

**REFERENCES AND PREFERENCES:**

**NEW INSIGHTS INTO FOOD**

**DECISION MAKING**

zur Erlangung

des wirtschaftswissenschaftlichen Doktorgrades

der Wirtschaftswissenschaftlichen Fakultät

der Universität Göttingen

vorgelegt von

Jutta Eleonore Schuch

geboren in Würzburg

Göttingen, 2015

This page is intentionally left blank.

Erstgutachterin: Prof. Dr. Yasemin Boztuğ

Zweitgutachter: Jun.-Prof. Dr. Till Dannewald

Drittgutachter: Prof. Dr. Maik Hammerschmidt

Tag der mündlichen Prüfung: 13.02.2015

<b>1</b>	<b>INTRODUCTION .....</b>	<b>8</b>
1.1	Aims and research outline .....	9
1.2	Summaries .....	10
1.2.1	Summary of “How Category Average Reference Points Affect Food Choice” ..	10
1.2.2	Summary of “The Role of Category Average Reference Points and Health Halos in Purchase Intentions of Healthy and Hedonic Food” .....	11
1.2.3	Summary of “Of Vice and Men: The Impact of References and Licenses to Sin on Food Preferences” .....	11
1.2.4	Summary of “External Reference Points and Abstract Goals: Interaction Effects in Food Decision Making” .....	11
<b>2</b>	<b>HOW CATEGORY AVERAGE REFERENCE POINTS AFFECT FOOD CHOICE .....</b>	<b>14</b>
2.1	Introduction .....	15
2.2	Theoretical Framework .....	17
2.3	Study 1.....	22
2.3.1	Method .....	22
2.3.2	Results .....	25
2.3.3	Discussion .....	25
2.4	Study 2.....	26
2.4.1	Method .....	26
2.4.2	Results .....	29
2.4.3	Discussion .....	34
2.5	General Discussion and Implications .....	35
2.6	Limitations and Future Directions.....	39
<b>3</b>	<b>THE ROLE OF CATEGORY AVERAGE REFERENCE POINTS AND HEALTH HALOS IN PURCHASE INTENTIONS OF HEALTHY AND HEDONIC FOOD.....</b>	<b>42</b>
3.1	Introduction .....	43

3.2	Theoretical Framework .....	45
3.3	Study 1.....	47
3.3.1	Method .....	47
3.3.2	Results .....	48
3.3.3	Discussion .....	49
3.4	Study 2.....	50
3.4.1	Method .....	51
3.4.2	Results .....	52
3.4.3	Discussion .....	54
3.5	General Discussion.....	55
<b>4</b>	<b>OF VICE AND MEN: THE IMPACT OF REFERENCES AND LICENSES TO SIN ON FOOD PREFERENCES.....</b>	<b>60</b>
4.1	Introduction .....	61
4.2	Conceptual Framework .....	64
4.2.1	Vices, Virtues and the Relation to Reference Points .....	64
4.2.2	Licensing, Eating Goals, and Self-Control.....	65
4.3	Study 1.....	68
4.3.1	Stimuli and Design .....	68
4.3.2	Results .....	70
4.3.3	Discussion .....	70
4.3.4	Results .....	71
4.3.5	Discussion .....	71
4.4	Study 2.....	72
4.4.1	Stimuli and Design .....	72
4.4.2	Results .....	73
4.4.3	Discussion .....	74

4.5	Study 3.....	74
4.5.1	Stimuli and Design.....	75
4.5.2	Results.....	76
4.5.3	Discussion.....	78
4.6	Study 4.....	78
4.6.1	Stimuli and Design.....	79
4.6.2	Results.....	80
4.6.3	Discussion.....	82
4.7	General discussion.....	82
4.7.1	Summary of Findings and Contributions.....	82
4.7.2	Limitations and Future Research Directions.....	83
<b>5</b>	<b>HOW AND WHEN ABSTRACT GOALS AND EXTERNAL REFERENCE POINTS INTERACT IN FOOD DECISION MAKING.....</b>	<b>86</b>
5.1	Introduction.....	87
5.2	Conceptual Framework.....	88
5.2.1	Preferences and Reference Points.....	88
5.2.2	Preferences and Goal Pursuit.....	89
5.2.3	The Interaction of Reference Points and Goal Pursuit.....	90
5.2.4	Propositions Regarding the Interaction of Reference Points and Goal Pursuit...92	
5.3	Empirical Study.....	94
5.3.1	Procedure.....	94
5.3.2	Results.....	96
5.4	Discussion.....	101
	<b>APPENDICES.....</b>	<b>CIV</b>
	<b>REFERENCES.....</b>	<b>CX</b>

## List of Figures

Figure 1: Average Sugar Consumption.....	25
Figure 2: Upper Bounds of the Latitude of Sugar Acceptance at 80% Choice Probability .....	31
Figure 3: Upper Bounds of the Latitude of Sugar Acceptance at 80% Choice Probability by Source Credibility .....	32
Figure 4: Choice Probabilities for Muesli Containing up to 30 grams Sugar.....	33
Figure 5: Category Average Reference Point Regulation vs. Pricing Intervention Effects on Sugar Acceptance.....	34
Figure 6: Moderated Mediation Model of Health Claim on Purchase Intentions.....	53
Figure 7: Conditional Effects of Health Claim on Purchase Intentions by Category and CARPs.....	54
Figure 8: Framework of Studies.....	63
Figure 9: Choice Ratio of Vice Product.....	71
Figure 10: Choice Ratio of Highly Vicious Product.....	73
Figure 11: Relative Purchase Intention by Degree of Viciousness in Non-Licensing Condition.....	77
Figure 12: Relative Purchase Intention by Degree of Viciousness in Licensing Condition.....	77
Figure 13: Purchase Intention of Low Self-Control Consumers by Degree of Viciousness and Ego-Depletion .....	81
Figure 14: Purchase Intention of High Self-Control Consumers by Degree of Viciousness and Ego-Depletion .....	81
Figure 15: Sugar Utility Functions for Consumers with Symbolic Goal Pursuit .....	99
Figure 16: Sugar Utility Functions for Consumers with Hedonic Goal Pursuit .....	100
Figure 17: Sugar Utility Functions for Consumers with Functional Goal Pursuit.....	101

## **1 Introduction**

Consumers' food preferences have led to a worldwide overweight rate of 35% in 2008 (World Health Organization 2015). It is a matter of fact that overweight is closely linked to unhealthy eating habits. Some consumers tend to trade in healthiness for tasty indulgences as they struggle with self-control issues being unable pursuing the healthy eating goal (Wilcox et al. 2009).

Another reason for rather unhealthy eating habits is that the nutritional quality and healthiness of food is hard to discern. The categorization into vices and virtues that is often depending on food types can help (Chernev 2008). Marketers have known consumers' problems to detect relatively healthy products, too and responded with respective health or nutrition claims on food packages, such as "low-fat" (Wertenbroch 1998). Yet, health claims often disguise the real nutritional quality of food (Chandon and Wansink 2007; Wansink and Chandon 2006).

Therefore, policy makers tried to provide consumers with the opportunity to identify and then choose healthier food products. As one measure they have introduced nutrition labels (Burton, Garretson, and Velliquette 1999). Those labels often contain information thought to provide a reference against which consumers can compare nutritional contents of food products (Krishnamurthy and Prokopec 2010).

Most existing nutrition labels contain reference information in the form of aspirational levels such as the Percentage Daily Value (Garretson and Burton 2000; Mathios 1996, 1998; Mojdzuska, Caswell, and Harris 2001; Visschers and Siegrist 2009), or traffic lights (Hersey et al. 2013; Koenigstorfer, Groeppel-Klein, and Kamm 2014; Kozup, Creyer, and Burton 2003, Visschers and Siegrist 2009). The Percentage Daily Value is a guide to the nutrients in one food serving and is based on a 2000-calorie diet for healthy adults (NLEA 1990 104 Stat. 2353). The traffic light system requires to bare red, amber



and green values to indicate high, medium or low levels of salt, sugar and fat (European Parliament, 2010).

Yet, it has been found that most existing labels possess only limited effectiveness when it comes to real purchase behavior (Mojduszka, Caswell, and Harris 2001; Sacks, Rayner, and Swinburn 2009; Sacks et al. 2011).

An alternative to these labels is the disclosure of summary information in the form of Category Average Reference Points (CARPs) (Viswanathan 1994). CARP displays the average amount of calories and/or key nutrients in one category and therefore qualifies otherwise meaningless nutrition information such as “contains 200 calories.”

Next, I give a short review of the research framework comprising four papers that look at different perspectives of the relationship between references and preferences.

## **1.1 Aims and research outline**

This dissertation investigates the effectiveness of CARPs and explores the mechanisms that link summary information with preferences for more and less healthy food.

More precisely, this thesis comprises three papers and one working paper on references and preferences in food decision making. We started off in our first paper by examining the effects of CARP disclosure on choice behavior and investigate the underlying process leading to changes in choice. This paper serves to introduce the notion of CARP and demonstrates its effectiveness in affecting choice. In our second paper, we extended our previous findings and dug deeper into CARPs’ effectiveness to change preferences. More precisely, we wondered if CARP disclosure can suppress health halos induced by health claims. Moreover, we obtained first hints of the role of categories in that notion.

While the first two papers provide a good understanding of the basic mechanism operating through CARP provision, the aim of the remaining two papers was to further

extend knowledge about the interplay of reference points, individual goal pursuit, self-control, and perceptions of healthiness.

In the third paper, we raised the hypothesis that members of a product category can be seen as vices or virtues depending on their position towards a reference point. We further introduced the new concept of ‘degree of viciousness’ and demonstrated how it impacts food preferences. We used goal theories to explain the effect. In the fourth paper which is still in working paper status we move beyond the application of goal theories and show how reference points interact with abstract eating goals. Taken together, the paper provides a comprehensive overview of how references and preferences are linked in food decision making.

## **1.2 Summaries**

### **1.2.1 Summary of “How Category Average Reference Points Affect Food Choice”**

While existing nutrition labels provide reference information in form of aspiration levels such as guideline daily amounts, it is argued that consumers rather use market level information such as summary information in the form of an average (i.e., Category Average Reference Point: CARP). It provides information otherwise effortful to obtain by comparing different products. Two studies provide converging evidence of a mechanism that links CARP with choice. In particular, the likelihood of consuming high amounts of bad nutrients increases when a high CARP is provided especially by a credible source as a result of increased consumer acceptance of higher levels of bad nutrients. Moreover, it is found that CARPs have the potential to outweigh effects of price increases. Implications of the important findings for research and public policy are discussed.

### **1.2.2 Summary of “The Role of Category Average Reference Points and Health Halos in Purchase Intentions of Healthy and Hedonic Food”**

Health claims can cause obsessive calorie intake. Two studies show that Category Average Reference Points can impact purchase intentions via healthiness perception. Moreover they can limit the consumption enhancing effect of health claims as they help correct biased calorie expectations. This applies to hedonic and healthy categories.

### **1.2.3 Summary of “Of Vice and Men: The Impact of References and Licenses to Sin on Food Preferences”**

The impact of the provision of Category Average Reference Points on the perception of food products as vices and virtues is investigated and linked to licensing. It is demonstrated that previous goal dissatisfaction of vice goals leads to licensing and thus increases desire for vice products. Moreover the degree of products’ viciousness impacts consumer preferences. High perceived degree of viciousness, which signals tastiness, and leads in contrary to previous research to lower preferences than low degree of viciousness. These findings contrast with previous research that licensing leads to what-the-hell behavior. Moreover, it is shown that the preference retarding effect of degree of viciousness is not holding when consumers are ego-depleted.

### **1.2.4 Summary of “External Reference Points and Abstract Goals: Interaction Effects in Food Decision Making”**

The influence of external reference points on consumer decision making is well known. Likewise are goals known to determine consumers’ preferences as they serve as aspirations towards which alternatives are judged. Interesting enough, we are the first to investigate the interaction of abstract goals and external reference points. Thus, the

current paper examines the impact of the interaction of abstract goals and external reference points on food preferences. The interaction is proven in an experiment by linking the shape of consumers' value functions to abstract goals. First, the impact of reference point disclosure on goal activation is shown. Second, it is found that the perception of high/low amounts of sugar depends on reference point disclosure and goal activation. Implications for public policy and theory development are derived.

This page is intentionally left blank.

## **2 How Category Average Reference Points Affect Food Choice**

The paper by Jutta Schuch, Steffen Jahn, Till Dannewald, and Yasemin Boztuğ has been invited for revision (second round) at the Journal of Public Policy & Marketing (Jourqual 2: B).

A previous version of this paper has been presented as poster at the Marketing and Public Policy Conference (MPPC) held in Washington D.C., USA in 2013.

## 2.1 Introduction

Nutrition facts panels have been assumed to stimulate healthier choice (Chandon 2013) and thus are mandatory on most prepackaged products in Western countries (Burton, Garretson, and Velliquette 1999). The numerical information, however, requires an effortful comparison process with other products (Kiesel and Villas-Boas 2013). Prior research has shown that consumers are unlikely to perform such comparisons (Russo, Krieser, and Miyashita 1975; Viswanathan and Hastak 2002). Hence, it is in question whether food label policies only considering nutrition facts panels are effective.

Most current nutrition labels contain reference information in form of an aspirational level; that is, a ratio of a specific nutrient towards daily consumption ideal. However, nutrition labels of this kind have not been significantly effective in improving consumers' diet (Balasubramanian and Cole 2002; Hersey et al. 2013). In this paper, we argue that market-level reference points (Klein and Oglethorpe 1987) provide an alternative to the aspiration-level approaches that characterize nutrition facts panels and traffic light labels. Specifically, a Category Average Reference Point (CARP) seems promising as it provides a basis for sound comparative judgments based on market levels and can be considered as a compromise between simple and informative nutrition information. CARP displays the average amount of calories and/or key nutrients in one category and therefore qualifies otherwise meaningless nutrition information such as "contains 240 calories" (Viswanathan 1994).

A category average is different from a Percentage Daily Value (PDV) of 2,000 calories as it does not require mental accounting in the sense of how much is left in one's "calorie budget" for the respective day. Rather, CARP allows a concrete assessment of an item's caloric performance, relative to what is typical for a product of its kind. A consumer might be aware that a chocolate bar has more calories than an apple and still

prefer a sweet snack. In this situation, she may find information useful that indicates which chocolate bar alternative is relatively low or high in calories without having to compare a number of alternatives on the shelf. Easy-to-process information of this kind allows consumers to avoid a chocolate bar that is particularly bad and rather pick one with average calories.

Despite the intuitive advantage of market-level reference points (Viswanathan 1994), existing research has not yet investigated the impact of such information on food choice, particularly when other product information (e.g., price) is available. Since pricing interventions have been considered as more effective than education interventions in regulating intake of “bad” food (Block et al. 2011; Chandon and Wansink 2012), it is unclear if reference information can exert an impact beyond that of price. Similarly important, it is unclear how CARP influences the amount of calories chosen and which role the communication of CARPs plays. Using two choice-based conjoint experiments, this article explores if and how CARP influences food choice in multi-cue environments (i.e., other product information is available). We make three main contributions. First, while existing research suggests that consumers either deeply process information or rely on vague claims (e.g., “low fat”), we argue that consumers use market-level summary information in the form of an average (i.e., CARP), when available. Second, less is known on the mechanism that links CARPs with choice. Thus, we examine the mechanism and show that the latitude of nutrient acceptance depends on the provided CARP. Third, we show that CARP information is not always less effective than a price premium in keeping bad nutrient choice at a minimum. In fact, the two can be combined for maximum effectiveness.

In the remainder, we review and organize existing literature on food choice, goals, and reference points to formulate our research hypotheses. Two studies serve to test our assumptions. Study 1 examines the effect of CARP on the choice probability of bad



nutrients. Study 2 extends study 1 and tests the underlying mechanism by looking at CARP's impact on the latitude of nutrient acceptance. The latitude of nutrient acceptance is derived from a choice model drawing on random utility theory that considers the credibility of the source that discloses the CARP in addition to the CARP per se. Study 2 also examines the impact of price interventions on the latitude of acceptance and investigates if a CARP is as effective as price increase. The paper ends with a discussion of the important findings.

## **2.2 Theoretical Framework**

The impact of nutrient levels and reference points on food choice has been subject to research for many years. It was found that nutrient levels yield positive effects on choice (e.g., Balcombe 2010; Barreiro-Hurle, Gracia, and de-Magistris 2010; Basil, Basil, and Deshpande 2009; Burton, Howlett, and Tangari 2009; Hassan, Shiu, and Michaelidou 2010) as they affect the perception of various product attributes, such as nutritiousness (Burton, Biswas, and Netemeyer 1994), taste, tenderness, and wholesomeness (Asam and Bucklin 1973) as well as disease risk (Howlett, Burton, and Kozup 2008) and weight gain probability (Burton, Howlett, and Tangari 2009). However, their impact is not universal but seems to depend on the presence of concrete reference information (Barone et al. 1996; Li, Miniard, and Barone 2000).

A typical food choice situation entails several options which are compared and jointly evaluated. Conventional wisdom holds that an option is more likely to be chosen when it yields higher utility. Reference points can help to determine which option is superior to others as they provide a comparison frame for choice and judgment. An area of application is the goals that are pursued when choosing food. Food choice often implies a conflict between hedonic and utilitarian goal achievement, namely the hedonic goal of

taste enjoyment and the utilitarian goal of maintaining good health (Belei et al. 2012; Bublitz, Peracchio, and Block 2010; Dhar and Simonson 1999; Fishbach, Friedman, and Kruglanski 2003). In general, consumers might want to follow the hedonic temptation but have trouble justifying their choice (Baumeister 2002; Okada 2005). This derives from the fact that hedonic consumption evokes a sense of guilt (Kivetz and Simonson 2002). Research has shown that consumers tend to buy the option that is easier to justify (Okada 2005; Shafir 1993), which means they would reject the hedonic option and choose the healthier option instead. However, when the situation facilitates the justification of hedonic consumption, it is easier for consumers to choose an indulgent option (Okada 2005). It is our contention that CARP can determine such a situation.

Use of the category average of an attribute has been acknowledged as affecting choice construction when the attribute information is missing for a specific product (Bettman, Luce, and Payne 1998). In addition to this information filling function, category averages may also serve to qualify a specific attribute value and, thus, affect choice. Such potential effect is rooted in reference points' general ability to provide a comparison framework (Krishnamurthy and Prokopec 2010). Applying this notion to the present context, a CARP—which refers to the mean of a key nutrient distribution in a category—can serve as an anchor that makes a particular product look like a vice or virtue (Chernev and Gal 2010). For example, learning that a food item has a relatively high calorie content when compared to the 'average item' in the category could reduce healthiness perceptions and stimulate expected guilt while choosing, independent of the absolute energy content. Conversely, learning that a food item such as chocolate has relatively few calories compared to the 'average treat' could take away the guilt and justify increased consumption even when it still contains more calories than most other food. When Category Average Reference Points are high, more products seem favorable concerning their nutrients. Consequently, unhealthful products are more easily justified.

Since consumer's need for justifying hedonic consumption drives choice (Okada 2005), we propose that the provision of a high (low) CARP leads to increased (decreased) consumption of food rich in bad nutrients (e.g., sugar).

**H1:** The provision of a reasonably high Category Average Reference Point (CARP) leads to a higher choice probability of bad nutrients than the provision of a rather low CARP.

While the first hypothesis is concerned with the existence of the CARP effect, the underlying mechanism for such an effect is yet to be explored. Put simply, we hypothesize that CARP determines which nutrient levels are deemed acceptable. Rather than preferring a specific attribute level, however, consumers have wider latitudes of acceptance. It has been shown that attribute levels that lie within the latitude are preferred while attribute levels outside that range are rejected (Sherif and Hovland 1961). However, the precise shape of the latitude of acceptance varies across situations (Simonson et al. 2013). Based on this knowledge, we contend that CARP can influence the size and position of the latitude of acceptance. In this case where the focus is on bad nutrients (e.g., sugar), we expect that particularly the upper bound of the latitude of acceptance is affected by the reference point information. Specifically, a lower CARP is expected to shift the latitude of acceptance to the left, meaning that the upper bound of acceptable nutrient content is lowered. As a consequence, higher nutrient values may drop out of the acceptance range, and are therefore rejected by the consumer. For example, 40 grams of sugar in muesli can still be acceptable if the CARP tells that the average muesli contains 37 grams. Instead, if the CARP tells the average muesli contains 10 grams sugar, consumers might have difficulty accepting 40 grams of sugar

in that specific product. Thus, the probability of choosing higher amounts of a bad nutrient decreases when a low CARP is presented and vice versa.

**H2:** A low Category Average Reference Point (CARP) leads to a lower upper bound of acceptable nutrient content than a high CARP.

When consumers learn about reference points, source credibility can become important (Rucker et al. 2014). It has been shown that communication by a less credible source can result in a backfire effect (Yoon, Gürhan-Canli, and Schwarz 2006). Thus, we expect that a highly credible source can boost the impact of CARP. That is, in case of a highly credible source and high CARP, we expect consumers to have the highest upper bounds of acceptable nutrient content. Likewise, in scenarios where a low CARP is provided by a credible source, consumers are expected to have the lowest upper bound of nutrient acceptance.

**H3:** In case of high source credibility and a high (low) Category Average Reference Point the upper bound of acceptable nutrient content is higher (lower), in comparison to a low source credibility condition.

From a practical point of view, it is also of interest to assess whether a CARP is similarly effective as pricing interventions. Pricing interventions (e.g., taxation of "bad" products or nutrients) represent a well-known mean to limit choice of food options with negative health consequences. Yet, the effectiveness of a CARP in comparison to a price increase remains unclear.

On the one hand, it has been shown that nontrivial pricing interventions may have some measurable effects on weight outcomes (Powell and Chaloupka 2009). Accordingly, some authors regard pricing interventions to be more effective than education interventions (Block et al. 2010; Chandon and Wansink 2012). On the other hand, small price increases seem to have limited effectiveness for achieving public health goals (Cash and Lakanilao 2007; Powell and Chaloupka 2009). Against this background, it is less clear that educational interventions such as CARP provision are inferior to pricing interventions.

To investigate this issue, we will compare scenarios of unfavorable price and favorable CARP (i.e., higher price and higher CARP) with favorable price and unfavorable CARP (i.e., lower price and lower CARP). We argue that a constant price increase (as would be the case with a sales/product tax for a specific unhealthy category) negatively affects all products from this category due to the negative utility of price. By contrast, the CARP disclosure should affect products with high levels of a bad nutrient more strongly than those with lower levels of that nutrient. The reason is that reference points are particularly effective the greater the distance between reference and revealed value becomes (i.e., the more intensely the item is framed as a vice or virtue). The underlying mechanism is that small deviations from a reference tend to be assimilated, while larger deviations are contrasted (Hovland, Harvey, and Sherif 1957). Hence, in situations of a low CARP products with high levels of the addressed nutrient lose attractiveness. By contrast, in situations of a high price all products suffer from decreasing attractiveness. We therefore posit that pricing interventions are more effective for products with a low level of bad nutrients.

**H4:** Pricing interventions are more effective than CARP disclosure for products with lower levels of a bad nutrient. Pricing interventions are not advantageous to CARP disclosure for products with higher levels of a bad nutrient.

Hypothesis 4 is concerned with the independent effects of CARP disclosure and pricing interventions. Recent research, however, has shown that regulation and price increases in combination are most effective in improving food choice (Disdier and Marette 2012; Sacks et al. 2011). The reason is that pricing interventions and regulation are dominant strategies (Sacks et al. 2011). Therefore, it is possible that price increase effects do not mask the effect of CARP provision. If both CARP disclosure and price increase offer unique contributions to healthy choice, their effects should combine.

**H5:** The upper bound of acceptable nutrient content is lower when price increase and CARP are combined, relative to situations of either price increase or CARP disclosure.

## **2.3 Study 1**

### **2.3.1 Method**

Study 1 examines whether provision of a relatively low or high CARP decreases or increases the average amount of sugar chosen when a number of breakfast cereals is presented. Sugar was selected as the nutrient being disclosed as its overconsumption can cause severe health problems (World Health Organization 2013). For example, early in their lives children learn that sugar causes tooth decay (Kay and Locker 1996). Moreover, high intakes of sugar include excessive energy consumption and decreased diet quality (Malik, Schulze, and Hu 2006). Fruit muesli, a German granola-based

cereal, was chosen for its wide sugar range—typically most of the available products contain between two and 37 grams sugar per 100 grams muesli.

