011). Halo effect is one of such biases, resulting from people's making use of heuristics to evaluate unmentioned attributes, which in turn generates inaccurate judgments. "Bounded rationality" can be caused by an overload of information that makes people unable to exert self-control due to cognitive depletion (Vohs et al., 2008). While the capacity of individuals has not changed in recent decades, the amount of information consumers need to process during a shopping/decision-making episode has dramatically increased. When people are inundated with ads, promotions, nutrition information, a huge range of selections and so on, they are more likely to turn to non-cognitive heuristic processing to draw judgment.

4.2. Main Hypotheses

We predict that people make use of an organic label as a heuristic cue to draw the calorie judgment. We aim to replicate the previous finding by Schuldt and Schwarz (2010) that people underestimate calories per this cue. Additionally, we test whether this bias is still active when they estimate the physical efforts to burn off calories. One explanation for the halo effect could be spreading activation theory (Collin and Loftus, 1975), when 'organic' co-activates 'healthy' and 'lower calories' concept, leading to consumers' calorie underestimation and willingness to forgo exercise. Besides, Prada et al. (2016) introduce moral self-licensing as another plausible driver of the halo effect. Khan and Dhar (2006) describe moral self-licensing as "a non-conscious effect that operates by providing a moral boost in the self-concept, which increases the preference for a relative immoral action subsequently".

Applied to our research setting, we anticipate that participants receive this moral boost from consuming organic chocolate (vs. conventional) and "allow" themselves to exercise less due to an unaccountable "feeling of not having to do so". Based on this reasoning, in Study 1, we predict that participants would underestimate "minutes to walk" to burn calories in the organic condition. To improve the measurement, in Study 2, we introduce the "intensity of exercise" as a new dependent variable and predict that it would be negatively influenced by the organic claim both with the absence and presence of the calorie content.

H1a: People's estimation of the calorie and physical effort will be negatively influenced by the organic claim with the absence of the calorie content.

H1b: People's estimation of the calorie and physical effort will be negatively influenced by the organic claim with the presence of the calorie content.

4.3. Hypotheses for Mediators and Moderators

We aim to contribute to the literature of the health halo effect by investigating possible moderators and mediators. Previous literatures suggest that the effect can be more

prominent amongst consumers who believe that organic products are good for environment and who are highly concerned about calories. That is, people high on the pro-environmentalism and calorie concerns are likely to have more positive attitudes toward organic production and therefore are more susceptible to organic claims. Hence, we include the pro-environmentalism and calorie concerns as potential moderators. We also investigate if perceived healthiness mediates the process (i.e. organic → healthy → fewer calories, lower intensity). In Study 3, we also add an income measurement to see if the main effect is moderated by participants' income level.

H2: Perceived healthiness mediates people's judgments on the calorie and physical effort estimation.

H3: The effect of organic claim on the physical effort estimation is more pronounced at higher levels of pro-environmentalism.

H4: The effect of organic claim on the physical effort estimation is more pronounced at higher levels of calorie concerns.

H5: The effect of organic claim on the physical effort estimation is more pronounced at higher levels of income.

We also look further into the presence of the ceiling effect. We do so by manipulating three levels of calorie conditions (no calorie info, low-calorie, high-calorie). It is to see if the high-calorie condition can lower the ceiling for the main effect to emerge. More specifically, "forgoing exercise" (per the 2010 study) was found to be significant under a relatively low calorie condition (160 kcal). In case our dependent variables (i.e. minutes to walk, intensity of exercise) prove to be insignificant under a similarly low-calorie condition (132 kcal in Study 1, 210 kcal in Study 2), setting up a much higher calorie condition could result in the underestimation of the "intensity of exercise".

H6: People's judgments on the physical effort estimation will be negatively influenced by the organic claim only when the calorie content is high.

5. Study 1

5.1. Method

Five hundred and twelve American participants recruited via Amazon Mechanical Turk (Male: 275, Female: 228, Undeclared: 9) completed this approximately 15-min online survey. The cover story was a marketing research survey on food and nutrition preference. The average age of participants was 35.6, ranging from 18 to 75. A monetary compensation of one dollar was paid to all participants who successfully completed the survey. Upon accessing the survey link, participants first provided consent and then were randomly assigned by Qualtrics' algorithm to one of the four conditions, which can be portrayed as a 2 (organic vs. conventional) by 2 (calorie info vs. no calorie info) between-subject design. In each condition, participants were exposed to a picture of chocolate blocks along with a nutritional label. The following text was displayed in one of the four conditions:

"Below is a nutritional label from an organic chocolate brand that is available in the market. Notice that the serving size is 33 grams which is equal to 4 blocks of this organic chocolate bar, which together contains 132 calories. Feel free to consult any of the nutritional information provided by the label."

(Figure 1: "Organic" with "Calorie Info" Condition Stimulus)

In a conventional condition, the USDA organic logo was excluded. As such, the calorie information (132 kcal) was not provided both in the text and the nutritional label in the no calorie condition.

5.2. Measurement of the Dependent Variables (0 to 100 scale on a slider)

1) Calorie estimation: *Compared to other chocolates, how many calories do you think one serving of this chocolate contains?*
2) Physical effort estimation (minutes to walk): *How many minutes do you think you would need to walk at your usual pace to burn off the calories obtained from consuming one serving of this chocolate?*
3) Perceived healthiness: *Compared to other chocolates, how healthy do you think this chocolate is?*

5.3. Measurement of the Moderators

Next, participants were asked to answer their exercise frequency, general concerns and awareness about daily calorie intake and shopping habits (to which extent they prefer organic products). In addition, dietary restraint questions derived from The Dutch Eating Behavior Questionnaire (DEBQ) (Van Strien et al., 1986) as well as pro-environmentalism related questions (Dunlap et al., 2000) were displayed. Questions concerning hunger (How hungry do you feel now?) and specific diet restrictions (Are you vegetarian? / Are you on any specific diet which might restrain you from eating chocolates?) were also presented. Some of the sample items for DEBQ included "I eat less than usual when I gained weight" and "I try not to eat in the evening because I watch my weight". As such, the pro-environmentalism measure included statements such as "When humans interfere with nature it often produces disastrous consequences" and "If things continue on their present course, we will soon experience a major ecological catastrophe". These were measured on a 5-point scale (strongly disagree – strongly agree). Finally, participants filled out demographic questions indicating their gender, age, ethical and educational backgrounds.