In our study participants read an introductory text about muesli as a breakfast cereal, its recommended serving size, and the digestion of carbohydrates and sugars (see appendix 1). The CARP was revealed within the text without highlighting or placing particular emphasis on this information. In order to determine a low and high CARP we employed a procedure suggested by Rhine and Severance (1970). As the low CARP we used the approximate middle of the lower half of the total range of sugar values in fruit muesli (10 grams). The upper end of the available sugar range (37 grams) was used for the high CARP (Rhine and Severance 1970). Participants were randomly assigned to one of the two CARP conditions.

To capture sugar choice under realistic settings we conducted a choice-based conjoint (CBC) experiment controlling for additional attributes. This method allows introduction of several product attributes at varying levels. In CBC experiments, participants are asked to choose from a number of alternative products composed of several product attributes (Carroll and Green 1995). In addition to sugar content, we included price, packaging, and organic labeling due to their importance in contemporary food product preference (Briers and Laporte 2013; Chandon and Wansink 2012). The sugar content attribute has six levels covering the whole range of sugar values in the muesli market (2 to 37 grams). The range of possible sugar values was divided into six equidistant levels: 2 grams, 9 grams, 16 grams, 23 grams, 30 grams, and 37 grams. Price has three levels (low, medium, and high): the usual sales price of popular German muesli Dr. Oetker Vitalis, which is 2.99 € (USD 3.72), serves as the medium price. The price range included values 25% below and above that price. This led to the low price of 2.29 € (USD 2.85), which is a common sales price for lower priced mueslis, and 3.69 € (USD 4.59) which is common for more expensive muesli products. The packaging attribute

has two levels: plastic bag and container. As for organic labeling the levels include presence versus absence of such a label.

In this experiment, each respondent was presented a sequence of 12 choice sets. Every participant received a particular set of choice tasks. Each choice set consisted of four hypothetical mueslis, comprised of one level of each of the four attributes as well as a no choice option. We used such a decompositional method in order to minimize socially desirable responses that overstress the relevance of sensitive attributes (Carroll and Green 1995; Louviere and Islam 2008). All choice tasks and product combinations presented to participants reflected a D-efficient design (Kuhfeld, Tobias, and Garratt 1994). Appendix 3 displays an exemplary choice task. Respondents were asked to select their most preferred product in each of the 12 choice tasks. We controlled for order effects by randomizing the order of profiles across participants, and we calculated the average sugar choice as the mean of the sugar content across the 12 chosen muesli.

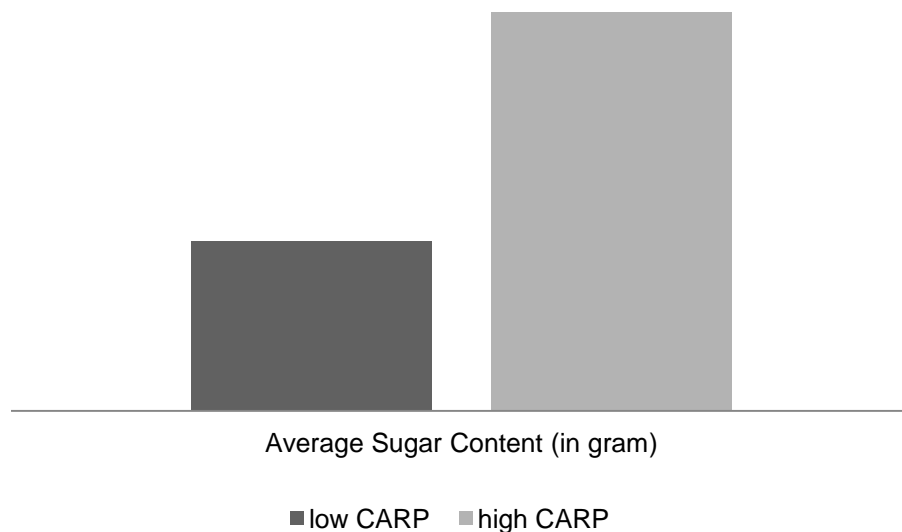
Students from five German universities participated in return for a chance to win an Amazon voucher in a post-survey drawing as well as a guaranteed donation to “Medicines sans Frontiers” for each completed questionnaire. At the beginning of the experiment, participants were randomly assigned to one of the two experimental conditions (low/high CARP). In order to ensure that only students with sufficient buying experience with respect to the test category were considered, qualifier questions were included at the beginning of the questionnaire. The final data set consists of 211 participants who completed all tasks. Sixty-one percent of the participants were female, and most were between 20 and 30 years old.



### 2.3.2 Results

Hypothesis 1 proposed that the average amount of sugar consumed by participants in the low CARP condition would be lower than the average amount chosen by participants in the high CARP condition. In support of H1, an ANOVA yielded a significant effect for CARP ( $F(1, 183) = 3.8, p = .05$ ). As predicted, participants in the high CARP group would have consumed more sugar ( $M_{\text{highCARP}} = 15.8\text{g}, SD = 6.7$ ) than those in the low CARP condition ( $M_{\text{lowCARP}} = 13.9\text{g}, SD = 6.6$ ). Figure 1 displays the sugar choice per treatment group.

**Figure 1: Average Sugar Consumption**



### 2.3.3 Discussion

Study 1 offers initial evidence supporting the hypothesis that providing consumers with a CARP influences their food choices. We proposed that when consumers are given a high CARP they feel justified to choose high amounts of sugar. This suggests that the

low CARP did intensify the feeling of guilt when choosing products with high amounts of sugar. Notably, we found these differences across CARP conditions while holding constant other product attributes such as price, packaging and organic labeling. This means that although sugar content was only one of four attributes, the sugar-related reference point affected overall product preferences and choice.

Once we have shown the effect of CARP on choice in study 1, we are interested in the mechanism that leads to changed choices. Hence, in study 2 we will investigate the effect of CARPs on latitude of sugar acceptance.

## **2.4 Study 2**

### **2.4.1 Method**

Study 2 used a 2 (CARP: high vs. low) x 2 (source credibility: high vs. low) between-subject design, with a similar procedure to that in study 1. Participants read an introductory text that was identical to that used in study 1, but additionally included mentioning of an information source and a short description of the source (see appendix 2). Source credibility was assessed in a pretest among 97 university students. These students evaluated one of four sources on a 4-item 5-point source credibility scale (Cronbach's  $\alpha = .90$ ) taken from Variyam, Blaylock, and Smallwood (1996). As expected, credibility significantly differed across the four information sources ( $F(3, 97) = 12.36, p < .001$ ). The sources with the lowest and highest mean credibility score were used for this study: a consumer protection foundation publishing a monthly print magazine was selected as the high-credibility source ( $M = 3.66$ ), and a tabloid was chosen as the less credible source ( $M = 2.14$ ).

The CARPs provided in study 2 were identical to those presented in study 1. Sixty-two percent of participants were female and most (95%) were 30 years and younger, with the majority of participants falling in the 20 to 24 age range.

To estimate the upper bounds of acceptable sugar content, we used the same CBC design as in study 1. Respondents chose between alternatives of a set of product profiles with varying levels of price, sugar content, organic labeling and packaging. The implicit utility of the product attributes was then statistically extracted based on these evaluations (Melles, Laumann, and Holling 2000).

As it is common for the application of CBC and to enhance our understanding of the underlying mechanism, we make use of random utility theory (McFadden 1974). Based on this approach, we assume that total utility can be composed as the sum of different part-worth for each observed attribute (i.e., packaging, organic labeling, price, and sugar). We deviate from standard CBC applications by assuming an ideal point model (Kamakura and Srivastava 1986) for sugar rather than just adding a single part-worth. This means that the utility of a given sugar level decreases to a greater extent the farther it moves from an ideal attribute level. The reason is that some consumers regard extremely low levels of sugar as less tasty and, hence, undesirable (Raghunathan, Naylor, and Hoyer 2006). Consequently, we model the part-worth of sugar as a quadratic function. Taking these aspects together, the utility function can be written as:

$$U = \beta_{Packaging} \times Packaging + \beta_{Organic} \times Organic + \beta_{low\_Price} \times low\_Price + (1) \\ \beta_{medium\_Price} \times medium\_Price + (\beta_{Sugar} + \beta_{Sugar\_squared} \times Sugar) \times Sugar + \varepsilon$$

with  $U$  representing the utility one product yields from the parameters of the control variables ( $Packaging$ ,  $Organic$  labeling,  $low\_Price$ , and  $medium\_Price$  as well as the

(squared) sugar term  $Sugar$ ). All non-deterministic influences are captured by an i.i.d. extreme value distributed error term  $\varepsilon$ , leading to the well-known multinomial logit model (Louviere, Hensher, and Swait 2000; McFadden 1974).

To get further insights on how CARP and credibility affect consumers' choice within the random utility framework, we assume the taste coefficients for sugar given in equation (1),  $\beta_{Sugar}$  and  $\beta_{Sugar\_squared}$ , to be influenced by both factors:

$$\begin{aligned}\beta_{Sugar} &= \beta_{Sugar\_0} + \beta_{Sugar\_CARP} \times CARP + \beta_{Sugar\_Credibility} \times Credibility + \\ &\beta_{Sugar\_CARP\_Credibility} \times CARP \times Credibility; \\ \beta_{Sugar\_squared} &= \beta_{Sugar\_squared\_0} + \beta_{Sugar\_squared\_CARP} \times CARP + \beta_{Sugar\_squared\_Credibility} \times \\ &Credibility + \beta_{Sugar\_squared\_CARP\_Credibility} \times CARP \times Credibility\end{aligned}\quad (2)$$

As equation (2) illustrates, taste coefficients  $\beta_{Sugar}$  and  $\beta_{Sugar\_squared}$ , respectively, are the sum of the intercepts for sugar content ( $\beta_{Sugar\_0}$ ;  $\beta_{Sugar\_squared\_0}$ ), the parameter of CARP ( $\beta_{Sugar\_CARP}$ ,  $\beta_{Sugar\_squared\_CARP}$ ), the parameter of credibility ( $\beta_{Sugar\_Credibility}$ ,  $\beta_{Sugar\_squared\_Credibility}$ ), and the interaction of credibility with CARP ( $\beta_{Sugar\_CARP\_Credibility}$ ,  $\beta_{Sugar\_squared\_CARP\_Credibility}$ ). In this manner, we are able to derive different levels of taste coefficients and thereby determine the part-worth of sugar depending on the level of CARP and credibility. Note that in a scenario in which neither CARP nor credibility is controlled for (i.e.,  $CARP = Credibility = 0$ ), the taste coefficients would reduce to  $\beta_{Sugar} = \beta_{Sugar\_0}$  and  $\beta_{Sugar\_squared} = \beta_{Sugar\_squared\_0}$ .

## 2.4.2 Results

As can be seen from table 1, all control variables (price, packaging, and organic labeling) significantly impact utility. Organic labeling increases the utility of the product, as do a low price and carton packaging. In addition to the impact of control attributes, increasing the amount of sugar reduces the utility of a muesli option ( $\beta_{Sugar} = -.021, p < .05; \beta_{Sugar\_squared} = -.001, p < .01$ ). The part-worth of sugar is further qualified by the Category Average Reference Point through a significant interaction with the quadratic term ( $\beta_{Sugar\_squared\_CARP} = .001, p < .001$ ). The three-way interaction between credibility, sugar content, and CARP is also significant ( $\beta_{Sugar\_CARP\_Credibility} = .030, p < .10; \beta_{Sugar\_squared\_CARP\_Credibility} = -.001, p < .10$ ).

**Table 1: Utility Parameter Estimates**

<b>Variables</b>	<b>Parameter Estimates</b>
<i>Package</i>	-0.106***
<i>Organic labeling</i>	0.714***
<i>Low_Price</i>	2.716***
<i>Medium_Price</i>	1.507***
<i>Sugar</i>	-0.021**
<i>Sugar_squared</i>	-0.001***
<i>CARP x Sugar</i>	-0.011 n.s.
<i>Credibility x Sugar</i>	-0.011 n.s.
<i>Credibility x Sugar x CARP</i>	0.030*
<i>CARP x Sugar_squared</i>	0.001***
<i>Credibility x Sugar_squared</i>	0.01*
<i>CARP x Credibility x Sugar_squared</i>	-0.001*

Notes: Levels of significance: \*\*\*p < .01, \*\*p < .05, \*p < .1, n.s. not significant

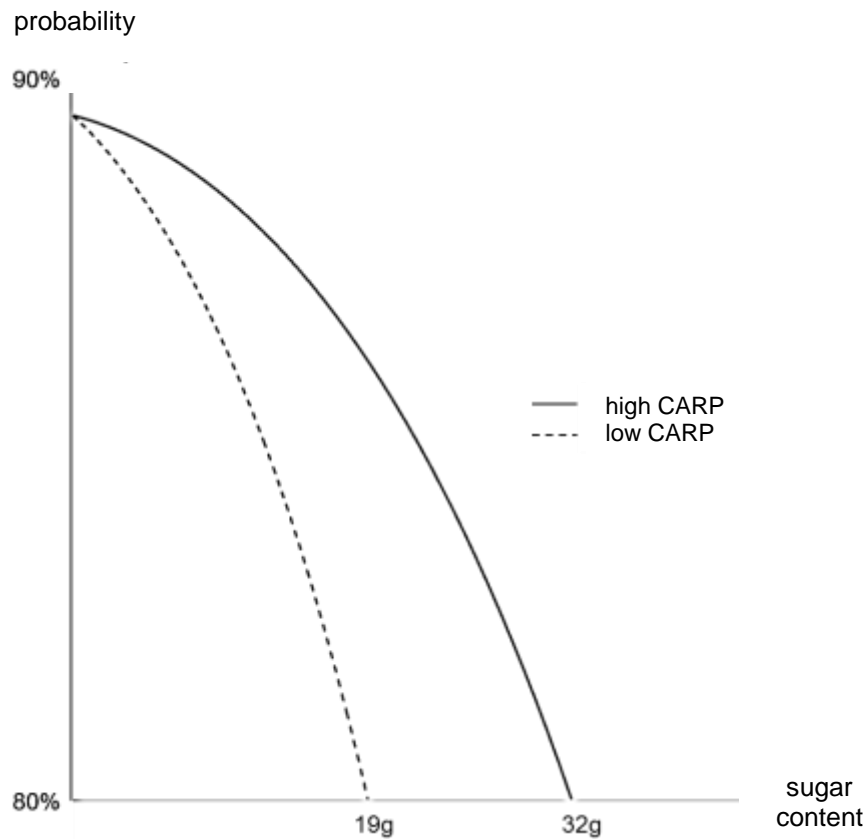
This means that CARP affects the utility of sugar and, hence, the acceptance of sugar content. In order to test the hypotheses the shape of the estimated curves are considered. To assist in the interpretation of our findings, we transform utility from equation (1) into a probability measure of sugar choice. The choice probabilities of sugar content allow assessment of hypotheses 2 and 3 (the CARP labeling effect) and hypotheses 4 and 5 (CARP regulation vs. pricing intervention effects).

To assess H2 and H3, we fix packaging, organic labeling, and price (to carton packaging, organic-label presence, and medium price) and look at the probability of choosing this particular muesli with varying sugar amounts versus choosing none. Thus, the probability of choosing versus not choosing ( $P$ ) can be captured by a simple binary logit model determined using equation (3).

$$P(U) = \exp(U)/(1+\exp(U)) \quad (3)$$

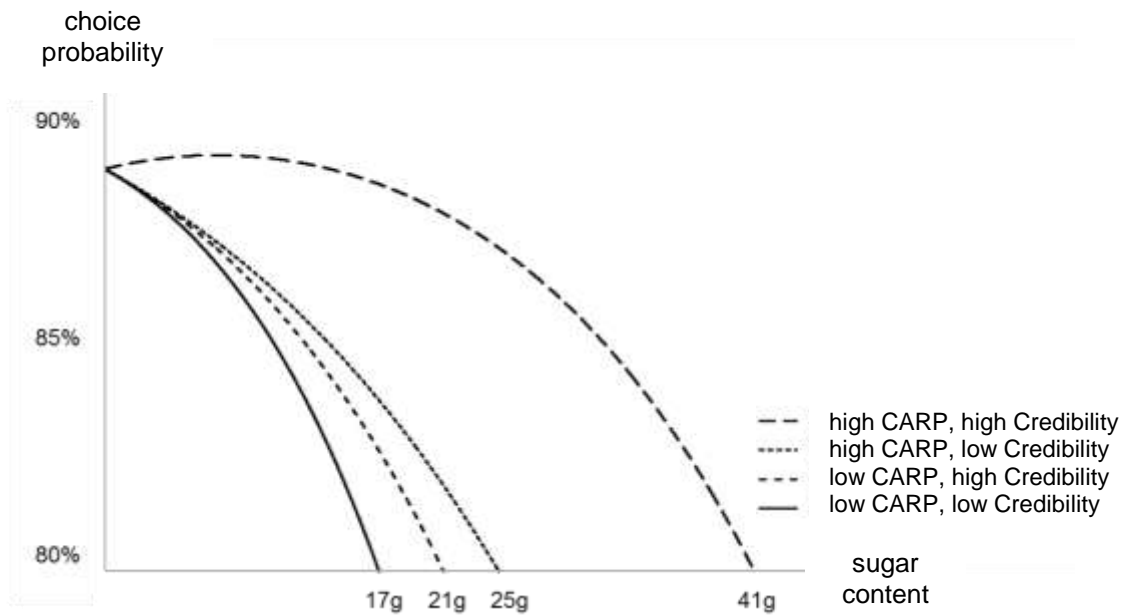
Next, we consider a situation with a high likelihood for the muesli to be chosen (e.g., 80% probability of choice). In that case a sugar amount of 32 grams per 100 grams would still be acceptable (i.e., 80% choice probability) when a high CARP is provided, while the low CARP shifts this upper bound to 19 grams (see figure 2). In support of hypothesis 2, this means that Category Average Reference Points affect the latitude of acceptance by shifting the upper bound of acceptable sugar content (in our case, by 13 grams per 100 grams).

**Figure 2: Upper Bounds of the Latitude of Sugar Acceptance at 80% Choice Probability**



Moreover, in hypothesis 3 we proposed that the impact of the CARP would be stronger in case of higher source credibility. We find that our proposition holds true for the high-CARP condition (acceptable upper bound of  $\text{sugar}_{\text{low credibility}} = 25$  grams vs. acceptable upper bound of  $\text{sugar}_{\text{high credibility}} = 41$  grams), but not for the low-CARP condition (acceptable upper bound of  $\text{sugar}_{\text{low credibility}} = 17$  grams vs. acceptable upper bound of  $\text{sugar}_{\text{high credibility}} = 22$  grams). In the latter case, the effect is contrary to our expectations. Therefore, hypothesis 3 is not supported. The four upper sugar bounds of the latitude of sugar acceptance across conditions are shown in figure 3.

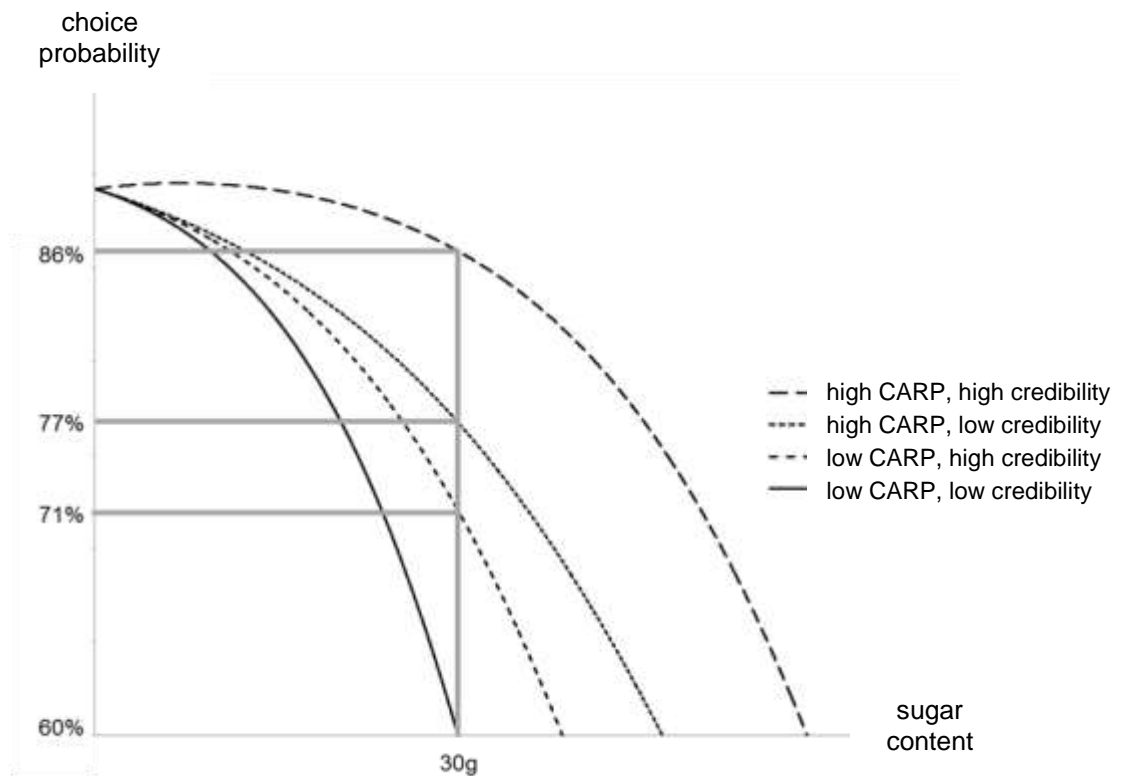
**Figure 3: Upper Bounds of the Latitude of Sugar Acceptance at 80% Choice Probability by Source Credibility**



To illustrate the policy consequences of the above findings, we look at the results from a different perspective (see figure 4). As can be seen from this figure, in the high CARP/ high source credibility condition 86% of the respondents would still accept muesli containing high amounts of sugar such as 30 grams. By contrast, only 60% accept the sugar-rich product in the low CARP/low credibility condition. This means that in the present case, the "right" CARP/ source credibility combination has the power to prevent 26 out of 100 consumers from buying high-sugar muesli. This finding lends additional support on hypothesis 2 and points to the effectiveness of CARP disclosure for dietary regulation.



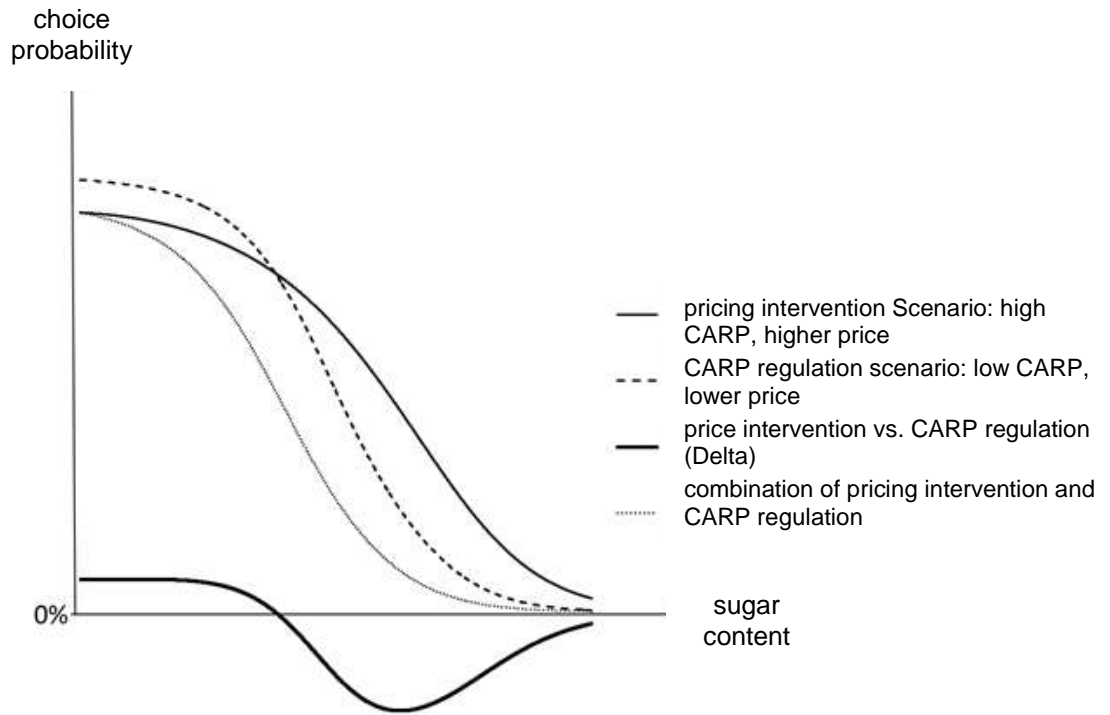
**Figure 4: Choice Probabilities for Muesli Containing up to 30 grams Sugar**



Similarly important to judge the policy implications of the present research is the comparison of CARP disclosure and pricing intervention as put forth in hypothesis 4. In hypothesis 4 we argued that pricing interventions may be more effective in regulating nutrient intake for products with low levels of the respective nutrient. However, we expected no advantage of pricing interventions over CARP disclosure among products with high levels of bad nutrients. In the following, we compare two scenarios: CARP regulation (unfavorable CARP and favorable price) versus pricing intervention (unfavorable price and favorable CARP). As shown in figure 5, we find that the CARP regulation effect is catching up with the price-increase effect at high sugar levels, indicated by the two crossing slopes. Thus, the pricing intervention does not necessarily need to be more effective than CARP regulation in decreasing the consumption of sugar-rich products. Hence, hypothesis 4 is supported. Moreover, it can be seen that pricing interventions lead to decreased consumption of low-sugar muesli and increased

consumption of high-sugar muesli, relative to CARP regulation. This means that a constant price increase can lead to unintended consequences. By contrast, the CARP regulation seems to work as desired.