5.4. Results

Out of 512 participants that were recorded in the original data set, we dropped 22 participants due to incomplete answers, 9 for consulting online and 34 for repetitive answers for NEP and DBEQ. After applying the filter regarding variables such as total time, attentiveness and quietness in SPSS, 385 respondents were resulted in our

analysis (Average age: 36.36, 54.8% Male), leaving us roughly 96 participants per cell. In line with our prediction, we replicated the earlier finding by Schuldt and Schwarz (2010). The participants' estimation of the calorie content was influenced by the organic claim; the organic chocolate received lower calorie judgments (M = 43.22) than did the conventional one (M = 47.20); F (1, 383) = 4.034, p < .05, d = .2 for the main effect (See Table 1). We also split the data to compare results between two conditions – no calorie info and calorie info. Contrary to our prediction (H1b), the calorie underestimation was only present in the no calorie info condition F (1, 181) = 3.692, p < .05 and did not emerge in the calorie info condition F (1, 200) = .921, p = .338.

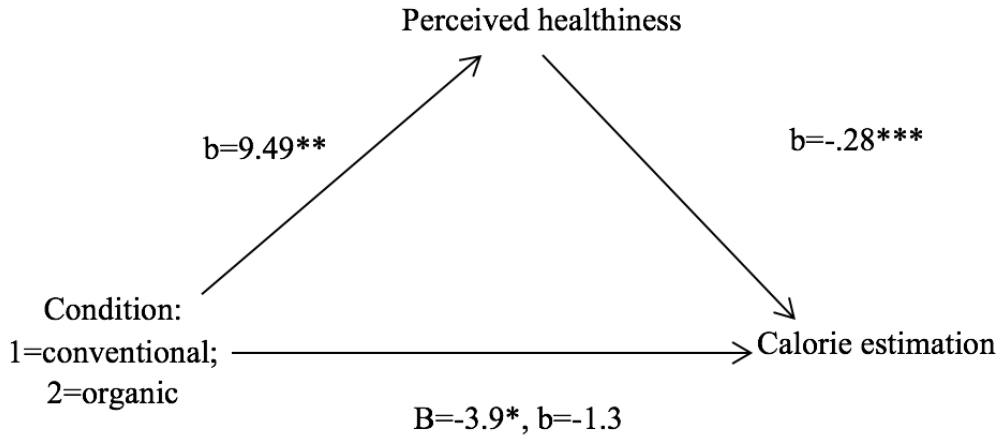
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1518.800	1	1518.800	4.034	.045
Within Groups	144191.891	383	376.480		
Total	145710.691	384			

(Table 1: Analysis of variance in calorie estimation for different label types)

In addition, the organic claim influenced participants' perceived healthiness. The organic chocolate was perceived as more healthful (M = 47.75) than was the conventional one (M = 38.26); F (1, 383) = 12.881, p < .001, d = .366. Because factor besides perceived healthiness might account for the effect of organic claim on the calorie estimation (e.g. the moral licensing effect of green consumption; Mazar & Zhong, 2010), we examined whether perceived healthiness mediated this effect by testing the significance of pathway coefficients (MacKinnon et al., 2002).

After confirming that both perceived healthiness and calorie estimation were significantly correlated with our manipulation, we regressed the calorie estimation onto conditions (organic vs. conventional) and the perceived healthiness. Results revealed that the conditions (organic vs. conventional) significantly predicted the calorie estimation (b = 7.97, t (383) = -3.97, p < .05). However, after controlling for the

mediator (i.e. perceived healthiness), it no longer significantly explained the calorie estimation (b = -1.3, | t | (382) = -.675, p = .5). The indirect effect was tested using a bootstrap estimation approach with 5000 samples (Shrout and Bolger, 2002). These results indicate that the indirect coefficient was significant, b = -2.7, SE = .86, 95% CI = -4.61, -1.24. Thus, we conclude that perceived healthiness mediated the effect of condition on calorie estimation (See Figure 2).

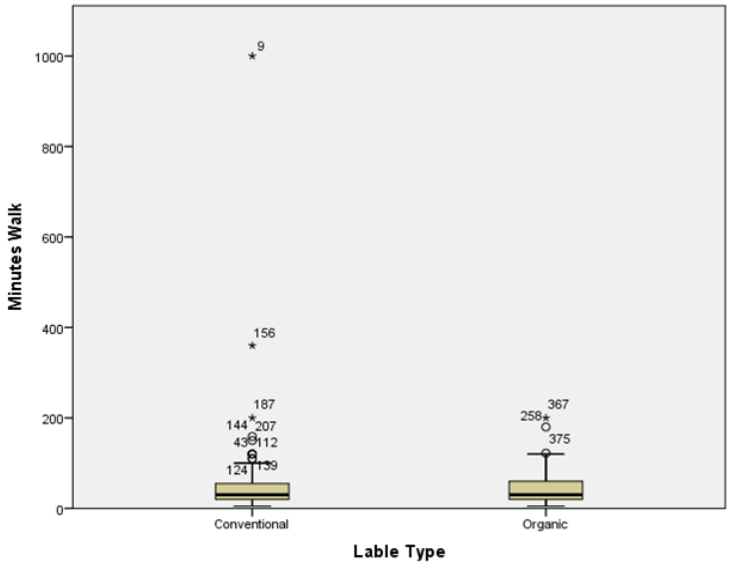


(Figure 2: Model depicting the mediating role of perceived healthiness on the relationship between condition (organic vs. conventional) and calorie estimation (∗p < .05; ∗∗ p < .01; ∗∗∗ p < .001))

Contrary to our hypothesis H1, we did not find any statistical significance between our independent variable and main dependent variable (e.g. organic → fewer minutes to walk); even though the organic chocolate received a lower mean value (M = 42.78) than did the conventional one (M = 46.25); the difference between these two conditions is not significant; F (1, 380) = .317, p = .574 for the main effect (See Table 2 and Figure 3).