**Figure 5: Category Average Reference Point Regulation vs. Pricing Intervention Effects on Sugar Acceptance**



Last but not least, we stated in H5 that the combination of pricing intervention and CARP regulation would be more effective than either CARP regulation or price-increase alone. As can be seen in figure 5, hypothesis 5 is supported as choice probabilities per sugar content are lower at any point for the combination scenario in comparison to the price-increase or regulation scenarios.

### 2.4.3 Discussion

The effects of CARP provision corroborate the results of study 1 in that a low CARP reduces the utility of sugar and fosters decreased consumption, relative to a high CARP.

Moreover, we learn that the effect of lower average sugar consumption is directly proportional to a decreased upper bound of acceptable sugar content. Yet, unlike our prediction, high source credibility did not lead to more amplified effects of low CARP. Rather, credible sources led to increased sugar consumption across CARP levels. One reason might be that respondents mistrusted the CARP information when provided by a less credible source, but assumed that low-credibility sources would always overstate the average sugar content. Ironically, respondents were even stricter in their inferences about the nutritional quality of the provided muesli options.

Moreover, we found that CARP regulation is not necessarily less effective than pricing interventions. Specifically, a low CARP renders products with high or very high amounts of sugar less attractive, even more so than a higher price. This finding qualifies earlier research that clearly favored pricing interventions over education interventions (Block et al. 2010; Chandon and Wansink 2012). While not all educational programs might be equally effective, CARP disclosure is one opportunity that can complement pricing interventions. Indeed, in this study the combination of both mechanisms was most effective.

## **2.5 General Discussion and Implications**

When qualifying nutrition information, consumers can make use of a number of reference points. They can use reference points based on aspirational levels such as the Percentage Daily Value (Garretson and Burton 2000; Mathios 1996, 1998; Mojduszka, Caswell, and Harris 2001; Visschers and Siegrist 2009), traffic light labels (Hersey et al. 2013; Koenigstorfer, Groeppel-Klein, and Kamm 2014; Kozup, Creyer, and Burton 2003, Visschers and Siegrist 2009) or verbal health claims (Andrews, Netemeyer, and Burton 1998, Chandon and Wansink 2007; Kiesel and Villas-Boas 2013). Market levels

such as the range of nutrition content across two or more other products on the shelf (Kiesel and Villas-Boas 2013; Visschers and Siegrist 2009; Viswanathan 1994) can also be used to qualify nutrition information. Worrysome for policy makers, some of these reference points either fail to change food consumption habits or can promote unhealthful food decisions (Andrews, Burton, and Kees 2011; Verplanken and Wood 2006; Chandon and Wansink 2007).

In this research, we put forth another market-level reference point; one that displays the average nutrition values in a category. Although use of such Category Average Reference Points was discussed two decades ago as one type of numerical summary information (Viswanathan 1994), previous research seemed unwilling to elaborate on this idea (see Viswanathan and Hastak 2002, for an exception). With the presented studies, we contribute to the growing literature on food consumption and nutrition labeling effectiveness by showing that Category Average Reference Points (CARP) can affect food choice. Notably, this effect occurs in multi-cue environments where other important product attributes are displayed. Moreover, we identify the process behind the CARP effect. This is an important addition to current knowledge of food choice.

As mentioned, PDV labels sometimes fail to facilitate product selection and even can be misleading (Andrews, Burton, and Kees 2011). CARP provides a way to compensate for these drawbacks. In line with research that states that nutrition information has no direct effect on purchase intentions (Garretson and Burton 2000) we extend previous literature on the effect of summary information on product evaluation (Viswanathan 1994; Viswanathan and Hastak 2002) by showing its effect on choice under realistic choice scenarios.

The results from studies 1 and 2 suggest that CARP affects choice by triggering justification processes. Specifically, it appears that CARPs increase healthiness perceptions which, in turn, justify higher levels of bad nutrients in food. Importantly,

the upper bound of acceptable nutrition content relies on the relative nutrient quality of food, rather than absolute values. Assessments of the relative food quality are constructed from the deviation of nutrient values from a category average. Likewise, muesli containing 37 grams sugar can be more desirable than muesli containing 30 grams, depending on CARP values presented (e.g., 10 vs. 37 grams), as shown in study 2.

This research also compared CARP effects to price increase consequences. The effect triggered by price increases follows the same mechanism as nutrient taxation, a strategy which has been recently discussed in the US Congress (113TH US CONGRESS 2014) and even been introduced by the Mexican government (BBC 2010). Although, Denmark introduced a fat tax and withdrew it only one year after. Nutrient taxation has been discussed as a potentially effective tool in fighting excessive sugar or fat intake (e.g., Brownell and Frieden 2009; Jacobson and Brownell 2000; Elbel et al. 2013; Kuchler, Tegene, and Harris 2005; Schroeter, Lusk, and Tyner 2008). Yet, nutrient taxation receives low public and industry support (Craher and Cowburn 2005). CARP disclosure can outrange the effect of price increases for products with high sugar content. Yet, it has also been linked to increased sodium consumption (Mytton et al. 2007) or even increasing obesity rates (Yaniv, Rosin, and Tobol 2009).

Admittedly though, the price increase in study 2 comprised 25%, which is more than a sugar tax would do. The currently discussed (US) sugar tax would foresee 1 cent tax per 4.2 grams sugar. Thus, the taxation of the “worst” product containing 37 grams sugar per 100 grams sold in a 600 grams (21.2 oz.) box would result in an approximate price increase of 41 cent (9.8%). The finding that the two processes (price increase and CARP regulation) work well together supports previous research that identified differential effects of regulations and taxation (Disdier and Marette 2012; Sacks et al. 2011).

In addition to these findings we got some surprising results. Contradictory to our proposition CARP communication via credible sources did not always lead to more emphasized effects. Low–not high–CARPs provided by less credible sources resulted in lowest accepted sugar levels. One explanation for this result might be that respondents in the low credibility condition did (as desired) not believe in the CARP and thus had no anchor to which to compare the products' individual sugar levels. Due to the missing comparison frame the health-framing of the introductory text could have kicked in and, thus, the healthiest (= least sugary) products were chosen. This means that communication of a low CARP via public media could affect consumers' food choices.

A more downstream effect of disclosure of low CARPs could be changes in food formulas and thus changes in the food market.

From a policy perspective, Category Average Reference Points represent a powerful means to nudge consumers towards the choice of more healthful products and away from their unhealthful counterparts. They could even provide the opportunity to reevaluate products with health halos such as low-carb bread. Consumers learn that low-carb bread is (calorie-wise) worse than simple wheat bread (average bread 220 calories vs. low carb bread 265 calories per 100 grams).

In study 2 we tested the effects of a price increase and found that the CARP provision is less effective at lower and medium sugar levels. The price increase advantage disappears, however, at higher sugar levels, even though the intervention was nontrivial. Even though 25% tax is in line with other studies on nutrient taxation effects (Elbel et al. 2013; Temple et al. 2011), this rate is very high in comparison to the proposition of Sen. DeLauro, which comprised only 1 cent tax per 4.2 grams sugar content (113TH US CONGRESS 2014). Taking this into account renders the option of introducing a CARP even more attractive.

CARP could be used as an additional front-of-pack label or as a shelf tag. However, policy makers should be very careful in specifying categories. Our results show that, aside from the ability to reveal betrayal with health claims, misspecification of categories could lead to high CARP values and, thus, foster overconsumption of bad nutrients. Another issue in using Category Average Reference Points is that food manufacturers could artificially increase category-specific averages by introducing products high in bad nutrients. To avoid that problem, the median (which is less sensitive to outliers) could be used instead of the average nutrient level.

Generally, our research can help advance consumers' well-being by providing insight in consumer food choice processes. This helps to understand the paradox of consumption by explaining why and under which boundary conditions consumers tend to over-consume. Hence, questions of transformative consumer research are addressed by surpassing the information-processing perspective and explaining under which conditions use of nutrition labels will lead to healthier or unhealthier consumption (Grunert, Bolton, and Raats 2012).

## **2.6 Limitations and Future Directions**

Our studies were not without limitations. Specifically, we only measured hypothetical (sugar) consumption, as opposed to actual consumption. We are aware that this might limit external validity of our findings. In the past, however, results of choice-based conjoint experiments proved robust when applied in real-world settings (Louviere 1988; Natter and Feurstein 2002). Moreover, our studies were not initially designed to measure pricing effect. Therefore, differences between different price attribute levels were rather high, while source credibility differences were relatively low in comparison to reality. Most noticeable are the differences between real-world CARPs and the

constructed CARPs in the experiments. Nevertheless, it was our goal to demonstrate the potential effectiveness of CARPs towards other regulatory measures such as nutrient taxation.

Moreover, though the majority of hypotheses found support, some unexpected results occurred that may point to interesting opportunities for future research. Unlike existing research that proposes that consumers do not have a strong internal reference point with which they compare nutrition information (van Herpen, Hieke, and van Trijp 2013), we believe that in some cases the Category Average Reference Point seemed to be overruled by internal reference points. Hence, future research could concentrate on the interrelation of external and internal reference points. In addition, our research is limited to external reference points as we did not consider internalized reference points such as historical-level reference points of the products purchased. We assume these reference points do not promote behavioral change (Verplanken and Wood 2006). However, it is a matter of fact that internalized reference points interact with external reference points. That interaction should be focused on in further research. Findings in that respect could contribute to our results, offering further valuable insight in how to protect consumers from food fraud.

Last, the practicability of CARPs could be a limitation as setting categories is not trivial. Yet, we propose that intended use like e.g. for breakfast or shopping basket categories could serve as means to classify food products. Policy makers should ensure that neither too few nor too many categories are created as this diminishes the diagnostic utility for consumers.

Concluding, the results of our research indicate that nutrition education programs have been effective in making salient the negative consequences of bad nutrients. This means that consumers do not prefer the tastier-but-less-healthy food per se. However, the marketplace is replete with deceptive offerings and situations where consumers have



difficulties to monitor their eating behaviors. Our findings corroborate existing research results that rendering less healthful food more favorably leads people to overeat. This means that policy regulation is needed to support people in their constant efforts to eat in a more healthful way. One tool is communicating a Category Average Reference Point regarding one or more key nutrients. It is easily implemented and, of equal importance, easily and consistently understood by consumers.

### **3 The Role of Category Average Reference Points and Health Halos in Purchase Intentions of Healthy and Hedonic Food**

This paper by Jutta Schuch, Steffen Jahn, and Yasemin Boztuğ has been published in  
Advances in Consumer Research 42 (2014) (Journal 2: C).

It has been presented at the 42<sup>nd</sup> Advances in Consumer Research (ACR) Conference  
held in Baltimore, Maryland in 2014.

### **3.1 Introduction**

Although we eat and drink every day, we often find it difficult to discern the nutritional quality of food (Chernev 2008). Marketers have known this for a long time and responded with respective health claims on food packages, such as “low-fat,” “organic” or “creamy” (Wertenbroch 1998). Research has shown, however, that such claims can be misleading and sometimes cause malnutrition, including obsessive calorie intake (Chandon and Wansink 2007; Wansink and Chandon 2006).

Nutrition labels are assumed to correct for misleading health claims (Chandon 2013). They are mandatory on most prepackaged products in the US and Europe in order to make consumers’ choices healthier (Burton, Garretson, and Velliquette 1999). Existing labels, however, possess only limited effectiveness when it comes to real purchase behavior (Kiesel and Villas-Boas 2013; Mathios 1998; Mojdzuska, Caswell, and Harris 2000; Sacks, Rayner, and Swinburn 2009; Sacks et al. 2011). One reason is that most existing numerical labels are harder to interpret than easy-to-understand verbal health claims (Kiesel and Villas-Boas 2013). A promising avenue to solve the dilemma of unhealthy food choice is the use of average category reference points (CARPs) as a basis for comparative judgments (Viswanathan 1994). CARPs display the average amount of calories and key nutrients in one category and therefore qualify otherwise meaningless nutrition information such as “contains 200 calories.” Thus, external CARPs may correct potentially existing internal reference points, and make food look like vices or virtues (Chernev and Gal 2010).

Although reference points referring to a category average generally have been acknowledged as affecting choice construction (Bettman, Luce, and Payne 1998), existing research has not investigated the impact of such information on food choice. Even more importantly, it is unclear how CARPs can influence purchase intentions. A

starting point is that CARPs can alter healthiness perceptions (Viswanathan and Hastak 2002). Healthiness perceptions, then, may translate into increased purchase intentions. For example, learning that a food item has a relatively high calorie content (compared to the ‘average item’ in the category) could reduce healthiness perceptions and stimulate expected guilt while choosing, independent of the absolute energy content. Conversely, learning that a food item such as ice cream has relatively few calories (compared to the ‘average ice cream’) could take away the guilt and justify increased consumption even when it still contains more calories than most other food.

Healthiness perceptions, however, also depend on the category, as different product categories are perceived as more or less healthful per se. While healthful food is often perceived as less tasty (Balasubramanian and Cole 2002; Raghunathan, Naylor, and Hoyer 2006), tasty products are perceived as high in negative nutrients and calories (Belei et al. 2012). In contrast, a product from a healthful category is expected to be low in calories and negative nutrients like sugar and therefore more healthful (a “category halo”). It is also known that different category types affect consumers differently depending on self-control. Consumers with high self-control tend to satiate faster on unhealthy foods, yet consumers with low self-control do not show that pattern for healthy foods (Redden and Haws 2013; Smith 2004).

Thus, the goal of the present paper is to investigate the mechanism and boundaries of CARPs influence on purchase intentions. We contribute to existing literature in several ways. First, we identify the underlying mechanism of the effect of CARPs on purchase intentions by investigating direct and indirect influences via healthiness perception. Second, we explore boundary conditions of the effect. The boundaries refer to self-control and product categories. Third, we investigate the differential effects of reference points and health claims.

In the remainder we start by reviewing the mechanism that may explain how CARPs influences consumers purchase intentions in healthy and hedonic product categories. We then present two studies to test the proposed mechanism. In the first study, we shall show that CARPs influence purchase intentions via healthiness perceptions. Consumers with low self-control feel justified to purchase hedonic product types in case of a CARP higher than the calorie content of the respective food item, while in the same condition consumers with high self-control tend to purchase unfavorable products of the healthy product category. In our second study we find that the health halo provoking effect of health claims can be refrained by low CARP. The paper concludes with a discussion of the important implications.

### **3.2 Theoretical Framework**

Previous literature on reference points in a food context has proposed that reference points can impact healthiness perceptions of products (Visschers and Siegrist 2009; Viswanathan 1994; Viswanathan and Hastak 2002). The perception of the product's healthiness, in turn, impacts purchase intentions (Burton, Biswas, and Netemeyer 1994). Accordingly, we propose that CARPs can affect purchase intentions via their influence on healthiness perceptions.

**H1:** The effect of Category Average Reference Points on purchase intentions is mediated by healthiness perceptions.

Yet, some product categories are perceived as more or less healthy per se. Therefore, we theorize that, CARPs will have a stronger impact on healthiness perceptions, when the

product is not expected to be healthy per se. For healthy products CARPs may carry less additional information needed to judge their healthiness.

**H2:** The mediating effect of healthiness perceptions is stronger in case of hedonic product types.

Hedonic products make consumers with high self-control capacities satiate faster than consumers with low self-control while consumers with low self-control do not show that differential pattern (Redden and Haws 2013). One explanation of consumers low in self-control satiating slower on hedonic products is their biased estimation of calories (Chandon and Wansink 2007, Chernev and Gal 2010, Redden and Haws 2013). We propose that the effect of biased calorie estimation can be limited (emphasized) by the presence (absence) of CARPs and thus help consumers with low self-control. This is because calorie estimations can be revealed by CARPs. More precisely, we theorize that high CARPs yield a stronger effect on health perception in the hedonic product category for consumers with low self-control. This is because we anticipate that those consumers with low self-control feel more justified as they underestimate calories and feel enforced by high CARPs. Yet, we propose that this effect is more elaborate for hedonic product types.

**H3:** The (mediated) effect of reference points on purchase intentions is moderated by self-control.

### 3.3 Study 1

#### 3.3.1 Method

Fife hundred and sixty-three respondents from Amazon Mechanical Turk participated in our study for a guaranteed payment of .6\$ and were randomly assigned to one of four conditions in a 2 (Category Average Reference Point valence below calorie content of actual product vs. above the calorie content of actual product) x 2 (type of category: hedonic vs. healthy category) between-subject design. To operationalize CARPs, we set the calorie value of the two products to a specific amount and varied the CARPs around that fixed point. The positive deviation from the actual value should be perceived as more favorable, while the negative deviation from the actual value should be perceived as less favorable. We chose muesli as healthy product type and ice cream as more hedonic product type.

Participants first saw a mock package of one of the two products. On the package participants saw a nutrition label stating the low or high CARP and the calorie content of the actual product. This was followed by questions regarding purchase intentions on a 9-point scale (“If available, how likely is it that you would buy that specific product on one of your shopping trips this month?” anchored by “very unlikely” and “very likely,” and “If available, how probable is it that you would buy that specific product on one of your shopping trips this month?” anchored by “not probable” and “very probable,” Cronbach’s  $\alpha = .97$ ) (Burton, Howlett, and Tangari 2009; Andrews, Burton, and Kees 2011). Participants then responded to a series of 7-point two item scales designed to assess the healthiness perception (“Assuming that I ate the product, I would feel healthy” and “The product information proposes the product is healthy,” anchored by “agree” – “disagree,” Cronbach’s  $\alpha = .78$ ) and self-control (“I am good at resisting temptation” and “I do certain things that are bad for me, if they are fun (r),” anchored by

“agree” – “disagree,” Cronbach’s  $\alpha = .70$ ) (shortened form of Tangney, Baumeister, and Boone 2004).

Fifty-seven percent of study participants were female and all income levels were present. Moreover, fifty percent of study participants exceeded the age of 30. Most participants in our sample come from California and Florida. We verified that perceived healthiness of muesli and ice cream were significantly different ( $M_{\text{muesli}} = 5.59$  vs.  $M_{\text{ice cream}} = 3.09$ ,  $p < .001$ ) and if ice cream was perceived more indulgent than muesli ( $M_{\text{muesli}} = 4.59$  vs.  $M_{\text{ice cream}} = 5.04$ ,  $p < .001$ ). Moreover we tested if both CARP conditions were perceived equally credibly ( $M_{\text{high}} = 4.99$  vs.  $M_{\text{low}} = 4.88$ ;  $p > .21$ ).

### **3.3.2 Results**

First, we tested for mediational evidence in order to determine whether healthiness perceptions mediate the effect of CARP on purchase intentions. As such, we followed procedures consistent with Hayes and Preacher (2013) for testing this hypothesis. As expected the CARP did not influence purchase intentions directly ( $b = -.13$ ,  $p = .51$ ) but indirectly via healthiness perceptions ( $b = .13$ ,  $SE = .05$ , 95% bootstrap CI: .05 to .25). Results show that healthiness perceptions fully mediate the relationship between CARP and purchase intentions. Thus, H1 is supported.

H2 predicts that the effect of CARP on purchase intentions is particularly strong in the hedonic category. A moderated mediation analysis reveals that the interaction of CARP x product category did not directly influence purchase intentions ( $b = -.20$ ,  $p = .58$ ). Yet, the conditional indirect effect of CARP on purchase intention is stronger for the hedonic ( $b = .33$ ,  $SE = .11$ , 95% bootstrap CI: .13 to .57) than for the healthy product type ( $b = .18$ ,  $SE = .10$ , 95% bootstrap CI: -.00 to .40). The direct effects in contrast do not differ



across categories and are all non-significant. Taken together results lend partial support on H2.

Moreover, we predicted in H3 an effect on purchase intention in the hedonic product category for low self-control. The highest order interaction of CARPs via healthiness perceptions on purchase intentions is significant ( $b = -.20$ ,  $SE = .10$ , 90% bootstrap CI:  $-.36$  to  $-.04$ ). We use a spotlight analysis to explore this interaction (Irwin and McClelland 2001). A look at the conditional indirect effects reveals that CARPs have, as predicted, a positive and significant indirect effect on purchase intentions in the hedonic product category when self-control is low ( $b = .52$ ,  $SE = .15$ , 90% bootstrap CI:  $.30$  to  $.79$ ) and a positive and significant indirect effect in the healthy product category for high self-control consumers ( $b = .29$ ,  $SE = .14$ , 90% bootstrap CI:  $.08$  to  $.53$ ). H3 is supported.

### **3.3.3 Discussion**

Study 1 enabled us to examine whether the deviation of the CARP from the nutritional value makes a difference for total choice. We complement existing literature on self-control and food choice as we show that category seems to make a difference in the impact of CARP. Moreover, we show that healthiness perceptions fully mediate the effect of CARPs on purchase intentions. This study confirms our prediction that individuals with lower self-control feel justified to purchase products from a hedonic product category if these are labeled as favorable (positive deviation of CARP from actual calorie content) while consumers with high self-control show the same effect for healthy product types. These findings update previous research that found that consumers high in self-control have the tendency to over-consume healthy product types (Smith 2004), as we find that low CARP can limit that effect as they make

product look less favorable. The same applies to consumption of hedonic product types by consumers with weak self-control. Different from most other nutrition information, low CARPs can limit over-consumption, as they reveal biased calorie estimation.

As we found that CARPs are apt to alter purchase intentions, we seek to find if CARPs can limit the purchase intention enhancing effect of health claims. We examine whether CARPs can limit the health perception enhancing effects of health claims. Therefore, we introduce in Study 2 a range of CARPs that deviate positively/negatively from the actual product value in order to better understand the functional connection between the distance of CARPs from the actual calorie content of the respective product and purchase intention.

### **3.4 Study 2**

It has been recognized that firms can “cheat” on consumers by overriding unfavorable product information (e.g., 100g contain 600 calories) with an alternative health claim (e.g., “healthy option” due to ingredients such as anti-oxidants) (Moorman et al. 2012). In this case, the health claim may have strong signaling power and function as a health halo (Andrews, Burton, and Kees 2011; Roe, Levy, and Derby 1999). Such practice is comparable to covert marketing, a “paid form of communication in which the commercial source is concealed and the marketing message is passed off as news [...] in an effort to minimize audience skepticism toward the message” (Ashley and Leonard 2009). Research has shown that consumers that become aware of covert marketing by a brand they use have lower intentions to repurchase this brand (Ashley and Leonard 2009). In a similar manner, consumers who become aware of “cheating” through misleading health claims may reduce their purchases of the respective product. In the case of a “healthy option” claim coupled with high calorie content, for example,

consumers may feel betrayed. Betrayal has been defined as “a voluntary violation of mutually known pivotal expectations of the trustor by the trusted party (trustee), which has the potential to threaten the well-being of the trustor” (Elangovan and Shapiro 1998). A sense of betrayal among consumers, then, would be the result of a perceived violation of the fairness norm (Grégoire and Fisher 2008). While one form to respond to perceived betrayal is “punishing” the brand through retaliating behavior, such as vindictive complaining or negative word of mouth (Grégoire and Fisher 2008), consumers could also just stop buying the product. Accordingly we propose:

**H4:** The positive impact of a health claim on purchase intentions is reduced by a decreasing Category Average Reference Point.

### **3.4.1 Method**

One thousand one hundred and forty seven respondents were nationwide recruited from Amazon Mechanical Turk and paid a small amount to participate in a 7 (distance of CARP from actual calorie content: actual calorie content +/-0, 25, 50 and 75%) x 2 (product category: healthy vs. hedonic) x 2 (health claim: claim absence vs. claim presence) between subject design study. Participants were randomly assigned to 1 of 28 conditions. As in our first study, participants saw a mock product with a label containing the calorie value of the product as well as one of the seven CARPs. Moreover in 50% of the cases the product contained a health claim stating “healthy option.” Given the differing operationalization of CARP in experiments 1 and 2 we sought to provide evidence that not just the mere valence but also the distance between the CARP and the actual calorie content matters. We assume that a wider range of CARPs can provide deeper insight into the effect of the distance of reference points, as

literature suggests that the judgment gets easier, the bigger the gap between actual value and CARP is (Howlett et al. 2009; Viswanathan and Narayanan 1994). The same measures of purchase intention and healthiness perceptions as in Study 1 were used.