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1150.313	1	1150.313	.317	.574
Within Groups	1380494.674	380	3632.881		
Total	1381644.987	381			

(Table 2: Analysis of variance in "minutes to walk" for different label types)

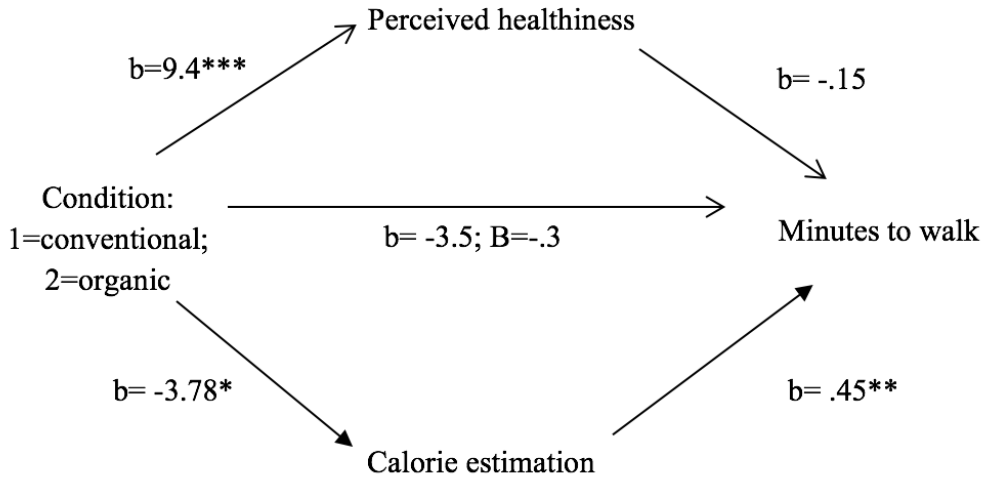


(Figure 3: Boxplot showing insignificant difference in mean of "minutes to walk" across conditions)

After conducting descriptive analysis, we suspected that entering a specific number of minutes may not be a suitable measure to observe the bias. Firstly, the data is highly skewed to the left and is widely scattered, indicating that participants had too little pre-existing knowledge about the calorie expenditure to make reasonable guesses: M = 44.46, SD = 60.219, ranging from 5 to 1000. Despite applying logarithmic transformation and filtering outliers in the dependent variable, no significant result has emerged. Secondly, we note that our wording (e.g. "minutes to walk at your usual pace")

may not have been explicit enough for some participants, compared to a more widely accepted concept of physical efforts such as “exercise”.

Though label types (organic vs. conventional) did not make the variance in “minutes to walk” significantly different across two conditions, we investigate if the effect can be significant after controlling for two potential mediators such as the perceived healthiness and calorie estimation by running a parallel mediation model. The results can be summarized in Figure 4. As illustrated below, even label types did not have a significant direct effect (after controlling for two mediators) on physical effort estimation measured by “minutes to walk”.



(Figure 4: Model depicting the mediating role of perceived healthiness and calorie estimation on the relationship between condition (organic vs. conventional) and “minutes to walk” (∗p < .05; ∗∗ p < .01; ∗∗∗ p < .001))

Next, we examined whether the halo effect on the physical effort estimation is more pronounced for people high on pro-environmentalism, as predicted in the H3. To test this, we used a bootstrap estimation approach with 5000 samples for the minutes of walking (Y), condition (organic vs. conventional) (X), pro-environmentalism (NEP score, mean-centered) (M). Results revealed an insignificant interaction (b = 8.45, t (382) = 0.4117, p = .68). Unlike the study finding by Schudlt and Schwarz (2010), pro-environmentalism was not found as a moderator in our study. We conducted a similar

analysis for the calorie concern and found insignificant interaction (b = -.17, t (382) = -.828, p =.408). Contrary to our hypothesis H4, the effect of the organic claim on the physical effort estimation was not more prominent at higher levels of the calorie concern. Finally, BMI, gender, organic shopping habit, exercise frequency and dietary restrain did not significantly moderate any of the effects (ps > .20).

6. Study 2

6.1. Method

In Study 1, we predicted that the estimation of the "minutes to walk" to burn off calories would be negatively influenced by the organic claim. Because no significant main effect had emerged, we modified a dependent variable from the "minutes to walk" to "intensity of exercise" in Study 2. Initially, we hypothesized that eating organics would influence participants to base their judgment on heuristic cues (i.e. organic → fewer calories → fewer minutes). Counterintuitively, participants' underestimation of the calorie content did not result in the underestimation of "minutes to walk". We speculated that estimating "minutes" was highly demanding for the participants that they might have entered a highly calculative mindset, thereby discounting the effect. Alternatively, we assert that the "intensity of exercise" is a relatively less demanding and more realistic measure, as participants are likely to have experienced a similar situation themselves before. Hence, we introduce the "intensity of exercise" as a new dependent variable in Study 2.

In addition, we have made three changes in the stimulus. Firstly, we remove the nutritional label and provide the calorie information in the text only. It is possible that the full exposure to the nutritional label would have prompted a more mental calculation than would a mere exposure to the calorie content in the text. Secondly, we introduce a fictitious character Amy in the new stimulus. Our first stimulus was a description of a chocolate brand. The study by Schuldt and Schwarz (2010), however, included a target character Susie and her scenario. If the adoption of a fictitious character results in a significant correlation, we could argue that the main behavioral agent (i.e. "I" versus "third person") serves as a boundary factor in capturing the main

effect. Finally, we increase the calorie content from 132 to 210 (59% increase) to see if the higher calorie content could activate the bias.

Study 2 entails similar procedures as in Study 1. Four hundred and eighty-six American participants recruited via Amazon Mechanical Turk (Male: 253, Female: 233) completed this approximately 15-min online survey. As before, the cover story was a marketing research survey on food and nutrition preference. The average age of the participants was 36.2, ranging from 19 to 72. The monetary compensation of one dollar was paid to all participants who successfully completed the survey. Upon accessing the survey link, participants first provided consent and then were randomly assigned by Qualtrics' algorithm to one of the four conditions, which was a 2 (organic vs. conventional) by 2 (calorie info vs. no calorie info) between-subject design. This time, participants were exposed to a picture of the chocolate blocks along with the scenario of the fictitious character Amy as follows:

"*Amy is currently trying to lose weight by eating healthy meals and getting regular exercise. In the above picture, you see an organic milk chocolate that is available in the market. As a dessert after her lunch, Amy has eaten 5 blocks of this chocolate, which together contain 210 calories. How intense do you think she should exercise to burn off the calories obtained from the organic chocolate when she goes to the gym later today?"*

(Figure 5: "Organic" with "Calorie Info" Condition Stimulus)

In the conventional condition, the USDA organic logo was excluded. As such, the calorie information (210 kcal) was not provided in the scenario for the no calorie condition. The nutritional label is dropped across all four conditions.

6.2. Measurement of the Dependent Variables (0 to 100 scale on a slider)

1) Physical effort estimation (intensity of exercise): *How intense do you think she should exercise to burn off the calories obtained from the organic chocolate when she goes to the gym later today?*
2) Perceived healthiness: *Compared to other chocolates, how healthy do you think this chocolate is?*
3) Calorie estimation: *Compared to other chocolates, how many calories do you think one serving of this chocolate contains?*

6.3. Measurement of the Moderators

Next, participants were asked to answer their exercise frequency, general concerns and awareness about daily calorie intake and shopping habits (to which extent they prefer organic products). In addition, a set of dietaries restrain questions derived from The Dutch Eating Behavior Questionnaire (DEBQ) (Van Strien et al., 1986) as well as pro-environmentalism related questions (Dunlap et al., 2000) were adopted this time. As such, questions concerning hunger (*How hungry do you feel now*?) and specific diet restrictions (*Are you vegetarian or vegan? / Are you on any specific diet which might restrain you from eating chocolates?*) were presented before the demographic questionnaires.

6.4. Results

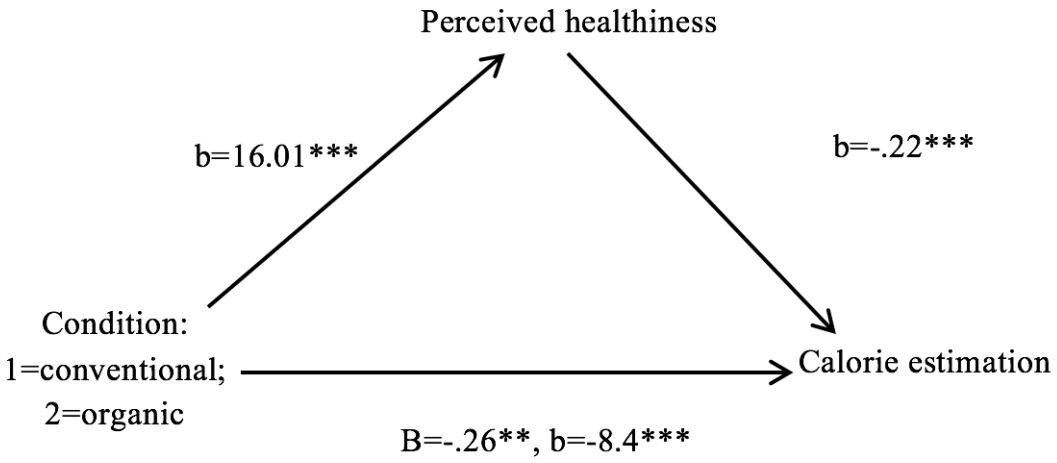
In Study 2, we collected answers from 516 participants. To clean the original data set and prepare for more detailed analysis, we dropped 27 participants due to incomplete answers, 5 for consulting online and 24 for repetitive answers for NEP and DBEQ. After applying the filter regarding variables, such as total time, attentiveness and quietness in SPSS, 405 respondents were resulted in our analysis (Average age: 36.45, 51.6% male), leaving roughly 101 participants per cell. As in Study 1, we found the significant effect of the calorie underestimation in the organic condition (See Table 3).

The organic chocolate received lower calorie judgments (M = 45.64) than did the conventional one (M = 54.04); F (1, 404) = 25.475, p < .001, d = 0.5. As in Study 1, we split the data to compare results between two conditions – calorie info and no calorie info. In line with Study 1, the effect is more robust in the no calorie info condition F (1, 203) = 20.814, p < .001 than in the calorie info condition F (1, 200) = 6.333, p = .013. However, unlike in Study 1, where we did not find any significance in the calorie info condition, the effect emerged in Study 2. We can attribute this to the change in our design for Study 2. Removing the nutritional label could have reduced the salience of calorie information and nudged participants into making more use of the heuristic cue (i.e. the organic label).

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7140.946	1	7140.946	25.475	.000
Within Groups	112967.632	403	280.317		
Total	120108.578	404			

(Table 3: Analysis of variance in calorie estimation for different label types)

In addition, the organic claim influenced participants' perceived healthiness. The organic chocolate was perceived as more healthful (M = 43.17) than was the conventional one (M = 27.16); F (1, 404) = 40.642, p < .001, d = .63. The same analysis for Study 1 was adopted to investigate the mediation effect of the perceived healthiness between the organic claim and calorie estimation. The results revealed a significant indirect effect of the independent variables (organic vs. conventional) on the dependent variable (calorie estimation) via the mediator (perceived healthiness), b = -3.52, SE = .85, 95% CI = -5.42, -2.08, | Z | = 2.96, p < .01 (See Figure 6).



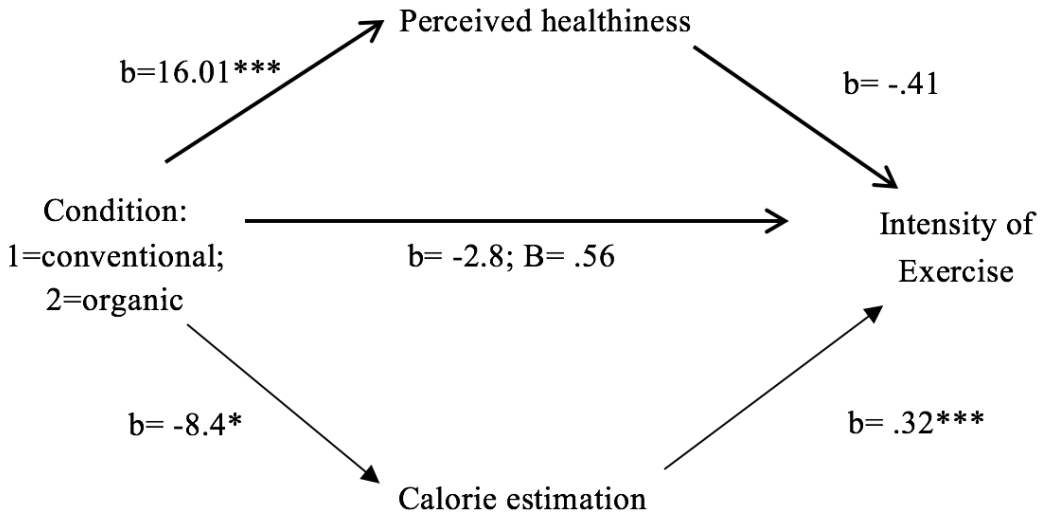
*(Figure 6: Model depicting the mediating role of perceived healthiness on the relationship between condition (organic vs. conventional) and calorie estimation (*p < .05; ** p < .01; *** p < .001))*