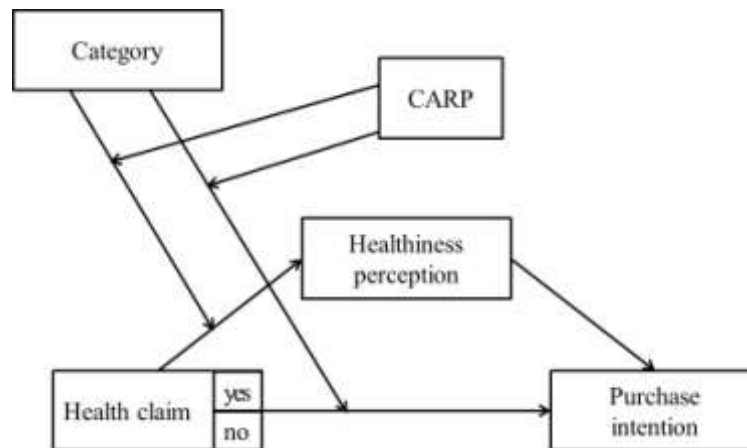
Fifty-seven percent of study participants were female, all income levels were present. Forty percent of study participants were above the age of 30. All US states were present in the sample with most participants from California. Half of the participants hold a Bachelor or Master degree. We assessed if muesli is perceived healthier than ice cream ( $M_{\text{muesli}} = 5.68$  vs.  $M_{\text{ice cream}} = 3.56$ ,  $p < .001$ ) and if ice cream is perceived more indulgent than muesli ( $M_{\text{muesli}} = 4.48$  vs.  $M_{\text{ice cream}} = 5.68$ ,  $p < .001$ ). Since the lowest and highest CARPs deviated by 75% from the actual calorie content of the presented product, we also checked credibility of the nutrition information. All CARP conditions were perceived equally credible ( $p = .78$ ).

### **3.4.2 Results**

In order to investigate whether health claims affect purchase intentions via the same path as CARPs (see Study 1) we first checked if claims impact purchase intention via health perceptions depending on category type. We proposed that the effect of health claims would be more elaborate in case of the hedonic product category as the healthy product category is perceived as more healthy per se. In line with this proposition, the indirect effect of the health claim on purchase intention is significant for the hedonic category ( $b = .49$ ,  $SE = .06$ , 95% bootstrap CI: .37 to .62) and non-significant for the healthy category ( $b = .07$ ,  $SE = .07$ , 95% bootstrap CI: -.03 to .16). The effect of the health claim ( $b = .06$ ;  $p = .53$ ) and the interaction of health claim and CARP on healthiness perceptions are non-significant ( $b = -.04$ ,  $p = .82$ ). Healthiness perception impacts, however positively, purchase intentions significantly ( $b = .68$ ,  $p < .001$ ).

It was our primary goal of Study 2 to find if CARPs can unveil the health halo of health claims. Next, we introduced the 7-point CARP metric to our model. The moderated mediation analysis (see figure 6) reveals that the health claim interacts with CARP and yields a direct positive effect on purchase intentions ( $b = .77, p = .03$ ). In order to gain greater insight, we consider the results of the spotlight analysis that reveals that, as predicted, for the hedonic product category the presence of the health claim indirectly increases purchase intentions by .50 in case of a low CARP (one standard deviation below the mean) ( $b = .50, SE = .10, 95\% \text{ bootstrap CI: } .32 \text{ to } .71$ ). Yet, the presence of a health claim directly decreases purchase intentions by -.55 in the hedonic category ( $b = -.55, p = .02$ ). Thus, the interaction of the presence of the health claim and a contradictory CARP is twofold in the hedonic category. The indirect and direct effects are opposing.

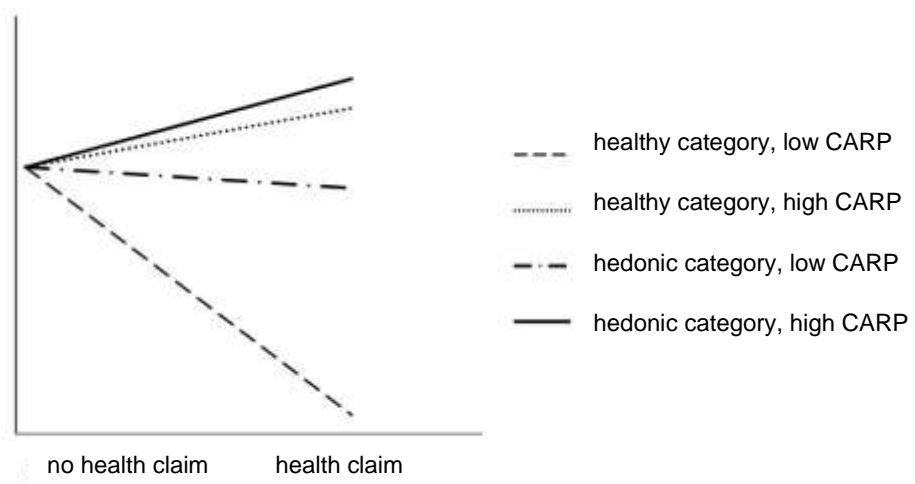
**Figure 6: Moderated Mediation Model of Health Claim on Purchase Intentions**



In the healthy product category the presence of the health claim decreases purchase intention in case of a low CARP ( $b = -.64, p = .01$ ), while the low CARP's indirect influence is non-significant ( $b = .05, 95\% \text{ bootstrap CI: } -.12 \text{ to } .23$ ) (see figure 7). Thus,

conflicting information represented by health claim presence and low CARP is punished by consumers. When CARP is low the indirect effect leads to an increase of purchase intentions while the direct effect leads to a decrease of purchase intentions. Overall the effect is negative. That applies to both categories. When CARP is high it yields a positive effect on purchase intention and interacts positively with health claim (see figure 7). H4 is supported.

**Figure 7: Conditional Effects of Health Claim on Purchase Intentions by Category and CARPs**



### 3.4.3 Discussion

In our second study, we extend previous literature that found that health claims impact healthiness perception (e.g. Ford et al. 1996; Garretson and Burton 2000; Kozup, Creyer, and Burton 2003), by showing that the positive effect of health claims on healthiness perception is not existing but for hedonic categories. Moreover, our findings replicate findings of previous studies that showed that health claims lead to increased purchase intention (Kiesel and Villas-Boas 2013) by decreased consumption guilt. Moreover, our results are in line with Garretson and Burton (2000) in demonstrating

that nutrition information and purchase intention did not interact. Most importantly, in Study 2 we examined if the health halo effect generalizes to conditions where the CARP signals conflicting information. In line with our contention, the halo effect disappeared when the CARP was low. This is an important addition to existing research as consumers have been shown to limit their search to the health claim if present (Kiesel and Villas-Boas 2013; Williams 2005). Howlett et al. (2009) showed that health halo can be weakened after comparison of actual calorie content and expectation on the calories content. Expectations however are subject to bias (Wansink and Chandon 2006). Our findings go beyond as they replace expectation by an unambiguous anchor.

In addition, it becomes apparent that “low CARP” corresponds with the -50 and -75% deviations from the product value, while there was no effect in the -25% condition. This indicates that consumers tend to assimilate smaller CARP deviations. This effect can be explained by a negative disconfirmation of the calorie estimation for low CARPs.

### **3.5 General Discussion**

We examined in two studies the effect of Category Average Reference Points on purchase intentions. In Study 1 we found that the effect of CARPs on purchase intention is fully mediated by healthiness perceptions. The positive effect of CARPs is stronger in the hedonic product category. Moreover, we showed that the moderating role of self-control is twofold. Low CARP can help consumers with high self-control to consume less of high-caloric healthy food; yet, high CARP can lead to positive disconfirmation of the products caloric content. The same applies to the hedonic category for consumers with low self-control. They tend to over-consume on hedonic products. The high CARP leads to positive disconfirmation of the product caloric

content and, thus, purchase intentions increases. In study 2 we found that CARP can help reveal health halos caused by health claims on healthy and hedonic product types.

This article contributes to research showing that CARPs can impact purchase intentions. Previous research indicated that CARP impact healthiness perceptions (Viswanathan 1994; Viswanathan and Hastak 2002). Consistent with that idea we show that CARPs effect on purchase intention is mediated by healthiness perceptions. Research has shown that differences in self-control can lead to overconsumption of hedonic or healthy product types (Redden and Haws 2013, Smith 2004) due to biased calorie estimation. In our research we demonstrate that CARPs seem to correct biased calorie estimations. Health claims have also been demonstrated to bias calorie estimation and healthiness perception (Chandon and Wansink 2007). In our research we contribute by finding that the health halo effect can be limited by CARPs. This is important as previous studies found that consumers limit their search to health claims if present (Kiesel and Villas-Boas 2013).

Our findings might be of interest for further research in nutrition labeling as we provided insight concerning the process initiated by Category Average Reference Points. Our results offer insight in the moderating role of category differences, as well as consumer characteristics such as self-control. Category Average Reference Points represent a powerful means to nudge consumers towards the choice of more healthy products. CARPs could be used as additional front of pack label or as shelf tag. But policy-makers should be very careful in specifying categories. Our results show that, apart from the ability to reveal betrayal with health claims, high Category Average Reference Points can lead to justification of the consumption of unfavorable food both for rather healthy or hedonic product types. Mis-specification of categories could lead to high CARPs and, thus, overconsumption of bad nutrients. Another issue in using Category Average Reference Points is that food manufacturers could increase category



specific averages by introducing products high in bad nutrient. More easily, food manufacturers could communicate self-invented overly high average category points using multiple channels in order to impact consumers to choose “worse” products. We strongly encourage policy makers to prohibit food makers to communicate such information.

Further research is needed to better explain the role of CARPs’ distance from the actual calorie content as we found that CARPs with small deviation are assimilated the actual calorie content. Additionally, it might be interesting to explore further boundary conditions of CARPs and claims by introducing different types of claims. Another interesting research avenue might be to explore the role of health and hedonic goal fulfillment.

**Table 2: Impact of Category Average Reference Points and Health Claims on Purchase Intentions.**

Study 1a																															
Healthiness perception (HP)	Purchase intention effect	Direct effect	Indirect effect	Study 1b																											
				Purchase intention				Cond. direct effect				Cond. indirect effect																			
CARP	HP	CARP	CARP	CARP				CARP																							
				Category	Health claim * Category	HP	Health claim * HP	Category	Health claim * Category	Healthiness perception	Health claim * Healthiness perception	Category	Health claim * Category	Healthiness perception	Health claim * Healthiness perception																
.473***	.269***	-.131	-.131	.127*	.24	.62***	-.10	2.12***	-.30	-.10	-.40	.18*	.33*																		
Study 1c																															
Purchase intention												Cond. direct effect										Cond. indirect effect									
Purchase intention												CARP										CARP									
CARP	Category	CARP * Category	Self-control	CARP * Self-control	Category	Healthiness perception	CARP * Healthiness perception	Self-control	CARP * Self-control	Category	CARP * Category	Healthy category		Hedonic category		Healthy category		Hedonic category		Healthy category		Hedonic category									
												low self-control	high self-control	low self-control	high self-control	low self-control	high self-control	low self-control	high self-control	low self-control	high self-control	low self-control	high self-control								
-.08	-3.32***	1.46**	-.04	.10	.28**	-.32**	.61***	.20	2.84***	.00	.13	-.08	-.19	-.07	.01	-.22	-.15	-.58	.10	.29*	.52*	.13									
Study 2a																															
Purchase Intention												Cond. direct effect										Cond. indirect effect									
Purchase Intention												Health claim										Health claim									
Health Claim	Category	Health claim * Category	HP	Health claim * HP	Category	Health claim * Category	Healthiness perception	Health claim * Healthiness perception	Hedonic category	Health claim * Hedonic category	Category	Health claim * Category	Healthy category		Hedonic category		Healthy category		Hedonic category		Healthy category		Hedonic category								
													low self-control	high self-control	low self-control	high self-control	low self-control	high self-control	low self-control	high self-control	low self-control	high self-control	low self-control	high self-control							
.10	-2.55***	.62***	.68***	-.11	1.72*	-.19	-.11	-.30*	.07	.49*																					
Study 2b																															
Purchase intention												Cond. direct effect										Cond. indirect effect									
Purchase intention												Health claim										Health claim									
Health Claim	Category	Health claim * Category	CARP	Health claim * CARP	Category	Health claim * Category	Healthiness perception	Health claim * Healthiness perception	Hedonic category	Health claim * Hedonic category	Category	Health claim * Category	Healthy category		Hedonic category		Healthy category		Hedonic category		Healthy category		Hedonic category								
													low self-control	high self-control	low self-control	high self-control	low self-control	high self-control	low self-control	high self-control	low self-control	high self-control	low self-control	high self-control							
-.06	-2.53***	.64***	.022*	-.04	.32*	.06	.68***	-.24	1.67***	-.14	-.42*	.77***	.29	-.45	-.64*	.12	-.55*	-.23	.05	.02	.50*	.44									

\*p<.10  
\*\*p<.05  
\*\*\*p<.01

This page is intentionally left blank

## **4 Of Vice and Men: The Impact of References and Licenses to Sin on Food Preferences**

This paper by Jutta Schuch, Steffen Jahn, Till Dannewald and Yasemin Boztuğ has been invited for revision (second round) by the Journal of Consumer Research (Journal 2: A+).

A previous version of this research has been published as:

Schuch, J., Jahn, S., Dannewald, T., Boztuğ, Y.: „Understanding Nutrition Information: How Reference Points Affect Healthful Food Choice”, *Proceedings of the AMA 2014 Summer Marketing Educators' Conference*. San Francisco, USA.

## 4.1 Introduction

Food items are generally categorized as vice or virtues (Chernev and Gal 2010; Wertenbroch 1998; 1999). Some product types or categories are seen as inherently virtuous, such as fruit salad (Mishra and Mishra 2011) or yogurt (Khan and Dhar 2007). By contrast, chocolate cake (Belei et al. 2012; Chernev and Gal 2010; Mishra and Mishra 2011), ice cream (Wertenbroch 1999), tobacco (Ma, Ailawadi, and Grewal 2013), or alcohol (Kivetz and Simonson 2002) are product types typically perceived as indulgent vices. This usual take on vices and virtues, however, is challenged by at least two observations. First, within one product type or category both vices and virtues are possible (Wertenbroch 1998). For example, 100ml of Ben & Jerry's Chocolate Fudge Brownie ice cream contain 210 calories (<http://www.benjerry.co.uk/flavours/gdas>). If you learn that ice cream typically contains 228 calories, the Ben & Jerry's Chocolate Fudge Brownie ice cream appears to be low-caloric and, thus, could be considered a relative virtue. Although ice cream is typically considered a vice, this specific item becomes a virtue depending on available reference information. Second, this reference information can also alter an item's degree of viciousness (and virtuousness). Consider two other Ben & Jerry's ice creams, Caramel Chew Chew and Chunky Monkey, which contain 240 and 288 calories per 100ml, respectively. Compared to the reference information claiming 228 calories as normal, the Chunky Monkey seems more vicious than the Caramel Chew Chew.

While existing literature mainly equals vices and virtuous with specific product types or categories, we contend that consumers respond differently to food items from one category, depending on reference points. Specifically, we argue that choice patterns of ice cream that is framed as a relative virtue versus one that is a relative vice will be similar to those patterns of choices between healthy and indulgent food types. Moreover, we investigate how degree of viciousness affects food choice and

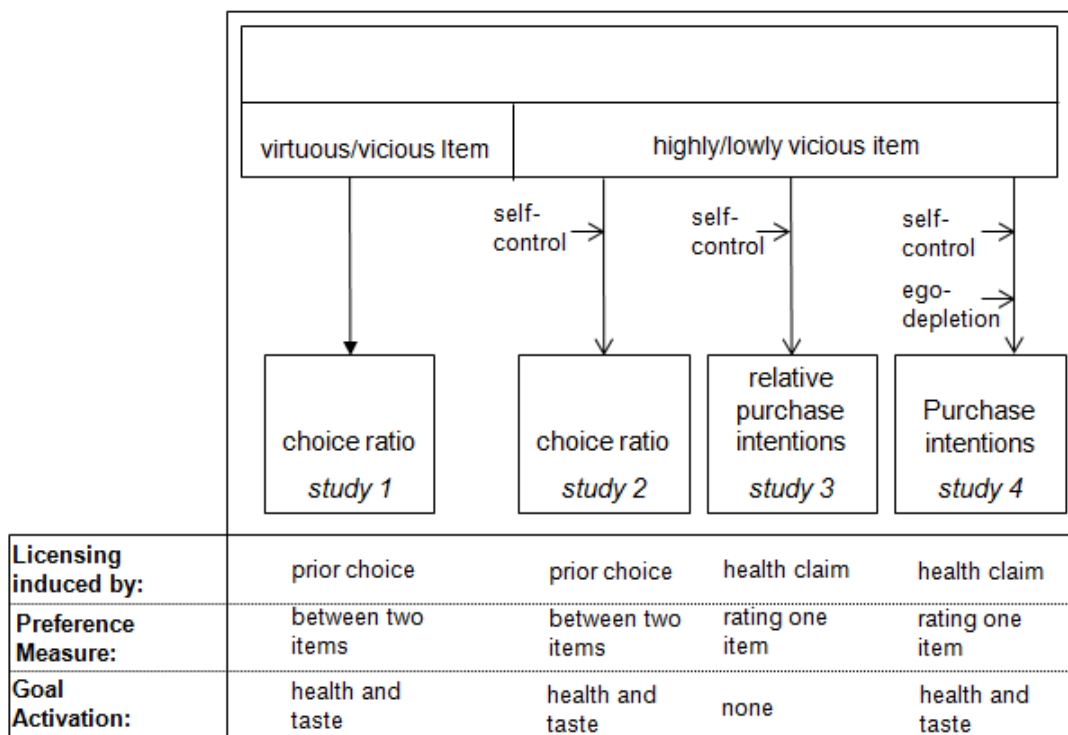
preferences. We draw on licensing theory (Fishbach and Dhar 2005; Khan and Dhar 2006; Wilcox et al. 2009) to predict these patterns.

This article contributes to research on context-dependent decision making that explores cues that lead to indulgent consumption. Specifically, our research contributes to two important areas. First and contrary to previous research that classifies product types into vices and virtues, this article raises the hypothesis that all product types can be seen as vices or virtues depending on a reference point. We illustrate our general idea by examining the choice between products of the same type yet differing concerning the distance of a calorie reference point from the actual calories of the items. Second, this article examines the theoretical preconditions, context effects and underlying mechanisms linking the new concept of relative vices and relative virtues to licensing. Thus, we not only extend knowledge on the concept of vices and virtues but at the same time further investigate licensing effects. We show that disconfirmation of an indulgence goal is necessary to provoke licensing. Further, licensing can be caused by nutrition claims disclosed on the packaging. Moreover, the combination of licensing theory with reference point theory (Krishnamurthy and Prokopec 2010; Tversky and Kahneman 1991) yields novel insights as our perspective on degree of viciousness qualifies some findings of previous studies. Specifically, we will argue and show that reference points that frame food items as highly vicious can reduce the what-the-hell effect (Polivy and Herman 1985) that has been found in previous studies on the licensing effect (Wilcox et al. 2009).

We organize the remainder of this article as follows. A brief review of prior research leads to our predictions. We present four studies to test our hypotheses. Study 1 shows that reference points can make products look like relative vices or virtues. It is further demonstrated that the reference point-framed virtues do not become more attractive through licensing, although they still belong to a "vice category." Study 3 examines two

products with differing degrees of viciousness. We replicate findings of Wilcox et al. (2009) by showing that especially consumers with high self-control fall victim to licensing and thus like the most vicious option better in case of a previously obtained license. Study 3 further qualifies the findings of study 2. We find that if only one option is presented to consumers, they prefer the slightly vicious option instead of the highly vicious item. Notably, the effect also applies to consumers with high self-control. In study 4 we explain the underlying mechanism by introducing ego-depletion to the study. Refer to figure 8 for a graphical display of the conceptual framework.

**Figure 8: Framework of Studies**



## **4.2 Conceptual Framework**

### **4.2.1 Vices, Virtues and the Relation to Reference Points**

Vices have been defined as products that serve short-term goals such as indulgence but infer long-term goals such as health (Wertenbroch 1998). In the food domain, it is often assumed that some products or categories are inherently healthful or unhealthful (Chernev and Gal 2012). This has resulted in a bulk of studies where participants had to choose between, say, chocolate cake or fruit salad (e.g., Mishra and Mishra 2011). Moving beyond this research, Belei and colleagues (2012) study healthful indulgences. Healthful indulgences represent "improved" versions of foods generally perceived as unhealthful and carry a verbal claim or label suggesting that the food is more healthful than conventional versions (Blei et al. 2012). Since such claims typically stress the presence of beneficial attributes or the absence of those detrimental to health, opposite consumption patterns emerged depending on whether the food attributes the claim stressed was of a hedonic or a functional nature (Blei et al. 2012).

Although Wertenbroch (1998) already pointed to the existence of relative vices and relative virtues, existing research is lacking sufficient consideration of this notion. We argue that numerical reference information is a means to differentiate alternative versions within one product type or category. Reference points have rather stable effects on consumption by providing a comparison framework (Bettman, Luce, and Payne 1998; Krishnamurthy and Prokopec 2010). For example, reference points that disclose the average amount of calories in one category can qualify otherwise meaningless nutrition information such as "contains 206 calories." In so doing, a reference point can serve as an anchor that makes a particular product look like a vice or virtue (Chernev and Gal 2010). Of primary interest are versions of inherently unhealthful products, such as ice cream. We contend that those items that perform better than the reference point (e.g., contain fewer calories than the average product from the category) are perceived



as relative virtues. Even more importantly, we expect that consumers respond to such items in a similar manner as they respond to inherently healthful products. In this case, the reference point would affect the general response pattern to items from inherently unhealthful categories.

In addition to merely distinguishing between relative vices and virtues within a category, exemplars might also differ in their degree of viciousness (and virtuousness). This can happen when reference points are below (above) the nutrient values of each alternative. The perspective of degree of viciousness has been neglected by existing research. Yet, reference theory would suggest that the highly vicious option should not be chosen (Okada 2005) unless taste perceptions favor the option with most calories (Belei et al. 2012; Raghunathan et al. 2006). In situations like these, the what-the-hell effect (Polivy and Herman 1985) can occur and foster overconsumption and obesity (Wilcox et al. 2009). We will now discuss those situations where consumers obtain a license to indulge. Moreover, we will link degree of viciousness with this research stream.

#### **4.2.2 Licensing, Eating Goals, and Self-Control**

Consumers often have to choose between relative vices and virtues thus options with immediate benefits (great taste) but delayed cost like bad health (relative vices) and options with immediate cost like bad taste, but delayed benefits like good health (relative virtues). Indulgence and healthiness are some of the most pronounced conflicting goals in food decision making (Chandon and Wansink 2007; Dhar and Simonson 1999; Fishbach, Friedman, and Kruglanski 2003; Kivetz and Simonson 2002; Wertenbroch 1998).

Research suggests that individuals license themselves to indulge in temptations when they have previously acted in line with long-term goals. Thus, when individuals focus on their progress toward an abstract goal, it allows them to temporarily disengage from that goal to pursue tempting alternatives (Fishbach and Dhar 2005; Fishbach and Zhang 2008; Wilcox et al. 2009). The most common way in which individuals perceive goal progress is by actively pursuing the goal. In absence of an indulgence goal there is no need for a license. Thus consumers do not have a reason to pursue that lacking goal e.g. indulgent consumption. Rather, the health goal is highlighted, leading to subsequent healthful choices (Dhar and Simonson 1999).