However, despite some modifications in the study design, we still did not find any statistical significance between our independent variable and main dependent variable (e.g. organic → lower intensity of exercise). Even though participants perceived that the organic chocolate required lower intensity of exercise (M = 59.23) than did the conventional one (M = 62.06), the difference is insignificant F (1, 404) =1.59, p =.208 to draw the main effect as illustrated in Table 4.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	810.386	1	810.386	1.589	.208
Within Groups	205504.192	403	509.936		
Total	206314.578	404			

(Table 4: Analysis of variance in "Intensity of exercise" for different label types)

Following the procedure in Study 1, we did the same parallel mediation analysis to investigate if the effect (organic → lower intensity of exercise) can be significant after controlling for two mediators: perceived healthies and calorie estimation. The results can be summarized in Figure 7. Notably, label types did not have any significant direct effect (even after controlling for two mediators) on physical effort estimation measured by the "intensity of exercise".



*(Figure 7: Model depicting the mediating role of perceived healthiness and calorie estimation on the relationship between condition (organic vs. conventional) and "Intensity of exercise" (*p < .05; ** p < .01; *** p < .001))*

Next, we examined whether the halo effect on the estimated intensity is more pronounced for people with the high pro-environmentalism and calorie concern, as predicted in the H3 and H4. Results revealed an insignificant interaction for the pro-environmentalism (b = -6.2, | t | (404) = -.88, p = .38) but a significant interaction for the calorie concern (b = .176, t (404) = 2.49, p < .05). Finally, BMI, gender, organic shopping habit, exercise frequency and dietary restrain did not significantly moderate any of the effects (ps > .20).

7. Study 3

7.1. Method

Across Study 1 and 2, no significant correlation between our independent variable (organic vs. conventional) and main dependent variable ("minutes to walk" in Study 1 and "intensity of exercise" in Study 2) has emerged, which led us to three possible explanations. Firstly, we could suggest that the halo effect pertaining to organic food is simply not robust enough to transfer perceived judgment created by heuristic cues into any behavioral intentions. Secondly, we note that the 2010 paper's finding on consumers' higher lenience to "forgo" exercise might have been due to the given context of the scenario. Susie, the target person from the study, had an option to spend more time on "schoolwork" than to run three miles after dinner. On the contrary, our dependent variables assumed that walking (Study 1) and exercise (Study 2) were mandatory, leaving out no alternative option to contemplate. Lastly, we recognize that our participants were asked to walk and exercise after eating something as sweet as chocolate, which is perceived to be a hedonic product. We argue that this context might have imbued them with the strong feeling of guilt or worry about weight gain, thereby canceling the bias.

Taking into account of these three factors, we acknowledge that the presence of a ceiling effect might have been overlooked. One potential variable we could easily manipulate to test such assumption is the calorie condition. For example, we have increased the calorie content from 132 kcal (Study 1) to 210 kcal (Study 2). We predict that another substantially increase of the calorie could make participants more prone to the bias. Hence, we conduct Study 3 where we manipulate three levels of the calorie condition. The design of the study can be portrayed as a 2 (organic vs. conventional) by 3 (no calorie info vs. low-calorie vs. high-calorie) between-subject. While we employ the calorie quantity from Study 2 (210 kcal, 5 blocks of chocolate) for the low-calorie condition, we increase this amount to 520 kcal (5 blocks) for the high-calorie condition, which is equivalent to 147% of the low-calorie condition.

"*Amy is currently trying to lose weight by eating healthy meals and getting regular exercise. In the above picture, you see an organic milk chocolate that is available in the market. As a dessert after her lunch, Amy has eaten 5 blocks of this chocolate, which together contain 520 calories. How intense do you think she should exercise to burn off the calories obtained from the organic chocolate when she goes to the gym later today?"*

(Figure 8: "Organic" with "High-calorie Info" Condition Stimulus)

In the conventional condition, the USDA organic logo was excluded. As such, the calorie information (210 kcal for the low-calorie and 520kcal for the high-calorie) was not provided in the scenario for the no calorie condition.

7.2. Measurement of the Dependent Variables (0 to 100 scale on a slider)

1) Physical effort estimation (intensity of exercise): *How intense do you think she should exercise to burn off the calories obtained from the organic chocolate when she goes to the gym later today?*
2) Perceived healthiness: *Compared to other chocolates, how healthy do you think this chocolate is?*
3) Calorie estimation: *Compared to other chocolates, how many calories do you think one serving of this chocolate contains?*

7.3. Measurement of the Moderators

Next, participants were asked to answer their exercise frequency, perception of organic products and general concerns and awareness about daily calorie intake. In addition,

dietary restraint questions derived from The Dutch Eating Behavior Questionnaire (DEBQ) (Van Strien et al., 1986) as well as pro-environmentalism related questions (Dunlap et al., 2000) were adopted. As such, questions concerning specific diet restrictions (*Are you vegetarian or vegan? / Are you on any specific diet which might restrain you from eating chocolates?*) were presented.

This time, we asked participants to indicate their yearly income level as a part of the demographic questions (i.e. $25k or less; $25k – $50k; $50k – $75k; $75k – $100k; or $100k or more). Because Hutchins et al. (1990) suggest a positive correlation between income and willingness to buy an organic product, we observe if the income level moderates the main effect.

7.4. Results

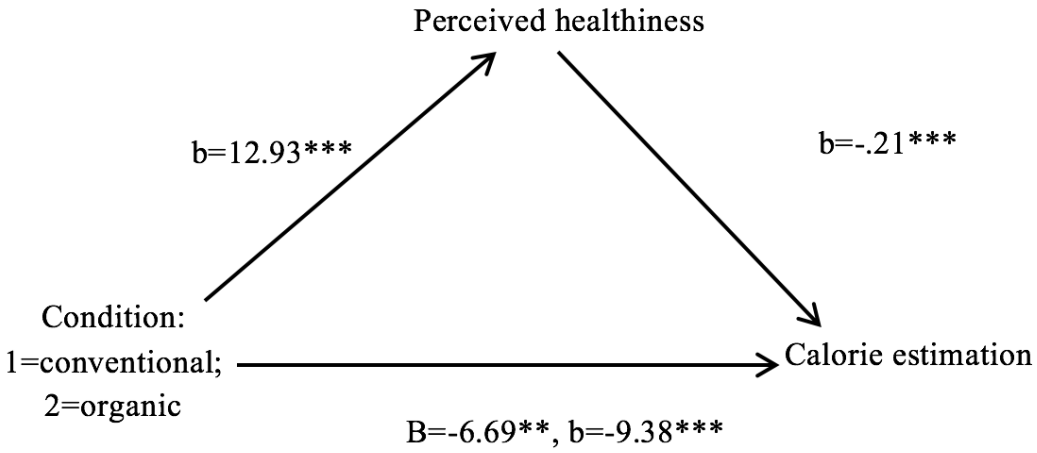
In Study 3, we recruited more participants to maintain a similar number of participants per cell as in two previous studies. This resulted in 602 answers in total. To clean the original data set and prepare for more detailed analysis, we dropped 12 participants due to incomplete answers, 5 for consulting online and 19 for repetitive answers for NEP and DBEQ. After excluding outliers for variables such as total time, attentiveness and quietness in SPSS, 493 participants were resulted in our analysis (Average age: 35.5, 40.69% male), leaving us 82 participants per cell.

As in the two previous studies, we captured the significant effect of the calorie underestimation in the organic condition. The organic chocolate received lower calorie judgments ($M = 50.91$) than did the conventional one ($M = 60.29$); $F\,(1, 493) = 44.053$, $p < .001$, $d = 0.56$. Moreover, the calorie estimation also significantly varied across three calorie conditions as predicted $F\,(2, 493) = 14.974$, $p < .001$ (See Table 5). As in Study 1 and Study 2, we split the data to compare results among calorie information conditions – high-calorie info, low-calorie info and no calorie info. Interestingly, unlike in our previous studies, the effect was less robust in the no calorie info condition $F\,(1, 168) = 9.784$, $p < .01$ than in the high calorie info condition $F\,(1, 166) = 14.235$, $p < .001$ and low calories condition $F\,(1, 157) = 20.468$, $p < .001$.

Source	Type III Sum of Squares	df	F	Sig.
Corrected Model	19118.248[a]	5	14.646	.000
Intercept	1519578.088	1	5820.575	.000
label_Coded	11501.014	1	44.053	.000
CalInfo_coded	7818.321	2	14.974	.000
label_Coded*CalInfo_coded	522.734	2	1.001	.368
Error	127402.205	488		
Total	1674720.000	494		
Corrected Total	146520.453	493		

(Table 5: Analysis of variance in calorie estimation for different label types and calorie conditions)

In addition, the organic claim influenced participants' perceived healthiness. The organic chocolate was perceived as more healthful (M = 41.86) than was the conventional one (M = 28.93); F (1, 494) = 34.568, p < .001, d = .53. The same analysis for Study 1 and Study 2 was adopted to investigate the mediation effect of the perceived healthiness between the organic claim and calorie estimation. The results revealed a significant indirect effect of the independent variables (organic vs. conventional) on the dependent variable (calorie estimation) via the mediator (perceived healthiness), b = -6.69, SE = 1.47, 95% CI = -9.58, -3.79, | Z | = 4.54, p < .001 (See Figure 9).



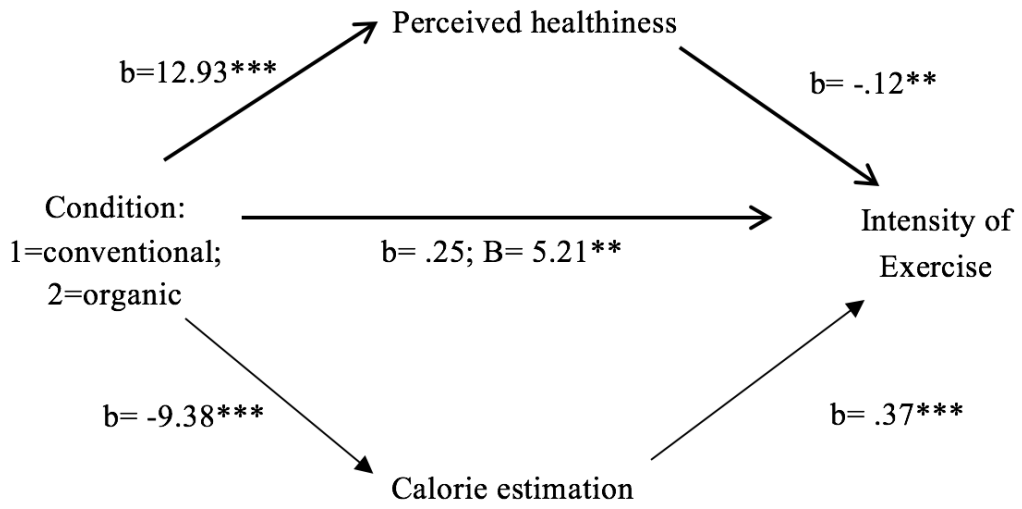
(Figure 9: Model depicting the mediating role of perceived healthiness on the relationship between condition (organic vs. conventional) and calorie estimation (∗p < .05; ∗∗ p < .01; ∗∗∗ p < .001))

However, despite some modifications in the study design, we still did not find any statistical significance between our independent variable and main dependent variable (i.e. organic → lower intensity of exercise). Unlike results reported in the previous studies, participants perceived that the organic chocolate required slightly higher "intensity of exercise" (M = 66.54) than did the conventional one (M = 66.29), and the difference remains insignificant F (1, 493) = .016, p =.901 to draw the main effect as illustrated in Table 6.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.490	1	7.490	.016	.901
Within Groups	237588.268	492	482.903		
Total	237595.757	493			

(Table 6: Analysis of variance in "Intensity of exercise" for different label types)

Following the procedure in Study 1 and Study 2, we did the same parallel mediation analysis to investigate if the effect (organic → lower intensity of exercise) can be significant after controlling for two mediators - perceived healthiness and calorie estimation. The results can be summarized in Figure 10. Even though label types did not have significant total effect, its direct effect (after controlling for two mediators) on the physical effort estimation measured by "intensity of exercise" was significant unlike Study 1 and 2.