Based on the preceding discussion, we expect foods from inherently unhealthy categories (e.g., ice cream) to be preferred when a reference point frames them as relative virtues (e.g., low-caloric ice cream), rather than vices (e.g., high-caloric ice cream). This assumption is based on the notion that consumption of relative virtues is more easily justified (Okada 2005). When the situation allows to obtain a license to indulge (e.g., having had healthful food for lunch) the likelihood of choosing the vice (e.g., high-caloric ice cream in the evening) should increase (Khan and Dhar 2006). The choice of vices can lead to the feeling of guilt as indulgent options violate ethical obligations in the western culture (Xu and Schwarz 2009). Thus, consumers need a guilt reducing mechanism, as they find it easier to opt for a vicious option for specific reasons like a graduation (Xu and Schwarz 2009). Guilt reduction is also triggered by the intention or actual virtuous behavior (Khan and Dhar 2006) or even the sheer presence of a virtuous option (Wilcox et al. 2009). These can license the subsequent preference for indulgent options. As health claims on products make consumers think of doing something healthy in the future, **we propose that a health claim can provoke a license to sin.**

Previous research has found that especially consumers with high self-control are prone to vice products in case of licensing (Wilcox et al. 2009). This is because increasing self-control leads to increased feelings of guilt when choosing vice products, as increasing self-control leads to raised awareness of calorie content and thus healthiness of products (Chandon and Wansink 2007; Chernev and Gal 2010; Redden and Haws 2013). Due to higher levels of perceived guilt, self-control leads without license decreasing to preferences for vice products. Thus, in case of licensing the feeling of guilt is suppressed and the preference for vices increases. This effect is amplified by self-control. **Thus, we propose that the absence of licensing leads to decreasing choice probabilities of vice products with increasing self-control.** Stating it differently: decreasing self-control leads to insensibility concerning the degree of viciousness.

The evidence concerning the impact of choice alternatives on food preferences is twofold. Healthy alternatives can lead to calorie reduction (Parker and Lehmann 2014) or to licensing and thus to choice of more indulgent options (Wilcox et al. 2009) as they make consumers think of virtuous behavior and thus pursue indulgence goals. Moreover, it is known that virtuous options from a choice set might lead to licensing by themselves (Wilcox et al. 2009). Against this background we propose that sheer presence of a virtuous or less vicious option in a choice set might lead to different results than the rating of a single item, as—besides an average reference point—a further comparison frame is provided by a choice alternative. Hence, in that case both the lowly and highly vicious product might be assimilated and thus the degree of viciousness might be perceived as smaller. Wilcox et al. (2009) who suggest that individuals underlie the what-the-hell effect (Polivy and Herman 1985) that means that consumers who obtained a license to sin do not only choose an indulgent option but the most indulgent option they can find (what-the-hell).

In case the alternative(s) are withdrawn, the perceived degree of viciousness of the highly vicious product increases as the big distance between reference point and actual calorie level leads to contrasting in the sense of Sherif and Hoveland (1961). We propose that lowly vicious products are preferred over highly vicious products, when no alternative is available. **Thus, we propose that the guilt reducing mechanism of licensing weakens with decreasing viciousness.**

However, it is known that self-control is an important concept in licensing. Studies have found that preferences for healthy foods depend on the degree of ego-depletion (Baumeister 2002). The concept of ego-depletion is narrowly woven with self-control and represents the state of current low self-control. Ego-depletion is damaged by any act of self-control, and that resource is then no longer available to help the person on the subsequent self-control task (Baumeister 2002; Muraven, Baumeister, and Tice 1999). **We propose that ego-depleted consumers are insensitive to licensing, thus prefer highly vicious products (e.g., 75% deviation) as much as lowly vicious products, as their self-control capacities are weakened.**

We test these predictions in five experiments. Participants in all five studies were recruited from a national online subject pool (Amazon Mechanical Turk), and they were paid for their time.

### **4.3 Study 1**

#### **4.3.1 Stimuli and Design**

Study 1 had the goal to find if licensing effects lead to higher-calorie choices. Of particular interest is that previous studies assume that product types are classified as vices or virtues, but there is no scope for vices and virtues within one product category.

In contrast, we predict that reference points qualify products from one category into vices and virtues.

First, respondents had to fulfill the 12 scrambled sentence tasks invented to activate either the taste and health goal. Participants were asked to solve the scrambled sentence tasks, 4 were activating their taste goal, and 4 were activating their health goal and 4 tasks acted as filler tasks. Second, participants were asked to imagine that they were having lunch and could choose from either the healthy or neutral meal options. To choose a dish, participants clicked on that dish and then clicked on a submit button. Within each group respondents were assigned to the healthy or the neutral menu choice condition. In the healthy menu choice condition respondents had the chance to choose between 3 healthy menu options (lean green soup, mixed salad with lemon ice cream, and grilled chicken and steamed Brussels sprouts) or 3 neutral menu options (fish fingers plate, bowl of spaghetti Bolognese, and chicken sandwich) (refer to appendix 4). The choices within the healthy and neutral menu conditions were supposed to give respondents the opportunity to choose freely and thus feel more realistically (e.g., Khan and Dhar 2006). We randomly assigned participants to the (2 goal x 2 menu choice) 4 conditions. Goal dissatisfaction occurred in the situation of a health goal activation and neutral menu choice as well as in the taste goal activation and healthy menu choice condition. As previous virtuous behavior is necessary for licensing (Khan and Dhar 2006), we assume licensing to occur in taste goal/healthy menu choice conditions.

In a second step all participants chose one out of two ice cream brands. Participants were asked to imagine that it was still the same day and they came home at night craving ice cream. They further were asked to picture that two ice cream brands were in their fridges. One product was qualified as vice (actual calories (399) were 75% higher than the category average reference point (228)) or as a virtue (actual calories (206)

were approximately 10% lower than the category average reference point (228)). Then, they indicated which brand they wanted to choose by clicking on the preferred brand.

Two hundred and ninety eight respondents (50.17% females, mean age = 33.2 years) recruited on Amazon Mechanical Turk completed this study.

### **4.3.2 Results**

As surveys ran on Amazon Mechanical Turk provide a rather heterogeneous sample we controlled for socio-demographics (e.g., age, household size, and gender), current dieting, preferences for ice cream and health orientation. The same applies to studies 2 through 4.

### **4.3.3 Discussion**

When choosing between two options from an inherently unhealthful category such as ice cream, a reference point-rendered relative virtue gains more preference over the vice. However, offering a previous opportunity for generating a license and activating the taste goal increases preferences for the vice, relative to activating the health goal. Interestingly, activating the taste goal without generating a license increases the choice rate of the vice. This finding suggests that a highlighting strategy can lead to more overconsumption than a balancing strategy (i.e., licensing). However, preferences for the vice are highest (and even higher than for the relative virtue) when an active health goal conflicts with a prior decision. Comparable to the findings by Belei and colleagues (2012), a what-the-hell effect seems to occur.

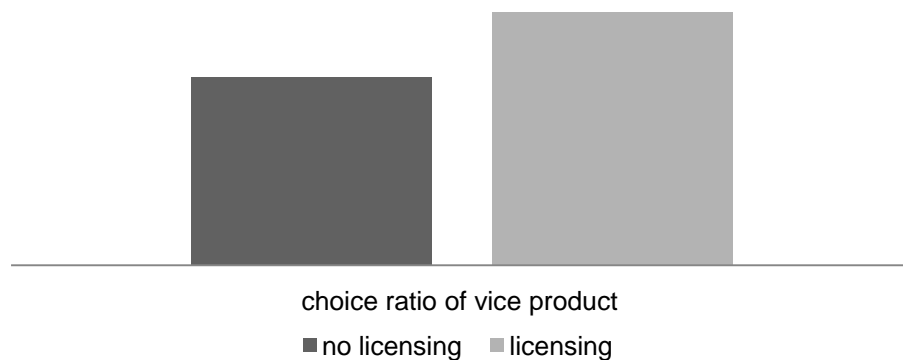
We found that goal dissatisfaction is a necessary precondition for licensing effects. Moreover, we find that licensing increased choice rates of the vice product. We qualify this finding further by showing that goal dissatisfaction leads to licensing effects just in

case of prior virtuous behavior. Finally, our results further indicate that reference points can make products look like vices or virtues.

#### 4.3.4 Results

In case respondents were in the healthy lunch menu choice condition, licensing effect was triggered by goal dissatisfaction of vice goal. As can be seen in figure 9, we find that consumers in the licensing condition (L) chose the vice product more often than in the condition without licensing (NL) ( $CR_{NL} = 32.22\%$ ;  $CR_L = 43.37\%$ ;  $b = .12$ ,  $p < .05$ ).

**Figure 9: Choice Ratio of Vice Product**



#### 4.3.5 Discussion

When choosing between two options from an inherently unhealthful category such as ice cream, a reference point-rendered relative virtue gains more preference over the vice. However, offering a previous opportunity for generation a license increases preferences for the vice. We replicated findings of Wilcox and colleagues (2009) and found that choices of vice products increase in case of prior licensing.

## **4.4 Study 2**

Study 2 was designed to investigate if the choice probability differs depending on the degree of viciousness. We proposed that the lowly vicious product (small distance between actual calorie value and average reference point) are more likely to be chosen than the highly vicious product (big distance between actual calorie value and average reference point). While participants in study 1 had the opportunity to choose from a relative vice or a relative virtue, participants in study 2 choose from two vice products that differ on the degree of viciousness.

### **4.4.1 Stimuli and Design**

As in study 1 we asked to imagine the participants were having lunch and were randomly assigned to the healthy/neutral lunch menu conditions. One factor—healthy vs. neutral lunch menu choice—was manipulated in order to evoke the feeling of a license to sin for respondents in the healthy lunch menu choice condition.

Participants in both conditions were then asked to imagine it was still the same day and came home at night craving ice cream. Participants were confronted with the two ice cream brands which were both calories wise worse (285/399 calories) than the reference point (228 calories), yet one ice cream was relatively more vicious than the other. The highly vicious ice cream stimulus complied with the vice stimulus in study 1 exceeding the reference point by 75% (containing 286 calories), while the lowly vicious ice cream exceeded the reference point by 25%. The choice ratio was captured as dependent variable next to control variables as in the studies before.

After choosing, the participants' self-control was captured using the short self-control scale (13 items) by Tangney, Baumeister, and Boone (2004) (Cronbach's  $\alpha = .90$ ).

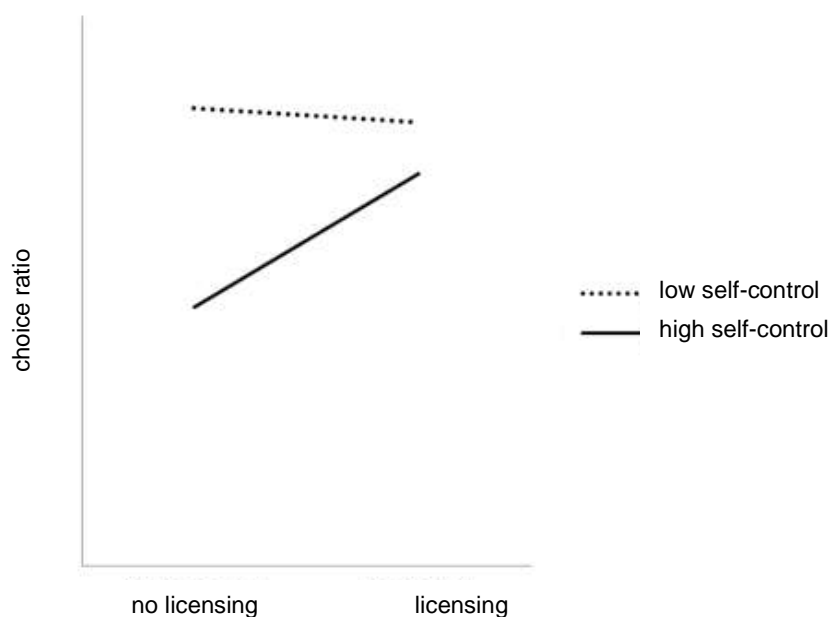


One hundred and twenty two participants (41.8% females, mean age = 32.7 years) recruited on Amazon Mechanical Turk completed the study.

#### 4.4.2 Results

A choice model revealed no significant main effect for self-control or licensing on choice. More importantly, both main effects were qualified by the expected interaction between licensing and self-control. The higher self-control the lower the probability to choose the highly vicious ice cream in the no license to sin condition ( $b = -5.86$ ;  $p < .05$ ). Yet, in the licensing condition increasing self-control does not lead to increase of choice probability of the most vicious product ( $b = -2.91$ ,  $p = .61$ ). Thus, high self-control decreases the choice probability of the highly vicious product in case no license was obtained. Figure 10 displays choice probabilities of the highly vicious product by licensing and self-control (self-control was median split for display.)

**Figure 10: Choice Ratio of Highly Vicious Product**



### **4.4.3 Discussion**

In study 2 we show that vice products with different degrees of viciousness are perceived differently. Thus, the degree of viciousness acts as a part in decision making. In detail, we find that the license to sin leads consumers to like the highly vicious product almost as much as the lowly vicious product (46.34%). Thus, high self-control decreases choices of the highly vicious product in case no license was obtained. We replicate the findings of Wilcox and colleagues (2009) by showing that the license to sin makes foremost consumers with high self-control chose the highly vicious products more often than without license to sin. Yet, we further qualify their findings by adding that consumers with high self-control are not more prone to highly vicious food, but rather more disciplined without license.

This is shown by the fact that participants with high self-control do not choose highly vicious products more intensively than consumers with low self-control when a license is obtained. In fact high self-control consumers' choice ratio of highly vs. lowly vicious products is not different from the choice ratio of consumers with low self-control. Consumers with low self-control are not affected by licensing at all. Their high choice ratio of highly vicious products (50%) is not changing in the licensing condition (48.48%).

Please refer to figure 10 for a graphical display of choice ratios of vicious products by self-control (median split).

### **4.5 Study 3**

The results so far support our theoretical predictions: people with high trait self-control show a greater difference in choice of the most vicious product when an alternative is given. Yet, we posit that by withdrawing the alternative, the lowly vicious product will

be preferred over the highly vicious product. Thus, study 3 was designed to show the effect of the degree of viciousness on the preference concerning a single alternative.

Moreover, we test two further changes in our design. First, the effect of altering average reference points in opposite to changing calorie levels is investigated. Second, we use health claims as licensing tool. We also change choice and use purchase intention as dependent variable instead.

#### **4.5.1 Stimuli and Design**

We conducted a 2 (licensing: health claim presence vs. health claim absence) x 3 (average reference point distance: 0%/25%/75% distance from actual calories) design. In contrary to the first three studies, licensing was manipulated via a health claim on the product. Thus, participants were assigned to either ice cream with/without health claim.

Average reference points disclosed on ice cream packages were manipulated (285, 213, 72 calories). In contrary to studies 1 through 3, we asked participants to look at only one stimulus and read the information carefully. Moreover, in the current study it is the average reference point that creates degree of viciousness by altering from fixed actual calories by 25% or 75%. Refer to appendix 5 for an exemplary stimulus.

Following the display of one product with average reference point, participants were lead on the next page and asked to imagine how they would feel if they had eaten that product and to rate it on a 7-point scale (content, encouraged, soothed, delighted, happy, healthy, guilty, fat, powerless, indulged, relieved, satiated, gluttoned, attractive, healthy). Moreover, they were asked to indicate if the product information suggests that the product is healthy, fattening, or tasty. This was meant to make respondents further reflect on the information (health claim and nutrition information) they had just obtained. Then, purchase intention was captured via two separate items. The dependent

variable was calculated as the difference of the mean purchase intention rating of the stimulus -25% or -75% in the licensing or control group and the respective 0% difference group. This was done in order to extract the impact of the distance from the actual calorie value in contrast to the impact of the presence or absence of the health claim on purchase intention.

Self-control was assessed with three items (Cronbach's  $\alpha = .72$ ) using the best items from the 13 item scale of Tangney and colleagues (2004) we measured in study 3. Then they were asked to rate if they would buy the product on one of their next shopping trips (1 = not probable; 9 = very probable and 1 = very unlikely = 1; very likely = 9; Cronbach's  $\alpha = .96$ ).

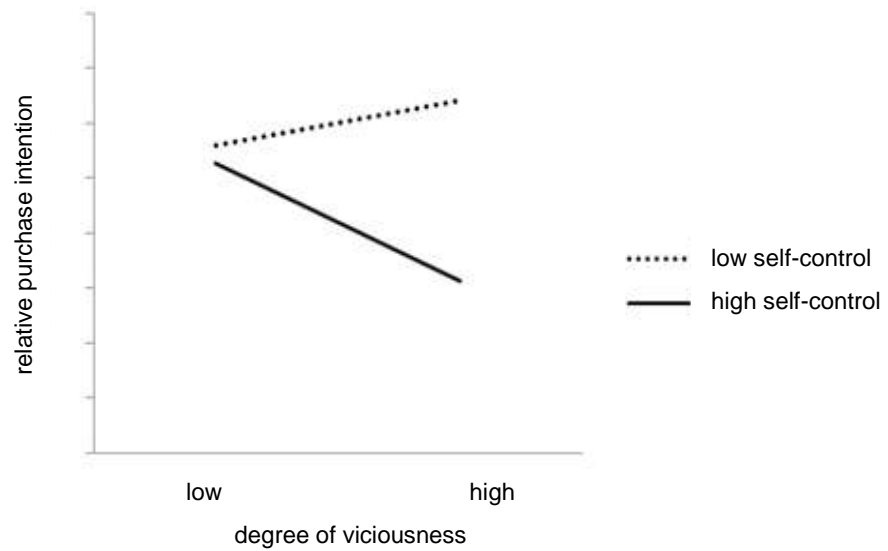
One hundred and forty three participants (56.64 % females, mean age= 31.9 years) recruited on Amazon Mechanical Turk completed the study.

#### **4.5.2 Results**

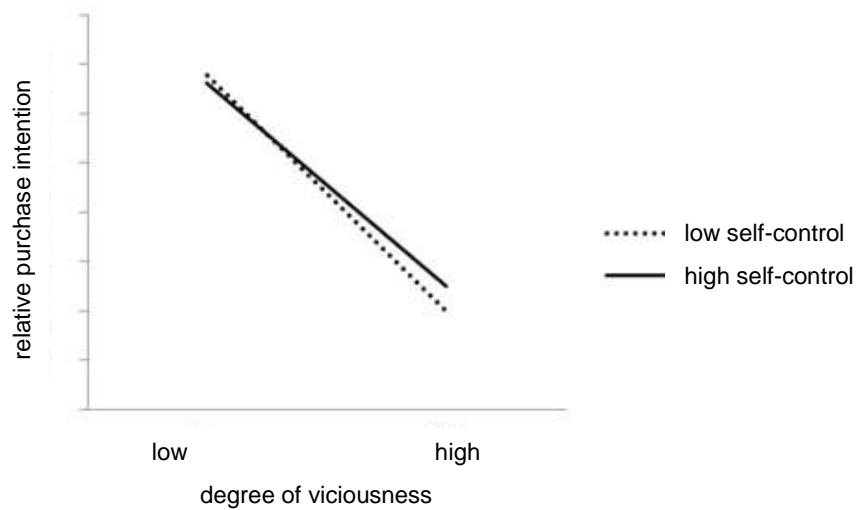
A regression model reveals a significant main effect for degree of viciousness ( $b = 3.004$ ;  $p < .01$ ), while licensing ( $b = 1.021$ ;  $p = .22$ ) and self-control ( $b = -.113$ ,  $p = .61$ ) did not directly affect relative purchase intentions. More importantly, the direct effect of degree of viciousness is qualified by a significant interaction between degree of viciousness and licensing ( $b = -8.299$ ,  $p < .001$ ) and between degree of viciousness and self-control ( $b = -.979$ ,  $p < .001$ ). The three-way interaction between degree of viciousness, licensing and self-control is also significant ( $b = 1.206$ ,  $p < .01$ ). A spotlight analysis reveals that in absence of a health claim low self-control consumers prefer the most indulgent ice cream, while high self-control consumers reject this option (see figure 11). When a health claim is present, high self-control consumers have higher relative purchase intentions toward the highly vicious product than low self-control

consumers (refer to figure 12). At the same time, purchase intentions are much lower for the highly vicious product than for the less vicious option, independent of self-control.

**Figure 11: Relative Purchase Intention by Degree of Viciousness in Non-Licensing Condition**



**Figure 12: Relative Purchase Intention by Degree of Viciousness in Licensing Condition**



### **4.5.3 Discussion**

First, these results show that health claims can stimulate licensing. Specifically, relative purchase intentions for (lowly) vicious products increased when a health claim was present at the packaging. Second, self-control did not directly affect purchase intentions and did not interact with the licensing condition either. That is, unlike Wilcox and colleagues (2009) we found evidence of licensing effects even for consumers with low self-control. Even more important, we show that licensing does not always lead to what-the-hell behavior. While we found similar effects like Wilcox and colleagues for some consumers (ironically, this also applies to low self-control people), in the licensing condition the highly vicious products were always less desirable than the slightly vicious option. Apparently the reference point-induced degree of viciousness is able to both increase and decrease attractiveness of generally vicious products. When products are slightly vicious, health goal fulfillment boosts intentions to buy these products (rather than products with fewer calories). However, larger deviations from the reference point (i.e., highly vicious products) can easily be identified as such. As a consequence, justification is harder, feelings of guilt increase and purchase intentions drop.

### **4.6 Study 4**

The previous four studies demonstrated in different contexts that viciousness and licensing affect consumer preferences. We theorized in 6.2.2 that these effects would emerge as a result of differences in self-control. Specifically, when a product is highly vicious consumers with high self-control pay more attention and prefer the highly vicious product less.

We now test our explanation by directly manipulating the proposed ego-depletion mediator using the procedures recommended by Baumeister and colleagues (1998). We propose that both—consumers with generally high and low self-control—do not show decreased purchase intention for the highly vicious product, when they are ego-depleted. Thus, they prefer both products the same. Moreover, we propose increasing self-control leads to diminished purchase intention of the highly vicious product in the control condition.

#### **4.6.1 Stimuli and Design**

The study employed a 2 (viciousness: lowly vs. highly vicious) x 2 (ego-depletion: presence vs. absence) between-subjects design with trait self-control as a measured factor.

Participants first had to solve the ego-depletion task (a stimulus detection task), which was described as a psycholinguistic task. It consisted of counting every word that contained the letter “a” in a one page long text. Respondents in the ego-depletion situation proceeded on the next side and had to either solve the same task again (no ego-depletion) or to count words following very complicated rules (ego-depletion). This task was adopted from previous research to manipulate ego-depletion (Baumeister et al. 1998; Tice et al. 2007; Wheeler, Briñol, and Hermann 2007).

Purchase intention was measured as in study 3 using two items (probable/likely) (Cronbach’s  $\alpha = .95$ ). Then, all participants were lead to a page containing the ice cream stimulus that differed on the degree of viciousness. The actual product was pretended to contain 285 calories per serving of one cup, while the given reference point differed either by -75% (72 calories for the highly vicious product) or -25% (213 calories) for the lowly vicious product. Then respondents rated their purchase intention.

Three hundred and ninety six respondents (female: 60.71%, mean age: 35.3 years) participated via Amazon Mechanical Turk in our study.

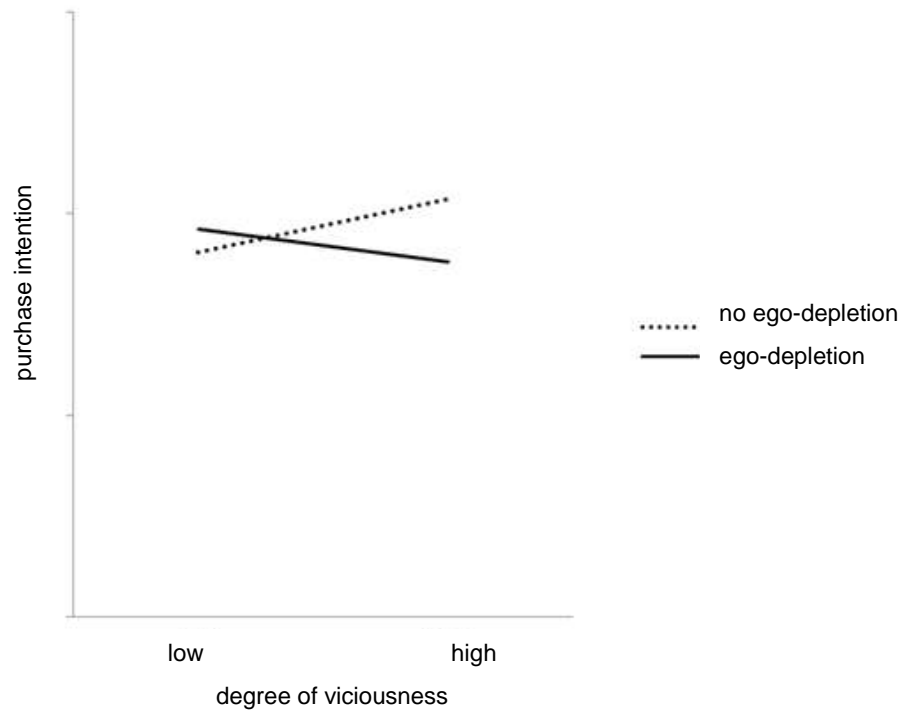
#### **4.6.2 Results**

A linear model revealed a significant main effect for self-control ( $b = .242$ ;  $p < .05$ ) but not for ego-depletion ( $b = -.348$ ,  $p = .28$ ) and for degree of viciousness ( $b = .007$ ;  $p < .67$ ) on purchase intentions. Thus, increasing self-control increases purchase intentions in general.

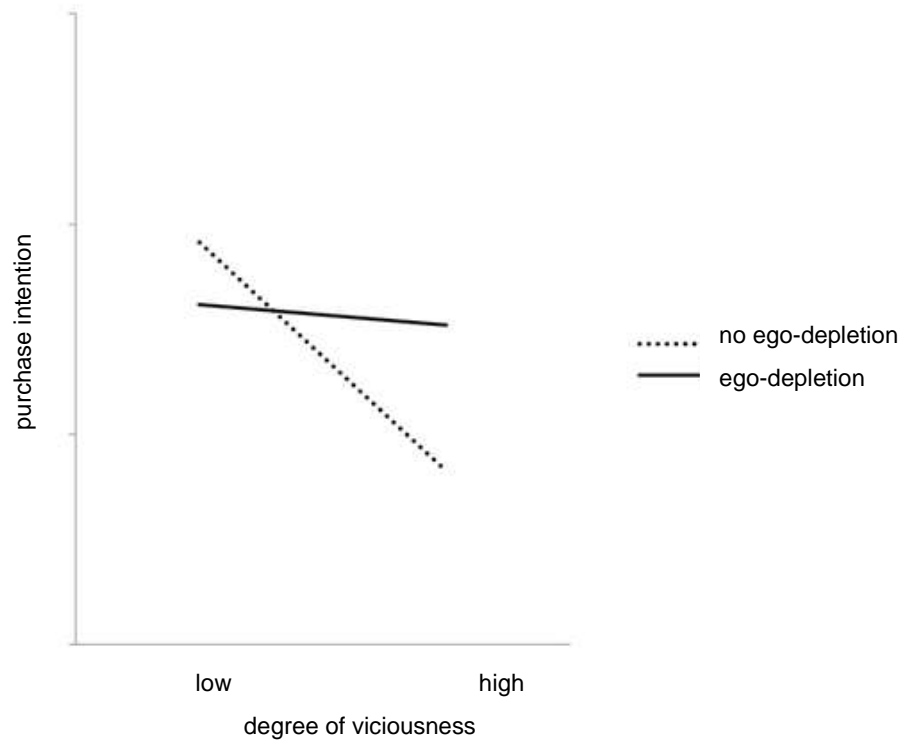
Even more importantly, the main effects were qualified by the expected interaction of ego-depletion and degree of viciousness ( $b = .029$ ;  $p < .08$ ). Thus, increasing degree of viciousness leads to increasing purchase intentions in case of ego-depletion. Moreover, the interaction of degree of viciousness, self-control and ego-depletion is not significant ( $b = .005$ ;  $p = .16$ ). Bigger degree of viciousness does not lead to different purchase intentions in the ego-depletion situation. Thus, in the ego-depletion condition, self-control and distance of the reference point do not play a role. This is what we proposed.



**Figure 13: Purchase Intention of Low Self-Control Consumers by Degree of Viciousness and Ego-Depletion**



**Figure 14: Purchase Intention of High Self-Control Consumers by Degree of Viciousness and Ego-Depletion**



### **4.6.3 Discussion**

Thus, in case of ego-depletion respondents reference points and self-control did not make any difference concerning purchase intentions, while in the control-group respondents had lower purchase intentions the higher the self-control and the bigger the degree of viciousness was. These results show that ego-depletion confiscates the effect of degree of viciousness. We median split self-control in figures 13 and 14 for better visibility and see that in the control condition (no ego-depletion) the bigger the degree of viciousness the smaller purchase intentions for consumers with high self-control. This replicates our previous finding. The decreasing effect of high self-control is yet confiscated by ego-depletion as this temporarily lowers self-control. Purchase intentions of consumers with high self-control are overall a little lower than for consumers with low self-control. Yet, self-control is not playing a role when the temporary self-control is diminished by the ego-depletion task.

## **4.7 General discussion**

### **4.7.1 Summary of Findings and Contributions**

Licensing is often thought to increase preferences for vice—often most vicious—products. Past work has typically focused on products that are categorized as vices or virtues. We focus instead on vices and virtues in one category and even more specifically different degrees of viciousness in one category. Therefore, our research extols the potential of reference points for the perception of vices/virtues and specifically the degree of viciousness. We replicated findings of previous research, yet extended the findings by adding context effects.

We build on past research that offers numerous explanations for why people perceive products as vices and virtues and why they experience licensing effects. These

mechanisms have all furthered our understanding of the various drivers of indulgent consumptions, and we add to these perspectives by carefully examining the impact of reference information on the perception of the degree of viciousness and its impact on licensing.

Our research provides several important contributions to the literature. First, we find that within categories products can be perceived as vices and virtues and more specifically consumers' perception of products' viciousness differs depending on reference points. Second, we add to context specific effects as we show that the perceived degree of viciousness can prevent what-the-hell-behavior. Finally, we provide theoretical contributions to understanding the overall process, including the role of self-control and ego-depletion.

Our studies establish an empirical relationship between degree of viciousness and consumer preferences under licensing. Interestingly, the nature of this relationship can be interpreted in two ways: Remarkably, consumer's preferences of highly vicious products increase under licensing when a choice set is given, while preferences of the highly vicious product decrease in a single alternative condition. This is caused by higher perceived viciousness in case only one alternative is presented.

#### **4.7.2 Limitations and Future Research Directions**

Our studies were not without limitations. Moreover, though the majority of propositions found support, some unexpected results occurred that may point to interesting opportunities for future research. Overall, our present research speaks out to the great potential for the use of reference points to limit preferences for vicious food. Such reference points could obviously be of great benefit to consumers with high self-control as our findings suggest that the degree of viciousness impacts food preferences.

Future research should test how our effects generalize along several dimensions. For example, if a food category is perceived as healthy (e.g., muesli or smoothies). Further exploration of boundaries may be enlightening. Moreover, the perceived degree of viciousness should be examined in greater detail. Research should focus on contexts in which the perception of the degree of viciousness is biased.

A further limitation is that we only used one health claim type in our studies 4 and 5. Introducing different types of claims (Lähteenmäki et al. 2010), such as “high in antioxidants,” is seen as an important extension of our research. We assume that the general mechanism underlying the interaction of category average reference points and health claims does not change when health claims get more specific. However, aside from health claims, hedonic claims such as “low fat” might lead to different results (Belei et al. 2012).

Also, the amount of time people took for their decision might have implications for the licensing effect. It can be argued that thinking about the degree of viciousness makes choices less biased. Future research needs to examine this issue in further depth.

Concluding, the results of our research indicate that nutrition education programs have been effective in making salient the negative consequences of bad nutrients. This means that consumers do not prefer the tastier-but-less-healthy food per se. However, the marketplace is replete with deceptive offerings and situations where consumers have difficulties to monitor their eating behaviors. Our findings corroborate existing research results that licensing leads to what-the-hell-behavior. This means that policy regulation is needed to support people in their constant efforts to eat in a more healthy way. One tool is communicating a category average reference point regarding one or more key nutrients. It is easily implemented and, of equal importance, easily and consistently understood by consumers.

This page is intentionally left blank.

## **5 How and When Abstract Goals and External Reference Points Interact in Food Decision Making**

This paper by Jutta Schuch and Yasemin Boztuğ is still in working paper status.

A previous version of this paper has been published as:

Schuch, J., Dannewald, T., Boztuğ, Y.: “The impact of framed reference points, source credibility and nutrition involvement on attribute utility and importance”, *Proceedings of the European Marketing Association Conference 2013 (EMAC)*, 42.

## 5.1 Introduction

Imagine Jill and Jane shop cereals. Jill is looking after her figure, Jane has a sweet tooth. Goal related theories propose that their food preferences are different as they are driven by their goals (Bagozzi and Dholakia 1999; Elliot and Freyer 2008; Fishbach and Dhar 2005). Thus, given the two alternatives, we assume that Jill will choose a product with rather low sugar content as that product helps her best pursuing her dieting goal, while Jane might choose a higher caloric (but more tasty) product (Raghunathan, Naylor, and Hoyer 2006) that helps pursuing her indulgence goal.

Further imagine that Jill and Jane find two products, one of which contains 100 calories per serving, while the other contains 150 calories per serving. Moreover, they learn that the average cereal product contains 120 calories. Research proposes that the disclosure of that nutrition reference information stimulates healthier choices (Barone et al. 1996) as consumers tend to choose options that are easier to justify (Okada 2005). Thus, the reference information makes the 100-calorie option look like a relative virtue which makes it easier to justify (Werthenbroch 1998). Thus, Jill but also Jane should go for that product.

As the hypothetical scenarios show, goal theories and reference-dependent preference theory (Tversky and Kahneman 1991) do not always align. A question arising is whether the disclosure of the reference information has the same consequence for indulgence-seeking Jane as it has for weight-watching Jill. A related question concerns the mechanism underlying the interaction of goals and reference points as well as its impact on food choice. This paper seeks to address these questions.

To date, research has merely focused on goals as reference points (Heath, Larrick, and Wu 1999). The impact of reference points on consumers with different goals has received less attention. Based on an experiment that combines choice data and survey

information, this study investigates the impact of reference points on groups of consumers with different consumption goals. In so doing, we are able to show how goals and reference points interact and jointly impact preferences.

In investigating the interaction of goals and reference points, this paper makes several key contributions. First, it offers a fruitful combination of loosely connected literature streams on consumer decision making. Moreover, the combination of reference points and goal pursuit and their application in the food context allows new perspectives on the study of individual differences in food choice. In contrast to previous research which proposed that reference points foster healthier food preferences (e.g., Balcombe 2010; Burton, Howlett, and Tangari 2009; Hassan, Shiu, and Michaelidou 2010), results of this research suggest boundary conditions of that effect.

The remainder of this paper is organized as follows. In the next section, the theoretical background is briefly explained and propositions are developed concerning the impact of external reference points on preferences, contingent on individual goal pursuit. Next, a detailed overview of the enhanced experimental design applied in the data gathering process is provided. After presenting the results of the statistical analyses the paper concludes with a discussion of the findings and a provision of directions for public policy and future research.

## **5.2 Conceptual Framework**

### **5.2.1 Preferences and Reference Points**

Consumers' preferences are represented by their individual value functions (van Ittersum and Pennings 2012). According to the reference-dependent model (Tversky and Kahneman 1991), value functions may be shifted by reference points. In this vein,



reference points can affect the preference for product attribute levels, choice and consumption (van Ittersum and Pennings 2012; Masiero and Hensher 2011). The effect depends on the provision of a comparison framework and the subsequent framing as loss or gain (Krishnamurthy and Prokopec 2010; Tversky and Kahneman 1991; van Ittersum et al. 2005).

In the food domain, perceptions of losses or gains can induce feelings of guilt or justification (Okada 2005). Accordingly, the goal of providing nutritional information (e.g., on food packages) was to help consumers to make healthful food choices by stimulating healthy food intake (which is easily justified) and reducing high-caloric food (Block and Peracchio 2006). Specifically, nutrition labels display reference points, such as Percentage Daily Values (e.g., Ippolito and Mathios 1993), traffic lights (e.g., Koenigstorfer, Groeppel-Klein, and Kamm 2014) or category average reference points (Viswanathan 1994). The various reference points qualify otherwise meaningless nutrition information such as “contains 460 calories” (Viswanathan 1994) and thereby induce justification processes or feelings of guilt.

### **5.2.2 Preferences and Goal Pursuit**

While preferences are greatly shaped by reference points, there is an emerging stream of literature pointing to the role goals play in preference construction (Bettman, Luce, and Payne 1998; Fishbach and Dhar 2005; Chernev 2004; Laran and Janiszewski 2009; Lee and Ariely 2006; Novemsky and Dhar 2005; van Osselaer and Janiszewski 2012; Zhang, Fishbach, and Dhar 2007). Goals are conceptualized as mental images (Ramanathan and Menon 2006) of desirable outcomes toward which consumers direct their actions (Aarts et al. 2005; Bagozzi and Dholakia 1999).

In their review of food decision making, Bublitz, Peracchio, and Block (2010) list three types of abstract eating goals: functional, symbolic, and hedonic. Functional goal pursuit means balancing one's diet, symbolic goal pursuit stands for the goal of being part of a group by fulfilling norms like being skinny, while hedonic goal pursuit means aiming for indulgence (Bublitz, Peracchio, and Block 2010). These types of goals have been shown to affect preferences for healthy, nutritious or tasty food (Belei et al. 2012; Beruchashvili, Moio, and Heisley 2014; Dhar and Simonson 1999; Finkelstein and Fishbach 2010; Fishbach, Friedman, and Kruglanski 2003; Papies and Hamstra 2010). The value functions representing those preferences (Chernev 2004) are commonly strictly increasing or falling (characterizing, for example, preferences for alternatives with either highest or lowest calories). In addition, consumers might also prefer a specific attribute level that is not the lowest or highest one obtainable resulting in a single-peaked value function.

### **5.2.3 The Interaction of Reference Points and Goal Pursuit**

In spite of the relevance of both reference points and goals for preference construction, research is only beginning to explore their relationship. For example, it has been shown that goals can serve as reference points when they are specific (Heath, Larrick, and Wu 1999). That is, the same outcome (e.g., doing 35 sit-ups) can be experienced differently by two persons who had the goal to do 31 (person A) versus 39 (person B) sit-ups (Heath, Larrick, and Wu 1999). Likewise, a person with the specific health goal of eating only food that contains less than 10% sugar would set 10 grams sugar per 100 grams as a reference point to assist choosing among food options.

It has to be noted, though, that people typically rather have abstract than specific eating goals (Bublitz, Peracchio, and Block 2010). Such abstract goals only refer to eating

healthy, low-caloric, or tasty food in general. A consequence of pursuing abstract goals is they cannot serve as reference points anymore. At the same time, abstract goals still animate general goal-directed behavior (van Osselaer and Janiszewski 2012). This implies that there may be a different relationship between reference points and goal pursuit than has been subject to existing research. We elaborate on this relationship next.

One interpretation of the reference-dependent model is that people react relatively consistently to deviations from reference points (if any, individual differences are a consequence of personal risk tolerance; Kahneman and Tversky 1979). For example, consumers' preferences toward a food alternative that is tastier but less healthy should be low, relative to the current option. The reason is that the alternative option implies a gain in taste, but also a loss in health (Dhar and Simonson 1999). Since losses loom larger than gains (Kahneman and Tversky 1979), perceptions of loss overrule the perceived gain (Dhar and Simonson 1999).

When considering goals, however, the general principle of collapsing losses and gains does not apply anymore. For example, pursuing the hedonic goal means that the gain in taste may be more relevant than the loss in health. In this situation preferences for the less healthy (but tastier) alternative may increase. Thus, we argue that preference heterogeneity is also greatly determined by (abstract) goal pursuit, even when reference points are present.

More interesting than the notion that consumers might react differently to deviances from reference points depending on their goals is, how reference points affect preferences among consumers who share an eating goal. For example, we lack knowledge whether consumers with a hedonic goal adjust their preferences when reference information is presented to the same degree as do consumers with a functional or symbolic goal. The next section explores this issue in more detail.

#### **5.2.4 Propositions Regarding the Interaction of Reference Points and Goal Pursuit**

Starting from the assertion that abstract goals frame the slopes of individual value functions and may interact with reference points, we investigate how consumers with different eating goals react to reference point disclosure. We limit our discussion to reference points that disclose a specific nutrient value (e.g., sugar level) as either ideal or typical in a category. We also focus on so-called bad nutrients that affect both taste and weight. As mentioned, reference points are assumed to both increase favorability of low nutrient levels (healthy food gains preference) as well as increase aversion towards high nutrient levels (unhealthy food loses preference). In contrast, we argue that depending on the shape of an individual's value function consumer responses can lean more towards the favorability effect, aversion effect, or both.

When consumers pursue a symbolic eating goal (being skinny or losing weight), reference point disclosure makes it easier to identify products that are in the way of reaching this goal (e.g., products with nutrient levels above the reference point). However, these consumers may already avoid higher levels of the nutrient. This means that disclosure of a reference point may not additionally impact (i.e., decrease) preferences for high nutrient levels. Conversely, a reference point that is not at the lowest end of the nutrient level range can justify choices of food options that do not contain the minimum nutrient level as long as they stay below the reference point. In this case, consumers may be less strict and prefer more products that have a low yet not the lowest level of a bad nutrient. We therefore **propose that for consumers with a symbolic goal reference point provision increases preferences for products with low nutrient levels, but does not affect preferences for products with high nutrient levels.**

Unlike people with symbolic goals, consumers pursuing the hedonic goal might be torn into two directions. These consumers want to follow indulgent temptations and fulfill the hedonic goal to a certain extent (Dhar and Simonson 1999), but may have trouble justifying their choice (Baumeister 2002; Okada 2005). This means that they would go for a hedonic option, yet are torn back by the need to justify their choices. Research has shown that consumers generally tend to buy the option that is easier to justify (Okada 2005), which means they would reject the hedonic option and choose the healthier option instead. As a consequence of the strength of this opposing mechanism, we argue that reference point disclosure would not boost the favorability of products with high nutrient levels, but rather decrease preferences for these products. At the same time, products with low nutrient values gain justification in a less relevant domain (i.e., health), diluting the favorability effect of reference point disclosure. Accordingly, **we propose that for consumers with a hedonic goal reference point provision decreases preferences for products with high nutrient levels, but does not affect preferences for products with low nutrient levels.**

In contrast to strictly falling value functions for consumers with a symbolic goal or decreasing value functions for consumers with a hedonic goal, functional goal pursuit (e.g., eating healthy food) is linked to ideal point value functions. If the value function of consumers with a functional goal was symmetric around the reference point, the reaction to options deviating from the reference point would be generally thought of as being similar at equal distances (negative and positive) from the reference point. In this case, reference point disclosure should affect preferences for both low and high nutrient levels. Yet, we assume that consumers with an abstract functional goal prefer lower nutrient levels over higher ones even though they do not prefer the lowest level most. This implies that the nutrient value function tends to be skewed to the left and steeper for higher nutrient levels. As consequence, reference points should impact health-

seeking consumers in a similar manner like they impact consumers with symbolic goals. At the same time, the preference increase for low nutrient levels should be greater because of the general acceptance for low yet not the lowest nutrient levels. Hence, **we propose that for consumers with a functional goal reference point disclosure increases preferences for products with low nutrient levels but does not affect preferences for products with high nutrient levels.**

### **5.3 Empirical Study**

#### **5.3.1 Procedure**

The “bad” nutrient of interest is sugar and fruit muesli was chosen for its wide sugar range. Typically most of the available products contain between two and 37 grams sugar per 100 grams muesli. In order to determine the impact of reference points, two reference points (low and high) were used. The approximate middle of the lower half of the total range of sugar values in fruit muesli was used as the lower reference point threshold at 10 grams, and the upper end of the sugar range was used for the high reference point at 37 grams (see Rhine and Severance 1970).

Participants read an introductory 76-word text about muesli as a breakfast cereal, its recommended serving size, and the digestion of carbohydrates and sugars. The randomly assigned reference point was revealed within the text without highlighting or placing too much emphasis on this information. The control group (CG) read the same text without disclosure of the reference point. Refer to appendix 2 for the text.

To capture sugar consumption under realistic settings we conducted a choice-based conjoint (CBC) experiment controlling for additional attributes. This method allows introduction of several attributes at varying discrete levels. In CBC experiments, participants are asked to choose from a number of alternative hypothetical products

composed of these product attributes (Carroll and Green 1995). In addition to sugar content, we included price, packaging, and organic labeling. The sugar content attribute has six levels covering the whole range of sugar values in the muesli market (2 to 37 grams). The range of possible sugar values was divided into six equidistant levels: 2 grams, 9 grams, 16 grams, 23 grams, 30 grams, and 37 grams. Price has three levels: the usual sales price of popular German muesli Dr. Oetker Vitalis, which is 2.99 € (USD 3.72) serves as the medium price. The price range included values 25% below and above that price. This led to the lower price of 2.29 € (USD 2.85), which is a common sales price for lower priced mueslis, and 3.69 € (USD 4.59) which is common for more expensive muesli products. The packaging attribute has two levels: plastic bag and container. As for organic labeling the levels include presence versus absence of such a label.

In this experiment, each respondent was presented a sequence of 12 choice sets. Every participant received a particular set of choice tasks. Each choice set consisted of four hypothetical mueslis, comprised of one level of each of the four attributes as well as a no choice option. All choice tasks and product combinations presented to participants reflected a D-efficient design (Kuhfeld, Tobias, and Garratt 1994). Appendix 3 displays an exemplary choice task. Respondents were asked to select their most preferred product in each of the 12 choice tasks. We controlled for order effects by randomizing the order of profiles across participants. In addition to the choice task, respondents answered survey questions. We captured consumers' symbolic weight goal (Oliver and Bearden 1985; Cronbach's  $\alpha = .86$ ), functional nutrition goal (Chandon and Wansink 2007; Cronbach's  $\alpha = .87$ ), and hedonic taste goal (Roininen et al. 2001; Cronbach's  $\alpha = .66$ ) using multiple items measured on five-point scales.

At the beginning of the experiment participants were randomly assigned to the experimental condition (reference point) or to the control group. In order to ensure that

only participants with sufficient buying experience with respect to the test category were considered, qualifier questions were included at the beginning of the questionnaire. The final data set consists of 659 participants who completed all tasks. Sixty-one percent of the participants were female, 98% ranged between 20 and 30 years of age.

### **5.3.2 Results**

Using a Bayesian statistics framework, individual utilities for organic labeling, price, packaging and sugar content were derived in order to use them for later analysis. Hierarchical Bayes is the standard estimation procedure for the parameters of a discrete choice model (Allenby et al. 2005; Moore 2004). The model exhibited good fit with an average root likelihood (RLH) of .75. Utilities per attribute level were derived by decomposing repeated choices. Plotting utilities for the six sugar levels generates value functions for every individual. Since the six sugar levels are equidistant, low and high-sugar content regions can be distinguished in a straightforward manner (low sugar content between 2 and 16 grams and high sugar content between 23 and 37 grams). To determine the sugar preferences in the low-content region, for each participant we calculated the difference between individual utilities of 2 grams and 16 grams. Similarly, we calculated the difference between individual utilities of 23 grams and 37 grams to determine the sugar preferences in the high-content region. This concept is known as importance in other publications (e.g., van Ittersum and Pennings 2007). Since the absolute difference in sugar values is constant across regions (i.e., 14 grams), the steepness of the value function slope corresponds with differences in sugar preferences.



Moreover, consumers were segmented depending on the slope of their sugar utility function. We used decision rules to set slope styles (e.g., strictly increasing or falling) which we used to build segments. Three consumer segments were derived based on their value function type. We sorted consumers with a decreasing trend utility function into the first segment. In this segment, the slope of sugar utility is negative and maximum utility is at the lowest given sugar level (2 grams, see figure 15). Consumers with a positive slope utility function and highest utility at the highest given sugar level (37 grams) were characterized as segment with increasing trend utility function (figure 16). Consumers with a single peak that is not at the minimum (2 grams) or maximum (37 grams) of the provided sugar content (figure 17) represent segment three with an ideal point utility function. Every individual was classified into one of the segments. The majority of respondents pursue a symbolic goal (54.4%) that is linked to decreasing utility function. The hedonic segment linked to increasing sugar utility function was smallest (3.63%). The individual-level information concerning the shape of the utility curve was used to test our research propositions.