(Figure 10: Model depicting the mediating role of perceived healthiness and calorie estimation on the relationship between condition (organic vs. conventional) and "Intensity of exercise "(∗p < .05; ∗∗ p < .01; ∗∗∗ p < .001))

However, when it comes to the direction of both total effect and direct effect, it is fairly against our expectation. The results seem to indicate that, when controlling for the perceived healthiness and calorie estimation, organic chocolate calls for significantly higher exercise intensity (B= 5.21**). Thus, the results of both ANOVA and parallel mediation analysis implies that people think those who eat healthy will be more likely to work out, due to an observed correlation in real life. And this unexpected direct effect could be based on a descriptive judgment ("people who eat organic are likely to work out more intensely, hence I give a high rating"), rather than normative judgment

("people who eat organic need to work out less intensely, hence I will give a low rating").

Next, we examined whether the halo effect on the estimated intensity is more pronounced for people with the high pro-environmentalism, calorie concern and income level, as predicted in the H3, H4 and H5. Results revealed an insignificant interaction for the pro-environmentalism (b = 7.83, | t | (494) = 1.19, p = .23), calorie concern (b = .009, | t | (494) = .12, p = .9) and for income level (b = -.35, | t | (494) = .65, p = .52). Finally, BMI, gender, organic shopping habit, exercise frequency and dietary restrain did not significantly moderate any of the effects (ps > .20).

8. Conclusions

The 2010 study by Schuldt and Schwarz cast light on people's cognitive bias known as the halo effect specifically pertaining to organic food consumption scenarios. Particularly, we learned that people tend to perceive organic food as healthier, which then leads to their underestimation of its calorie content. As such, forgoing exercise after consuming organic food versus conventional counterpart was deemed more acceptable. What we found most interesting was the fact that mere cognitive judgment (i.e. calorie underestimation) was translated into behavioral intentions (i.e. forgoing exercise), demonstrating its possibility to affect our daily behaviors.

To test how far the bias can be stretched, we examined whether physical efforts such as exercise can be also differently estimated depending on the label of food (i.e. organic vs. conventional). Therefore, we conducted three studies where we adopted "minutes to walk" (Study 1) and "intensity of exercise" (Study 2 and 3) as dependent variables. Throughout these studies, we repeatedly observed that people associate organic food with being healthier, therefore containing fewer calories. Counterintuitively, underestimating the calorie content of organic food did not extend to the underestimation of the exercise intensity even under the high-calorie condition (Study 3). That is, even when people consume organic food and perceive it to be less caloric, they will still exercise at the same intensity as they would with the non-organic counterpart, which they perceive to contain more calories.

We attribute this counterintuitive result to three possible factors. Firstly, we note that the physical effort estimation, such as walking and exercise, was a highly goal-driven action in our scenario. We asked the participants to estimate the minutes to walk (Study 1) and the exercise intensity (Study 2 and 3) right after having consumed food. Thus, exercise could have been translated more as a mean for weight loss, while it is supposed to serve other purposes depending on different individual needs. Such explicit goal-driven context in turn might have inflicted a strong calculative mindset on the participants, thereby hindering any cognitive bias to kick in.

Secondly, in contrary to the 2010 study, whose dependent variable was the leniency to "forgo" exercise, we reflect that our dependent variables for our three studies were too specific, which require relatively more complex judgment. For example, in Study 1, we asked the participants to enter a specific number of minutes to walk to burn off calories. As such, in Study 2 and 3, participants were asked to rate the intensity of exercise. While minutes to walk can be understood as a concept of "length" of a physical activity, exercise intensity represents "depth" of such an act. In real-life situations, however, we do not precisely pre-define such concepts before committing the act (i.e. walking or exercise). Therefore, being asked to estimate these could have been too demanding that participants might have neglected heuristic cues (e.g. organic label).

Lastly, we note that our choice of food, chocolate, is highly hedonic in its essence. Due to its negative association with "fat" and "obesity", the pathway between judgment (i.e. calorie) and behavioral intentions (i.e. exercise) could have been neutralized. Because chocolate is a symbol of guilt-inducing food, it might have left the participants with no choice but only to exercise as intensively as they could regardless of its perceived calorie content.

The parallel mediation process gives us an interesting insight into the potential mechanism underlying the halo effect and participants' process of thinking. Firstly, we examine why the parallel mediation only works in Study 3. Despite having a different dependent variable (i.e. "minutes to walk" in Study 1 and "exercise intensity" in Study

2 and 3), we ran the same parallel mediation analysis for Study 1 for more consistent comparison. We then found that there is no significant main effect, even after controlling for the two mediators. Other indirect effects are also significant but at a lower confidence level compared to Study 3. The analysis for Study 2 yielded a similar result. Thus, we suspect that the difference in the study design (with three levels of calories information in Study 3 vs. only two levels in Study 1 and 2) may have come into play. The high-calorie condition in Study 3 presented the chocolate with 520 kcal, a 190% increase from the two previous studies. Since 520 kcal is a decidedly high intake of calories, participants' underlying perception on calorie expenditure after consuming organic chocolate (vs. conventional) was more clearly captured in the measurement. This then in turn could have helped to detect the significant result from the parallel mediation analysis in Study 3.

Secondly, however, when it comes to the direct effect of the parallel mediation, the effect's direction is quite against our hypothesis H1. The results seem to indicate that, when controlling for the perceived healthiness and calorie estimation, organic chocolate calls for significantly higher exercise intensity (B=5.21**). This is unexpected, given that the indirect effects supported our hypotheses and expectation. More specifically, the organic chocolate was perceived significantly healthier (b= 12.93***), the calorie of the organic chocolate is significantly underestimated (b= -9.38***), the healthier the chocolate was perceived, the less intense the exercise should be (b= -.12 **) and the higher the calorie, the more intense the exercise should be (b= .37***).