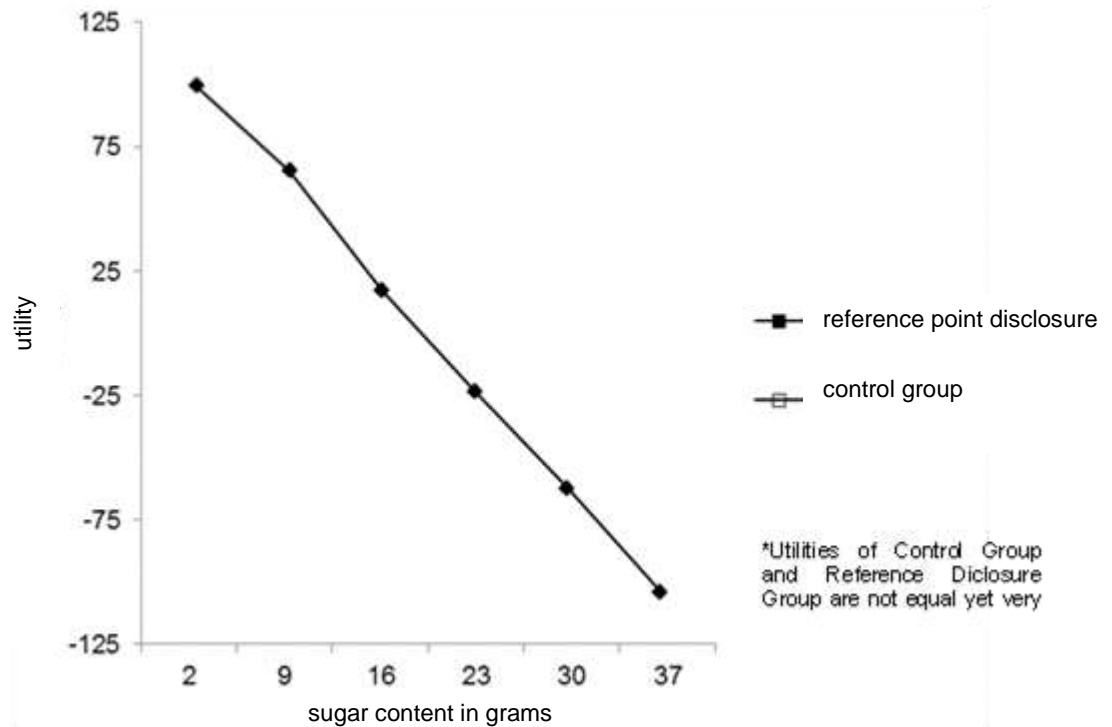
Our propositions are based on the assumption that the shape of the value function is linked to goal activation. In line with this assumption, an ANOVA yielded a significant effect showing differences in functional goal activation between the three segments ( $F(2, 162) = 10.94, p < .001$ ). As predicted, consumers with ideal point (IP) sugar utility function showed higher functional goal activation ( $M_{IP} = 2.63$ ) than consumers with a decreasing trend (DT) of the sugar utility function ( $M_{DT} = 1.98$ ) or consumers with increasing trend (IT) of the sugar utility function ( $M_{IT} = 2.29$ ). Furthermore, an ANOVA concerning differences in activation of the hedonic goal between the three segments yielded a significant effect ( $M_{IT} = 2.75, M_{DT} = 2.57, M_{IP} = 2.35, F(2, 162) = 4.92, p = .01$ ) as did an ANOVA concerning the symbolic goal activation in the three segments ( $M_{IT} = 2.80, M_{DT} = 1.98, M_{IP} = 2.91, F(2, 156) = 6.19, p = .01$ ). As assumed,

hedonic goal activation was highest for consumers with increasing trend of the sugar utility function as well as the symbolic goal activation for consumers with decreasing sugar utility trend.

As the assumptions hold, we can now proceed to analyze how goal pursuit interacts with reference points in affecting preferences. In this study, the interaction is shown as follows: preferences for products with high (low) sugar content are affected by the disclosure of reference points when, within consumer segments, the shape of the value function differs between the experimental group (reference point disclosure) and the respective control group.

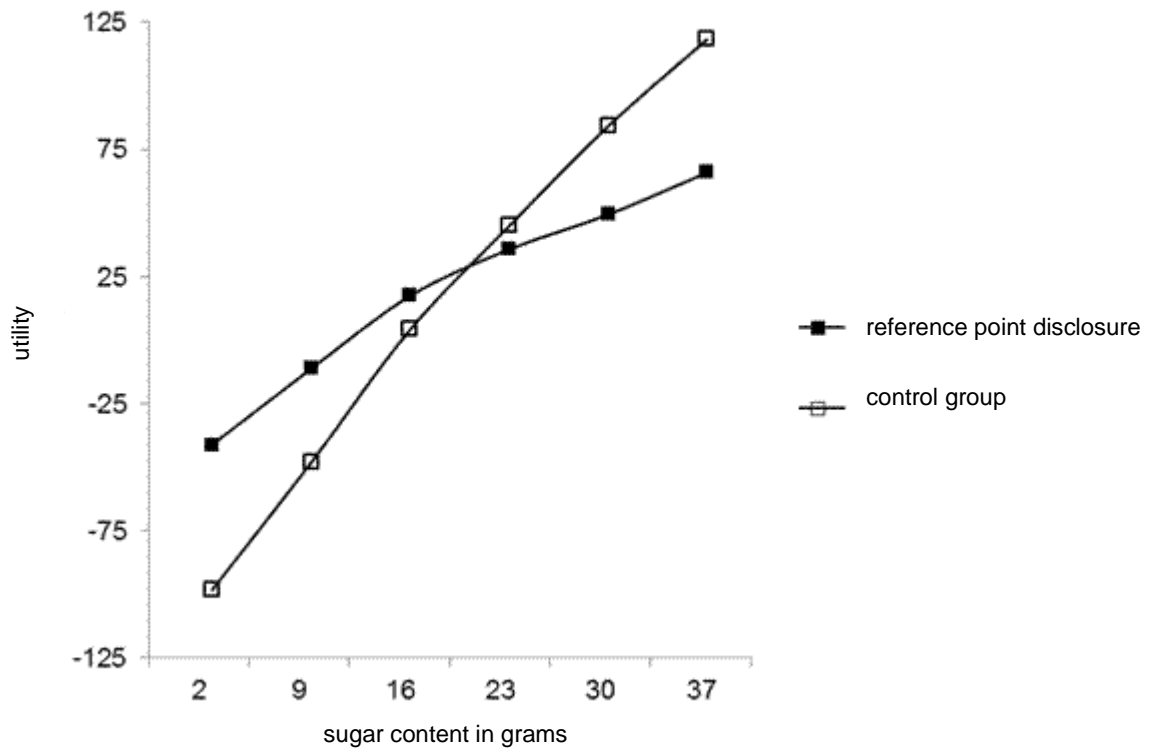
First, we find that for consumers with a symbolic goal reference point (RP) disclosure does not impact preferences for either low or high sugar levels, relative to the control group (CG). Specifically, the average sugar utility in the low-content region does not differ across groups ( $M_{CG} = -78.86$  vs.  $M_{RP} = -77.63$ ,  $p = .82$ ). The same pattern emerges within the high-content region, where reference point disclosure does not lead to decreased aversion ( $M_{CG} = -75.84$  vs.  $M_{RP} = -76.25$ ,  $p = .89$ ). Figure 15 shows that the value functions are almost identical for both groups. Accordingly, our first proposition is rejected.

**Figure 15: Sugar Utility Functions for Consumers with Symbolic Goal Pursuit**



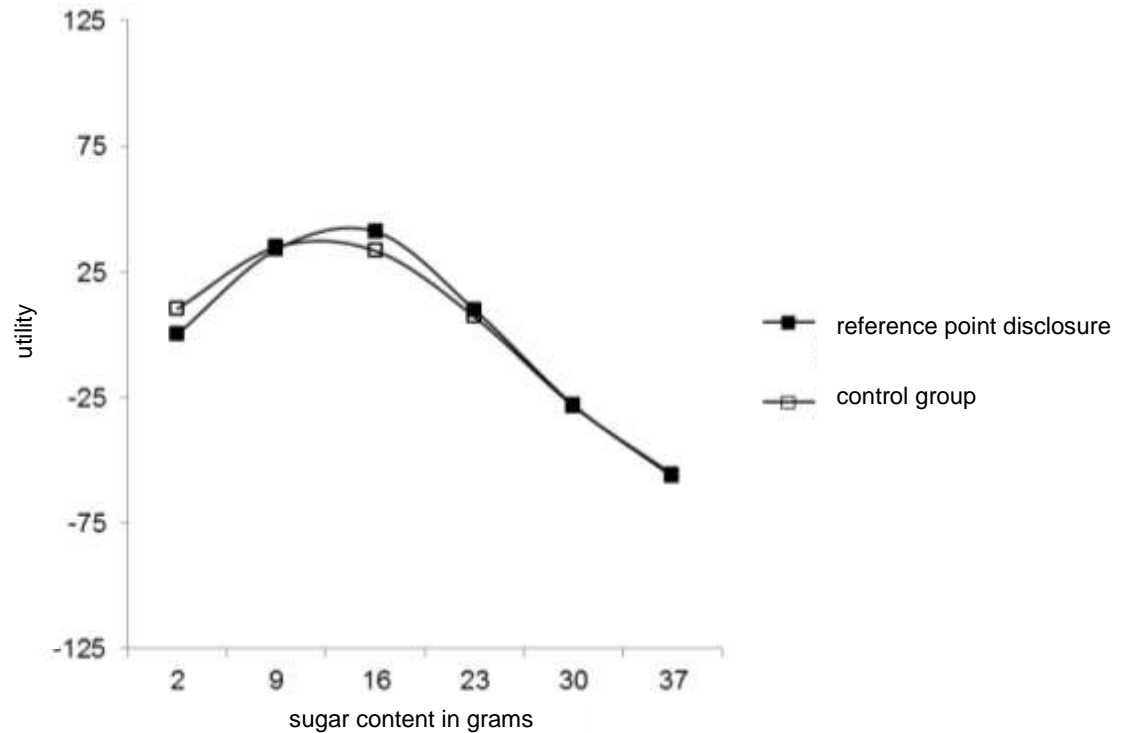
The second proposition stated that for consumers with a hedonic goal reference point disclosure leads to decreased preferences for high sugar levels, but does not affect low-sugar preferences. In line with this proposition, reference point disclosure leads to decreased preferences in the high-content region ( $M_{CG} = 64.97$  vs.  $M_{RP} = 27.90$ ,  $p < .001$ ). Specifically, utility of high sugar levels drops by 37.07 when a reference point is disclosed to consumers with a hedonic goal. In contrast and as predicted, reference point disclosure did not significantly change preferences in the low-content region ( $M_{CG} = 90.53$  vs.  $M_{RP} = 55.23$ ,  $p = .15$ ), although the reference point minimally reduced the preference decrease that comes with ever smaller sugar levels. Figure 16 provides a graphical display of the effect.

**Figure 16: Sugar Utility Functions for Consumers with Hedonic Goal Pursuit**



The third proposition stated that for consumers with a functional goal reference point disclosure leads to increased preferences for low sugar levels without affecting high-level preferences. In line with the proposition, in the low-content region sugar gained higher utility (plus 17.89) when a reference point was disclosed ( $M_{CG} = 23.18$  vs.  $M_{RP} = 41.07$ ,  $p < .01$ ). At the same time, the consumer group's preferences of high sugar levels seem less sensitive to reference point disclosure. That is, in the high-content region sugar utility does not decrease as a consequence of setting a reference point ( $M_{CG} = -66.88$  vs.  $M_{RP} = -66.75$ ,  $p = .57$ ). Thus, our proposition is supported. Figure 17 illustrates the reference point effect within this consumer group.

**Figure 17: Sugar Utility Functions for Consumers with Functional Goal Pursuit**



#### **5.4 Discussion**

The objective of this research was to understand the interaction of reference points and abstract eating goals. Starting from the assumption that value functions for food alternatives with different amounts of unhealthy nutrients differ across consumers with varying eating goals, we contended for differential effects of reference point disclosure within these consumer groups. The abstract eating goals considered in this research were functional, symbolic, and hedonic, referring to healthy, low-caloric, and tasty food, respectively.

The most important finding of the present research is that depending on goal pursuit reference points exert differential effects. Notably, reference point disclosure affected consumers' evaluations of muesli alternatives at different sugar regions. Specifically, reference point disclosure increased preferences for low-sugar options among those consumers with a functional goal. These consumers' preferences for high-sugar

products remained unchanged, though. Conversely, reference point disclosure affected taste-seeking consumers' preferences towards high-sugar options, but not low-sugar ones. Another striking finding is that reference point disclosure did not affect consumers with a symbolic goal at all. Within this segment, value functions of the experimental and control group were almost identical. One explanation might be that consumers with an abstract symbolic goal are likely to avoid bad nutrients even when a reference point is not present (Shine, O'Reilly, and O'Sullivan 1997).

The analyses have further shown that it is worthwhile distinguishing between symbolic and functional eating goals. Though similar regarding their general preference for low-caloric food and aversion towards high-caloric food, only consumers with a functional goal seemed to change their preferences upon reference point disclosure.

Coming full circle to the Jill and Jane example from the introduction, disclosure of the reference information may have the same consequence for indulgence-seeking Jane as it has for weight-watching Jill (i.e., choosing the 100-calorie product instead of the 150-calorie one when a reference point of 120 calories is presented). However, the mechanism behind these choices appears to differ. Jill's preference for the 100-calorie option seems to be unaffected by the reference point, and merely reflect her symbolic eating goal. By contrast, Jane's preference for the product that better serves her hedonic goal decreases when a reference point is presented. While this finding may seem counterintuitive (since the reference point would suggest that a high-sugar option should be particularly tasty), we argued that reduced justification of that choice, at least in parts, overrules the general temptation to follow the indulgence.

From a practical standpoint, results suggest that reference points are effective means to either decrease preferences for unhealthy food or increase preferences for healthy alternatives. The consideration of abstract eating goals has shown, however, that these mechanisms are independent. Interestingly, it seems they apply to the more relevant

regions, namely high-sugar products for people with a hedonic goal, and low-sugar products for functional-goal consumers. It has to be mentioned, though, that the largest consumer segment in this study (consumers with a symbolic goal) did not react to the reference point. However, from a policy perspective this consumer group is less vulnerable to obesity and “bad” eating habits. More importantly, the consumer segment hardest to address namely consumers with active taste goal reacted strongest to the reference point provision.

Our study is not without limitations. The use of a sample of students who are usually prone to belong to a group and thus tend to have active symbolic goals might have biased segment sizes. Moreover, the external validity of our results is limited due to the fact that only one nutrient (sugar) and one product type (muesli) was used. Thus, further research should broaden that perspective and use e.g. calories and a rather unhealthy product category. Moreover, further research should break down unspecific goals in goal types like e.g. distant/ immediate goals. Furthermore, goals may be unstable, depending on temporary activation (van Osselaer and Janiszewski 2012). The perceived progress on the fulfillment of a goal can lead to goal switching, when one goal is sufficiently reached. In that case, another salient goal steps into place (Fishbach and Dhar 2005). External references have been shown to activate health goals (Belei et al. 2012). This temporary activation can lead to unstable utility even when choice sets are stable and thus changing slope of the value function (Brendl, Markman, and Messner 2003, Cunha and Laran 2009, Fitzsimons, Chartrand, and Fitzsimons 2008).

## **Appendices**

### **Appendix 1: Introductory Text (translated from German)**

#### **About the importance of breakfast**

A healthy breakfast is important for a good start into the day. Cereals recharge the body's energy reserve. In addition, cereals contain many important nutrients and vitamins, minerals and fiber. A serving of five tablespoons of muesli and 125 ml of whole milk covers approximately half of the recommended energy intake of an adult in the morning. Muesli usually contains 10 (37) grams of sugar per 100 grams. The human body's metabolism utilizes most carbohydrates from grains more slowly than sugar. Thus, the energy from grains is kept for longer.



**Appendix 2:** Introductory Text with Source Mentioning (translated from German)

***Stiftung Warentest (BILD) about the importance of breakfast***

A healthy breakfast is important for a good start into the day. Cereals recharge the body's energy reserve. In addition, cereals contain many important nutrients and vitamins, minerals and fiber. A serving of five tablespoons of muesli and 125 ml of whole milk covers approximately half of the recommended energy intake of an adult in the morning. Muesli usually contains 10 (37) grams of sugar per 100 grams. The human body's metabolism utilizes most carbohydrates from grains more slowly than sugar. Thus, the energy from grains is kept for longer.

**Credible source condition:**

About *Stiftung Warentest*

Stiftung Warentest tests products and services using scientific methods in independent institutes and publishes the results in specialized outlets. Stiftung Warentest guarantees to its customers that they can rely on their quality judgments.

**Less credible source condition:**

About *BILD*

BILD, Europe's biggest daily newspaper is in site when things happen. BILD provides its readers with an information advantage and chooses the topics of the day—clear, concise, and with the best photos. BILD reader-reporters expand the coverage of stories.

**Appendix 3: Exemplary Choice Task (translated from German)**

 <p>dorset cereals Fruchtemüsli 500g</p>	 <p>dorset cereals Fruchtemüsli 500g</p>	 <p>dorset cereals Fruchtemüsli 500g</p>	 <p>dorset cereals Fruchtemüsli 500g</p>	<p>I would choose none of the shown products.</p>
 <p>100% Müsli contains: 2g sugar</p>	 <p>100% Müsli contains: 9g sugar</p>	 <p>100% Müsli contains: 2g sugar</p>	 <p>100% Müsli contains: 16g sugar</p>	
<p>Dorset Fruit Müsli 3.69€</p> 	<p>Dorset Fruit Müsli 2.29€</p> 	<p>Dorset Fruit Müsli 2.99€</p> 	<p>Dorset Fruit Müsli 2.99€</p> 	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

## Appendix 4: Menu Choice Sets

### I) Healthy Menu Choice Set (Licensing Condition)

Mixed salad with lemon ice cream dressing



Bowl of lean green soup



Grilled chicken and steamed Brussels sprouts



I) Neutral menu choice set (Control Condition)

Chicken sandwich



Bowl of spaghetti Bolognese



Fish fingers plate



Appendix 5: Ice cream Stimuli



## References

- 113TH CONGRESS 2D SESSION. H. R. 5279. <https://beta.congress.gov/bill/113th-congress/house-bill/5279/text>
- Aarts, Henk, Tanya L. Chartrand, Ruud Custers, Unna Danner, Giel Dik, Valerie E. Jefferis, and Clara M. Cheng (2005), "Social Stereotypes and Automatic Goal Pursuit," *Social Cognition*, 23 (6), 465–90.
- Allenby, Greg. M., Geraldine Fennell, Joel Huber, Thomas Eagle, Tim Gilbride, and Dan Horsky (2005), "Adjusting Choice Models to Better Predict Market Behavior," *Marketing Letters*, 16 (3-4), 197–208.
- Andrews, J Craig, Richard G. Netemeyer, and Scot Burton (1998), "Consumer Generalization of Nutrient Content Claims in Advertising," *Journal of Marketing*, 62 (4), 62–75.
- Andrews, J. Craig, Scot Burton, and Jeremy Kees (2011), "Is Simpler Always Better? Consumer Evaluations of Front-of-Package Nutrition Symbols," *Journal of Public Policy & Marketing*, 30 (2), 175–90.
- Asam, Edward H. and Louis P. Bucklin (1973), "Nutrition Labeling for Canned Goods: A Study of Consumer Response," *The Journal of Marketing*, 37 (2), 32–37.
- Ashley, Christy and Hillary A. Leonard (2009), "Betrayed by The Buzz? Covert Content and Consumer-Brand Relationships," *Journal of Public Policy & Marketing*, 28 (2), 212–20.
- Bagozzi, Richard P. and Utpal Dholakia (1999), "Goal Setting and Goal Striving in Consumer Behavior," *Journal of Marketing*, 63, 19–32.
- Balasubramanian, Siva K. and Catherine Cole (2002), "Consumers' Search and Use of Nutrition Information: The Challenge and Promise of the Nutrition Labeling and Education Act," *Journal of Marketing*, 66 (3), 112–27.

- Balcombe, Kelvin (2010), "Traffic lights and food choice: A Choice Experiment Examining the Relationship between Nutritional Food Labels and Price," *Food Policy*, 35 (3), 211-20.
- Barone, Michael J., Randall L. Rose, Kenneth C. Manning, and P.W. Miniard (1996), "Another Look at the Impact of Reference Information on Consumer Impressions of Nutrition Information," *Journal of Public Policy & Marketing*, 55-62.
- Barreiro-Hurle, Jesus, Azucena Gracia, and Tiziana de-Magistris (2010), "Does Nutrition Information on Food Products Lead to Healthier Food Choices?" *Food Policy*, 35 (3), 221-29.
- Basil, Michael D., Debra Z. Basil, and Sameer Deshpande (2009), "A Comparison of Consumers and Dieticians: Nutrition Focus, Food Choice, and Mental Accounting," *Journal of Nonprofit & Public Sector Marketing*, 21 (3), 283-97.
- Baumeister, Roy F. (2002), "Yielding to Temptation: Self-Control Failure, Impulsive Purchasing, and Consumer Behavior," *Journal of Consumer Research*, 28 (4), 670-76.
- Baumeister, Roy F., Ellen Bratslavsky, Mark Muraven, and Dianne M. Tice (1998), "Ego depletion: Is the Active Self a Limited Resource?" *Journal of Personality and Social Psychology*, 74 (5), 1252-65.
- BBC (2010), Denmark introduces world's first food fat tax. <http://www.bbc.co.uk/news/world-europe-15137948>, accessed 08.09.2014.
- Belei, Nina, Kelly Geyskens, Caroline Goukens, Suresh Ramanathan, and Jos Lemmink (2012), "The Best of Both Worlds? Effects of Attribute-Induced Goal Conflict on Consumption of Healthful Indulgences," *Journal of Marketing Research*, 49 (6), 900-09.
- Beruchashvili, Mariam, Risto Moision, and Deborah D. Heisley (2014), "What Are You Dieting for? The Role of lay Theories in Dieters' Goal Setting," *Journal of Consumer Behaviour*, 13 (1), 50-59.

- Bettman, James R., Mary F. Luce, and John W. Payne (1998), "Constructive Consumer Choice Processes," *Journal of Consumer Research*, 25, 187–217.
- Block, Lauren G. and Laura A. Peracchio (2006), "The Calcium Quandary: How Consumers Use Nutrition Labels," *Journal of Public Policy & Marketing*, 25 (2), 188–96.
- Block, Lauren G., Sonya A. Grier, Terry L. Childers, Brennan Davis, Jane E. J. Ebert, Shiriki Kumanyika, Russell N. Laczniak, Jane E. Machin, Carol M. Motley, Laura Peracchio, Simone Pettigrew, Maura Scott, and Mirjam N. G. van Ginkel Bieshaar (2011), "From Nutrients to Nurturance: A Conceptual Introduction to Food Well-Being," *Journal of Public Policy & Marketing*, 30 (1), 5–13.
- Brendl, C. Miguel, Arthur B. Markman, and Claude Messner (2003), "The Devaluation Effect: Activating a Need Devalues Unrelated Objects," *Journal of Consumer Research*, 29 (4), 463–73.
- Briers, Barbara and Sandra Laporte (2013), "A Wallet Full of Calories: The Effect of Financial Dissatisfaction on the Desire for Food Energy," *Journal of Marketing Research*, 50 (6), 767–81.
- Brownell, Kelly D. and Thomas R. Frieden (2009), "Ounces of Prevention—the Public Policy Case for Taxes on Sugared Beverages," *New England Journal of Medicine*, 360 (18), 1805–08.
- Bublitz, Melissa G., Laura A. Peracchio, and Lauren G. Block (2010), "Why Did I Eat that? Perspectives on Food Decision Making and Dietary Restraint," *Journal of Consumer Psychology*, 20 (3), 239–58.
- Burton, Scot, Abhijit Biswas, and Richard Netemeyer (1994), "Effects of Alternative Nutrition Label Formats and Nutrition Reference Information on Consumer Perceptions, Comprehension, and Product Evaluations," *Journal of Public Policy & Marketing*, 13 (1), 36–47.
- Burton, Scot, Elizabeth Howlett, and Andrea H. Tangari (2009), "Food for Thought: How Will the Nutrition Labeling of Quick Service Restaurant Menu Items



Influence Consumers' Product Evaluations, Purchase Intentions, and Choices?" *Journal of Retailing*, 85 (3), 258–73.

Burton, Scot, Judith A. Garretson, and Anne M. Velliquette (1999), "Implications of Accurate Usage of Nutrition Facts Panel and Information for Food Product Evaluations and Purchase Intentions," *Journal of the Academy of Marketing Science*, 27 (4), 470–80.

Carroll, J. Douglas and Paul E. Green (1995), "Guest Editorial: Psychometric Methods in Marketing Research: Part I, Conjoint Analysis," *Journal of Marketing Research*, 32 (4), 385–91.

Cash, Sean B. and Ryan D. Lacadilao (2007), "Taxing Food to Improve Health: Economic Evidence and Arguments," *Agricultural and Resource Economics Review*, 36 (2), 174-82.

Chandon, Pierre (2013), "How Package Design and Packaged-Based Marketing Claims Lead to Overeating," *Applied Economic Perspectives & Policy*, 35 (1), 7–31.

\_\_\_\_\_ (2012), "Does Food Marketing Need to Make Us Fat? A Review and Solutions," *Nutrition Reviews*, 70 (10), 571–93.

Chandon, Pierre and Brian Wansink (2007), "The Biasing Health Halos of Fast-Food Restaurant Health Claims: Lower Calorie Estimates and Higher Side-Dish Consumption Intentions," *Journal of Consumer Research*, 34 (3), 301–14.

Chernev, Alexander (2004), "Goal Orientation and Consumer Preference for the Status Quo," *Journal of Consumer Research*, 31 (3), 557–65.

Chernev, Alexander (2008), "The Role of Purchase Quantity in Assortment Choice: The Quantity-Matching Heuristic," *Journal of Marketing Research*, 45 (2), 171–81.

Chernev, Alexander and David Gal (2010), "Categorization Effects in Value Judgments: Averaging Bias in Evaluating Combinations of Vices and Virtues," *Journal of Marketing Research*, 47 (4), 738–47.

Caraher, Martin and Gill Cowburn (2005), "Taxing food: implications for public health nutrition," *Public Health Nutrition*, 8 (08), 1242–49.

- Cunha Jr, Marcus and Juliano Laran (2009), “Asymmetries in the Sequential Learning of Brand Associations: Implications for the Early Entrant Advantage,” *Journal of Consumer Research*, 35 (5), 788–99.
- Dhar, Ravi and Itamar Simonson (1999), “Making Complementary Choices in Consumption Episodes: Highlighting Versus Balancing,” *Journal of Marketing Research*, 36 (1), 29–44.
- Disdier, Anne-Célia and Stéphan Marette (2012), “Taxes, Minimum-Quality Standards and/or Product Labeling to Improve Environmental Quality and Welfare: Experiments can Provide Answers,” *Journal of Regulatory Economics*, 41 (3), 337–57.
- Elangovan, A. R. and Debra L. Shapiro (1998), “Betrayal of Trust in Organizations,” *Academy of Management Review*, 23 (3), 547–66.
- Elbel, Brian, Glen B. Taksler, Tod Mijanovich, Courtney B. Abrams, and Dixon, L. B. (2013), “Promotion of Healthy Eating through Public Policy: A Controlled Experiment,” *American Journal of Preventive Medicine*, 45 (1), 49–55.
- Elliot, Andrew J. and James W. Fryer (2008), “The Goal Construct in Psychology,” *Handbook of Motivation Science*, 18, 235–50.
- European Parliament (2010), "MEPs set out clearer and more consistent food labelling rules," (accessed August 18, 2013), [available at <http://www.europarl.europa.eu/sides/getDoc.do?language=entype=IM-PRESSreference=20100615IPR76127>].
- Finkelstein, Stacey R. and Ayelet Fishbach (2010), “When Healthy Food makes you Hungry,” *Journal of Consumer Research*, 37 (3), 357–67.
- Fishbach, Ayelet and Ravi Dhar (2005), “Goals as Excuses or Guides: The Liberating Effect of Perceived Goal Progress on Choice,” *Journal of Consumer Research*, 32 (3), 370–77.

- Fishbach, Ayelet and Ying Zhang (2008), "Together or Apart: When Goals and Temptations Complement versus Compete," *Journal of Personality and Social Psychology*, 94 (4), 547–59.
- Fishbach, Ayelet, Ronald S. Friedman, and Arie W. Kruglanski (2003), "Leading Us Not into Temptation," *Journal of Personality and Social Psychology*, 84 (2), 296–309.
- Fitzsimons, Gráinne M., Tanya L. Chartrand, and Gavan J. Fitzsimons (2008), "Automatic Effects of Brand Exposure on Motivated Behavior: how Apple Makes you "Think Different"" *Journal of Consumer Research*, 35 (1), 21–35.
- Ford, Gary T., Manoj Hastak, Anusree Mitra, and Debra J. Ringold (1996), "Can Consumers Interpret Nutrition Information in the Presence of a Health Claim? A Laboratory Investigation," *Journal of Public Policy & Marketing*, 15 (1), 16–27.
- Garretson, Judith A. and Scot Burton (2000), "Effects of Nutrition Facts Panel Values, Nutrition Claims, and Health Claims on Consumer Attitudes, Perceptions of Disease-Related Risks, and Trust," *Journal of Public Policy & Marketing*, 19 (2), 213–27.
- Grégoire, Yany and Robert J. Fisher (2008), "Customer Betrayal and Retaliation: When your Best Customers Become your Worst Enemies," *Journal of the Academy of Marketing Science*, 36 (2), 247–61.
- Grunert, Klaus, Lisa E. Bolton, and Monique M Raats. (2012), "Processing and Acting on Nutrition Labeling on Food: The State of Knowledge and New Directions for Transformative Consumer," in *Transformative Consumer Research for Personal and Collective Well-Being*, ed. David G. Mick, New York, NY: Routledge, 333–52.
- Hassan, Louise M., Edward M. K. Shiu, and Nina Michaelidou (2010), "The Influence of Nutrition Information on Choice: The Roles of Temptation, Conflict and Self-Control," *The Journal of Consumer Affairs*, 44 (3), 499–515.
- Heath, Chip, Richard P. Larrick, and George Wu (1999), "Goals as Reference Points," *Cognitive Psychology*, 38 (1), 79–109.

- Hersey, James C., Kelly C. Wohlgenant, Joanne E. Arsenault, Katherine M. Kosa, and Mary K. Muth, (2013), "Effects of Front-of-Package and Shelf Nutrition Labeling Systems on Consumers," *Nutrition Reviews*, 71(1), 1–14.
- Hovland, Carl I., O. J. Harvey, and Muzafer Sherif (1957), "Assimilation and Contrast Effects in Reactions to Communication and Attitude Change," *The Journal of Abnormal and Social Psychology*, 55 (2), 244.
- Howlett, Elizabeth A., Scot Burton, Kenneth Bates, and Kyle Huggins (2009), "Coming to a Restaurant Near You? Potential Consumer Responses to Nutrition Information Disclosure on Menus," *Journal of Consumer Research*, 36 (3), 494–503.
- Howlett, Elizabeth, Scot Burton, and John C. Kozup (2008), "How Modification of the Nutrition Facts Panel Influences Consumers at Risk for Heart Disease: the Case of Trans Fat," *Journal of Public Policy & Marketing*, 27 (1), 83–97.
- Irwin, Julie R. and Gary H. McClelland (2001), "Misleading Heuristics and Moderated Multiple Regression Models," *Journal of Marketing Research*, 38 (1), 100–09.
- Ippolito, Pauline M. and Alan D. Mathios (1993), "New Food Labeling Regulations and the Flow of Nutrition Information to Consumers," *Journal of Public Policy & Marketing*, 12 (2), 188–205.
- Jacobson, Michael F. and Kelly D. Brownell (2000), "Small Taxes on Soft Drinks and Snack Foods to Promote Health," *American Journal of Public Health*, 90 (6), 854-57.
- Kamakura, Wagner A. and Rajendra K. Srivastava (1986), "An Ideal-Point Probabilistic Choice Model for Heterogeneous Preferences," *Marketing Science*, 5 (3), 199–218.
- Kay, EJ and David Locker (1996), "Is Dental Health Education Effective? A Systematic Review of Current Evidence," *Community Dentistry and Oral Epidemiology*, 24 (4), 231–5.

- Khan, Uzma and Ravi Dhar (2006), "Licensing Effect in Consumer Choice," *Journal of Marketing Research*, 43 (2), 259–66.
- \_\_\_\_\_ (2007), "Where There is a Way, is there a Will? The Effect of Future Choices on Self-Control," *Journal of Experimental Psychology: General*, 136 (2), 277.
- Kiesel, Kristin and Sofia B. Villas-Boas (2013), "Can Information Costs affect Consumer Choice? Nutritional Labels in a Supermarket Experiment," *International Journal of Industrial Organization*, 31 (2), 153–63.
- Kivetz, Ran and Itamar Simonson (2002), "Self-Control for the Righteous: Toward a Theory of Precommitment to Indulgence," *Journal of Consumer Research*, 29 (2), 199–217.
- Klein, Noreen M. and Janet E. Oglethorpe (1987), "Cognitive Reference Points in Consumer Decision Making," *Advances in Consumer Research*, 14 (1), 183–87.
- Koenigstorfer, Joerg, Andrea Groeppel-Klein, and Friederike Kamm (2014), "Healthful Food Decision Making in Response to Traffic Light Color-Coded Nutrition Labeling," *Journal of Public Policy & Marketing*, 33 (1), 65–77.
- Kozup, John C., Elizabeth H. Creyer, and Scot Burton (2003), "Making Healthful Food Choices: The Influence of Health Claims and Nutrition Information on Consumers' Evaluations of Packaged Food Products and Restaurant Menu Items," *Journal of Marketing*, 67 (2), 19–34.
- Krishnamurthy, Parathasarathy and Sonja Prokopec (2010), "Resisting That Triple-Chocolate Cake: Mental Budgets and Self-Control," *Journal of Consumer Research*, 37 (1), 68–79.
- Kuchler, Fred, Ababayehu Tegene, and J. M. Harris (2005), "Taxing Snack Foods: Manipulating Diet Quality or Financing Information Programs?" *Applied Economic Perspectives and Policy*, 27 (1), 4–20.
- Kuhfeld, Warren F., Randall D. Tobias, and Mark Garratt (1994), "Efficient Experimental Design With Marketing Research Applications," *Journal of Marketing Research*, 545–57.

- Lähtenmäki, Liisa, Piritta Lampila, Klaus Grunert, Yasemin Boztuğ, Øydis Ueland, Annika Åström, and Emilia Martinsdóttir (2010), "Impact of Health-Related Claims on the Perception of Other Product Attributes," *Food Policy*, 35 (3), 230–39.
- Laran, Juliano and Chris Janiszewski (2009), "Behavioral Consistency and Inconsistency in the Resolution of Goal Conflict," *Journal of Consumer Research*, 35 (6), 967–84.
- Lee, Leonard and Dan, Ariely (2006), "Shopping Goals, Goal Concreteness, and Conditional Promotions," *Journal of Consumer Research*, 33 (1), 60–70.
- Li, Fuan, Paul W. Miniard, and Michael J. Barone (2000), "The Facilitating Influence of Consumer Knowledge on the Effectiveness of Daily Value Reference Information," *Journal of the Academy of Marketing Science*, 28 (3), 425–35.
- Louviere, Jordan J. (1988), "Conjoint analysis modelling of stated preferences: a review of theory, methods, recent developments and external validity," *Journal of transport economics and policy*, 93–119.
- Louviere, Jordan J. and Towhidul Islam (2008), "A Comparison of Importance Weights and Willingness-To-Pay Measures Derived from Choice-Based Conjoint, Constant Sum Scales and Best–Worst Scaling," *Journal of Business Research*, 61 (9), 903–11.
- Louviere, Jordan J., David A. Hensher, and Joffre D. Swait (2000), "*Stated Choice Methods: Analysis and Application*," Cambridge, UK: Cambridge University Press.
- Ma, Yu, Kusum L. Ailawadi, and Dhruv Grewal (2013), "Soda Versus Cereal and Sugar Versus Fat: Drivers of Healthful Food Intake and the Impact of Diabetes Diagnosis," *Journal of Marketing*, 77 (3), 101–20.
- Malik, Vasanti S, Matthias B. Schulze, and Frank B. Hu (2006), "Intake of Sugar-Sweetened Beverages and Weight Gain: A Systematic Review," *The American Journal of Clinical Nutrition*, 84 (2), 274–88.

- Masiero, Lorenzo and David A. Hensher (2011), "Shift of Reference Point and Implications on Behavioral Reaction to Gains and Losses," *Transportation*, 38 (2), 249–71.
- Mathios, Alan D. (1996), "Socioeconomic Factors, Nutrition, and Food Choices: An Analysis of the Salad Dressing Market," *Journal of Public Policy & Marketing*, 15 (1), 45–54.
- Mathios, Alan D. (1998), "The Importance of Nutrition Labeling and Health Claim Regulation on Product Choice: An Analysis of the Cooking Oils Market," *Agricultural and Resource Economics Review*, 27, 159-68.
- McFadden, Daniel (1974), "The Measurement of Urban Travel Demand," *Journal of Public Economics*, 3 (4), 303–28.
- Melles, Torsten, Ralf Laumann, and Heinz Holling, ed. (2000), *Validity and Reliability of Online Conjoint Analysis*, Vol. 8: Sawtooth Software Sequim, WA.
- Mishra, Arul and Himanshu Mishra (2011), "The Influence of Price Discount versus Bonus Pack on the Preference for Virtue and Vice Foods," *Journal of Marketing Research*, 48 (1), 196–206.
- Mojduszka, Eliza M., Julie A. Caswell, and J. M. Harris (2001), "Consumer Choice of Food Products and the Implications for Price Competition and Government Policy," *Agribusiness*, 17 (1), 81–104.
- Moore, William L. (2004), "A Cross-Validity Comparison of Rating-Based and Choice-Based Conjoint Analysis Models," *International Journal of Research in Marketing*, 21 (3), 299–312.
- Moorman, Christine, Rosellina Ferraro, and Joel Huber (2012), "Unintended nutrition consequences: firm responses to the nutrition labeling and education act," *Marketing Science*, 31 (5), 717–37.
- Muraven, M., Roy F. Baumeister, and Dianne M. Tice (1999), "Longitudinal Improvement of Self-Regulation through Practice: Building Self-Control

- Strength through Repeated Exercise,” *The Journal of Social Psychology*, 139 (4), 446–57.
- Mytton, Oliver, Alastair Gray, Mike Rayner, and Harry Rutter (2007), “Could Targeted Food Taxes Improve Health?” *Journal of Epidemiology and Community Health*, 61 (8), 689–94.
- Natter, Martin and Markus Feurstein (2002), “Real World Performance of Choice-Based Conjoint Models,” *European Journal of Operational Research*, 137 (2), 448–58.
- Novemsky, Nathan and Ravi Dhar (2005), “Goal Fulfillment and Goal Targets in Sequential Choice,” *Journal of Consumer Research*, 32 (3), 396–404.
- Okada, Erica M. (2005), “Justification Effects on Consumer Choice of Hedonic and Utilitarian Goods,” *Journal of Marketing Research*, 42 (1), 43–53.
- Oliver, Richard L. and William O. Bearden (1985), “Disconfirmation Processes and Consumer Evaluations in Product Usage,” *Journal of Business Research*, 13 (3), 235–46.
- Papies, Esther K. and Petra Hamstra (2010), “Goal priming and eating behavior: Enhancing self-regulation by environmental cues,” *Health Psychology*, 29 (4), 384–88.
- Parker, Jeffrey R. and Donald R. Lehmann (2014), “How and When Grouping Low-Calorie Options Reduces the Benefits of Providing Dish-Specific Calorie Information,” *Journal of Consumer Research*, 41(1), 213-35.
- Polivy, Janet and C. P. Herman (1985), “Dieting and Binging: a Causal analysis,” *American psychologist*, 40 (2), 193.
- Powell, Lisa M. and Frank J. Chaloupka (2009), “Food Prices and Obesity: Evidence and Policy Implications for Taxes and Subsidies,” *Milbank Quarterly*, 87 (1), 229–57.



- Raghunathan, Rajagopal, Rebecca W. Naylor, and Wayne D. Hoyer (2006), "The Unhealthy = Tasty Intuition and its Effects on Taste Inferences, Enjoyment, and Choice of Food Products," *Journal of Marketing*, 170–84.
- Redden, Joseph and Kelly Haws (2013), "Healthy Satiation: The Role of Decreasing Desire in Effective Self-Control," *Journal of Consumer Research*, 39 (5), 1100–114.
- Rhine, Ramon J. and Laurence J. Severance (1970), "Ego-Involvement, Discrepancy, Source Credibility, and Attitude Change," *Journal of Personality and Social Psychology*, 16 (2), 175–90.
- Roe, Brian, Alan S. Levy, and Brenda M. Derby (1999), "The Impact of Health Claims on Consumer Search and Product Evaluation Outcomes: Results from FDA Experimental Data," *Journal of Public Policy & Marketing*, 18 (1), 89–105.
- Roininen, Katariina, Hely Tuorila, EH Zandstra, Cees de Graaf, K. Vehkalahti, K. Stubenitsky, and DJ Mela (2001), "Differences in Health and Taste Attitudes and Reported Behaviour among Finnish, Dutch and British Consumers: a Cross-National Validation of the Health and Taste Attitude Scales (HTAS)," *Appetite*, 37 (1), 33–45.
- Rucker, Derek D., Zakary L. Tormala, Richard E. Petty, and Pablo Brinol (2014), "Consumer Conviction and Commitment: An Appraisal-Based Framework for Attitude Certainty," *Journal of Consumer Psychology*, 24 (1), 119–36.
- Russo, John. E., Gene Krieser, and Sally Miyashita (1975), "An Effective Display of Unit Price Information," *Journal of Marketing*, 11–19.
- Sacks, G., Veerman, J. L., M. Moodie, and B. Swinburn (2011), "'Traffic-light' Nutrition Labelling and 'Junk-Food' Tax: A Modelled Comparison of Cost-Effectiveness for Obesity Prevention," *International Journal of Obesity*, 35 (7), 1001–09.
- Sacks, Gary, Kim Tikellis, Lynne Millar, and Boyd Swinburn (2011), "Impact of 'Traffic-Light' Nutrition Information on Online Food Purchases in Australia," *Australian and New Zealand Journal of Public Health*, 35 (2), 122–26.

- Salerno, Anthony, Juliano Laran, and Chris Janiszewski, "Hedonic Eating Goals and Emotion: When Sadness Decreases the Desire to Indulge," *Journal of Consumer Research*, 41(1), 135-151.
- Schroeter, Christiane, Jayson Lusk, and Wallace Tyner (2008), "Determining the Impact of Food Price and Income Changes on Body Weight," *Journal of Health Economics*, 27 (1), 45–68.
- Shafir, Eldar (1993), "Choosing Versus Rejecting: Why Some Options Are Both Better and Worse Than Others," *Memory & Cognition*, 21 (4), 546-55.
- Sherif, Muzafer and Carl I. Hovland (1961), *Social Judgment. Assimilation and Contrast Effects in Communication and Attitude Change*. New Haven, CT: Yale University Press.
- Shine, Angela, Seamus O'Reilly, and Kathleen O'Sullivan (1997), "Consumer Use of Nutrition Labels," *British Food Journal*, 99 (8), 290–296.
- Simonson, Itamar, James R. Bettman, Thomas Kramer, and John W. Payne (2013), "Comparison Selection: An Approach to the Study of Consumer Judgment and Choice," *Journal of Consumer Psychology*, 23 (1), 137–49.
- Smith, Trenton G. (2004), "The McDonald's Equilibrium. Advertising, Empty Calories, and the Endogenous Determination of Dietary Preferences," *Social Choice and Welfare*, 23 (3), 383–413.
- Tangney, June P., Roy F. Baumeister, and Angie L. Boone (2004), "High Self-Control predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success," *Journal of Personality*, 72 (2), 271–324.
- Temple, Jennifer L., Karena M. Johnson, Kelli Archer, Allison LaCarte, Christina Yi, and Leonard H. Epstein (2011), "Influence of Simplified Nutrition Labeling and Taxation on Laboratory Energy Intake in Adults," *Appetite*, 57 (1), 184–92.
- Tice, Dianne M., Roy F. Baumeister, Dikla Shmueli, and Mark Muraven (2007), "Restoring the Self: Positive Affect helps Improve Self-Regulation Following Ego-depletion," *Journal of Experimental Social Psychology*, 43 (3), 379–84.

- Tversky, Amos and Daniel Kahneman (1991), "Loss aversion in riskless choice: A reference-dependent model," *The Quarterly Journal of Economics*, 106 (4), 1039–61.
- van Herpen, Erica, Sophie Hieke, and van Trijp, Hans (2013), "Inferring Product Healthfulness from Nutrition Labeling: The Influence of Reference Points," *Appetite*, 72 (1), 138–49.
- Van Houwelingen, Jeannet H. and Van Raaij, W. Fred (1989), "The Effect of Goal-Setting and Daily Electronic Feedback on In-Home Energy Use," *Journal of Consumer Research*, 98–105.
- van Ittersum, Koert and Joost M. E. Pennings (2007), "Attribute-Value Functions and the Importance of Attributes," *Advances in Consumer Research - North American Conference Proceedings*, 34, 627.
- \_\_\_\_\_ (2012), "Attribute-value Functions as Global Interpretations of Attribute Importance," *Organizational Behavior and Human Decision Processes*.
- van Ittersum, Koert, Joost M. E. Pennings, Brian Wansink, and Hans C. M. van Trijp (2005), "The Effect of Primed and Framed Reference Points on Product Attribute Importance," *Advances in Consumer Research*, 32 (1), 113–14.
- van Osselaer, Stijn M. J. and Chris Janiszewski (2012), "A Goal-Based Model of Product Evaluation and Choice," *Journal of Consumer Research*, 39 (2), 260–92.
- Variyam, Jayachandran N., James Blaylock, and David Smallwood (1996), "A Probit Latent Variable Model of Nutrition Information and Dietary Fiber Intake," *American Journal of Agricultural Economics*, 78 (3), 628–39.
- Verplanken, Bas and Wendy Wood (2006), "Interventions to Break and create consumer habits," *Journal of Public Policy & Marketing*, 25 (1), 90–103.
- Visschers, Vivianne H. M. and Michael Siegrist (2009), "Applying the Evaluability Principle to Nutrition Table Information. How Reference Information Changes People's Perception of Food Products," *Appetite*, 52 (2), 505–12.

- Viswanathan, Madhubalan (1994), "The Influence of Summary Information on the Usage of Nutrition Information," *Journal of Public Policy & Marketing*, 13 (1), 48–60.
- Viswanathan, Madhubalan and Manoj Hastak (2002), "The Role of Summary Information in Facilitating Consumers' Comprehension of Nutrition Information," *Journal of Public Policy & Marketing*, 21 (2), 305–18.
- Viswanathan, Madhubalan and Sunder Narayanan (1994), "Comparative Judgments of Numerical and Verbal Attribute Labels," *Journal of Consumer Psychology*, 3 (1), 79–101.
- Wang, Guijing and Stanley M. Fletcher (1995), "Consumer Utilization of Food labeling as a source of nutrition information," *Journal of Consumer Affairs*, 29 (2), 368–80.
- Wansink, Brian and Pierre Chandon (2006), "Can "Low-Fat" Nutrition Labels Lead to Obesity?" *Journal of Marketing Research*, 43 (4), 605–17.
- Wertenbroch, Klaus (1998), "Consumption Self Control by Rationing Purchase Quantities of Virtue and Vice," *Marketing Science*, 17 (4), 317–37.
- Wheeler, S. Christian, Pablo Briñol, and Anthony D. Hermann (2007), "Resistance to Persuasion as Self-Regulation: Ego-Depletion and its Effects on Attitude Change Processes," *Journal of Experimental Social Psychology*, 43 (1), 150–56.
- Wilcox, Keith, Beth Vallen, Lauren Block, and Gavan J. Fitzsimons (2009), "Vicarious Goal Fulfillment: When the Mere Presence of a Healthy Option leads to an Ironically Indulgent Decision," *Journal of Consumer Research*, 36 (3), 380–93.
- Williams, Peter (2005), "Consumer Understanding and Use of Health Claims for Foods," *Nutrition Reviews*, 63 (7), 256–64.
- World Health Organization (2013), "WHO | Obesity," [http://www.who.int/gho/ncd/risk\\_factors/obesity\\_text/en/index.html](http://www.who.int/gho/ncd/risk_factors/obesity_text/en/index.html), accessed 12.07.2013.

- World Health Organization (2015), “WHO | Obesity,” [http://www.who.int/gho/ncd/risk\\_factors/obesity\\_text/en/index.html](http://www.who.int/gho/ncd/risk_factors/obesity_text/en/index.html), accessed 02.01.2015.
- Xu, Jing and Norbert Schwarz (2009), “Do We Really Need a Reason to Indulge?” *Journal of Marketing Research*, 46 (1), 25–36.
- Yaniv, Gideon, Odelia Rosin, and Yossef Tobol (2009), “Junk-Food, Home Cooking, Physical Activity and Obesity: The Effect of the Fat Tax and the thin Subsidy,” *Journal of Public Economics*, 93 (5–6), 823–30.
- Yoon, Yeosun, Zeynep Gürhan-Canli, and Norbert Schwarz (2006), “The Effect of Corporate Social Responsibility (CSR) Activities on Companies With Bad Reputations,” *Journal of Consumer Psychology*, 16 (4), 377–90.
- Zhang, Ying, Ayelet Fishbach, and Ravi Dhar (2007), “When Thinking Beats Doing: The Role of Optimistic Expectations in Goal-Based Choice,” *Journal of Consumer Research*, 34 (4), 567–78.