These should have caused a downward/negative (instead of positive) bias toward exercise intensity after consuming organic chocolate as stated in H1. However, after considering possible explanations, we conclude that we people might have given the rating based on a descriptive judgment ("people who eat organic are likely to work out more intensely, hence I give a high rating"), rather than normative judgment ("people who eat organic need to work out less intensely, hence I will give a low rating").

Lastly, we note that only the direct effect in the parallel mediation analysis is significant (not the total effect). We argue such outcome demonstrates people's possible thinking path. In other words, workout intensity is only biased if both perceived healthiness and calorie estimation is also significantly biased. To put it differently, people perceive organic products to be healthier than conventional ones, then underestimate its calorie content and consider people who eat organic products as fitter and exercising more frequently. And subsequently, people consuming organic food are rated as more likely to work out more intensely.

We believe this finding shed light on how activation theory works and revealed important nodes in the network in the case of halo effect for organic food. "organic" as the central node seems to have activated the surrounding ones such as "healthy", then "less calories", then these two nodes also further triggered "fit", "work out frequently". Quite far-fetched as they may seem at the first place, these associations have been built gradually and reinforced in consumers' minds by countless marketing and advertising efforts of organic food manufacturers. With an aim to sell not just a product, but the whole organic lifestyle, these overwhelming advertising claims and nutrition labels, to some extent, have misled and created a halo bias for consumers.

9. General Implications

The Schuldt and Schwarz's study in 2010 found that people underestimate the calorie content of organic food and therefore are more likely to forgo exercise afterwards, compared to when they consume non-organic food. We also learned that the calorie underestimation was mediated by the perceived healthiness of organic food. The subsequent study undertaken by Schuldt, Mullter and Schwarz (2012) found a comparable halo bias generated by social ethical clams on food packaging (e.g. Fairtrade).

One of the most noteworthy implications from these findings is how cognitive bias can be transferred to behavioral intentions and how explicit this path appears to be (i.e. fewer calories $\rightarrow$ less exercise). Obviously, organic food manufacturers and relevant marketing practitioners can benefit from these biases by implicitly branding their

products to be healthier, as the perceived healthiness significantly mediates the pathway and biases its actual calorie content. On the contrary, public health policy makers tackling obesity issues should be aware of such bias and educate consumers on these issues as people could over-consume organic products regardless of its actual calorie content.

We expected that people would underestimate the intensity of exercise when they consume organic food products. To our surprise, however, our finding was rather counterintuitive. While our participants exhibited the biased perception on the calorie content of organic food, which was mediated by the perceived healthiness, they did not adjust the intensity of exercise accordingly. If we compare this with the 2010 finding, we could argue that people's halo bias tends to be canceled out in a relatively more complex decision-making scenario, such as deciding on the intensity of the workout. It is clear that we are biased enough to forgo exercise after consuming organic food. But when we are placed in a situation where we are supposed to exercise, the halo bias does not affect how intensely we choose to do so.

Considering consumers' biased perception on organic food's perceived healthiness, we suggest that the halo bias could be weakened as more and more consumers educate themselves about organic farming practices going forward. Because the organic farming is not strictly related to the overall healthiness of its final product, consumers might associate it less with how healthy it is, thereby leading up to more accurate estimation of its calorie content. In this respect, marketing managers promoting organic food should focus on strengthening potential scientific link between organic farming and its associated health benefits (e.g. less pesticide residue) if they wish to exploit the halo bias (i.e. underestimation of the calorie content) in their favor.

10. Limitations and Future Study Recommendations

One of our studies' limitations comes from our choice of MTurk sample. Although our MTurk samples brought the representative of American public compared to recruiting college students, participants might vary widely in terms of educational background, organic awareness and income levels and thus, unlikely to be representative of the

organic consumer public. We note that this could possibly limit the generalizability of our findings. In addition, the study was limited to only one food choice which is hedonic (chocolate). We acknowledge that it could have activated pre-existing bias for some of the participants. Ideally, one could include a greater variety of food categories such as products more neutral in perceived healthfulness (e.g. pretzels, crackers) – to generalize the utility of our findings. We therefore suggest future studies to test both hedonic and utilitarian food products. In addition, our survey only collected self-reported data, which relies much on participants' honesty, understanding and introspective ability. We recommend future studies to also look at behavioral data collected in a more real-life setting to see if similar effect emerges (e.g. calorie underestimation of organic food) outside of the pre-defined environment.

As we noted earlier in the method part for Study 3, when we compare the 2010 paper and our studies, we can easily observe that the employed scenario for the 2010 study contains more contexts (See Figure 11) where Susie had an option to spend more time on "schoolwork" than to run three miles after dinner. On the contrary, our scenario assumed that walking (Study 1) and exercise (Study 2) were mandatory, which left out no alternative option to contemplate. In the conclusion and general discussion section, we attributed our insignificant finding solely to differences in dependent variables between these studies and gave corresponding explanations. To verify our claim, we recommend future studies to employ the same scenario as the 2010 study and change a dependent variable from "leniency to forgo exercise" to "intensity of exercise". If the result turns out to be insignificant still, then validity of our claims could be confirmed. If the result yields statistical significance, on the other hand, then we could claim that the halo bias can be highly context sensitive with limited generality.

Name: Susie Thompson (college student, age 20)
Susie is member of Kappa Alpha Omega sorority at West Virginia University. She is currently trying to lose weight by eating healthy meals and getting regular exercise. For example, last night Susie had a spinach salad topped with chicken and walnuts for dinner, a small piece of cake for dessert. She then went on her usual 3-mile run.

Tonight, Susie has lots of homework to do and so she is a bit busier than normal. She has just finished dinner and dessert, and is trying to decide whether or not to skip her usual run in order to save time. For dinner, she had roasted vegetables over brown rice. For dessert, she was deciding between…

[conventional conditions]

… a small bowl of organic ice cream and a chocolate chip cookie, and she chose to eat the chocolate chip cookie.

…an organic chocolate chip cookie and a small bowl of ice cream, and she chose to eat the ice cream.

(Figure 11: scenario adopted by the Schuldt and Schwarz study in 2010)

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