

# **The affective dynamics of hedonic versus healthy food choices: Making salient post-consumption affect promotes healthy food choices**

**Claudia Toma, Marcel Zeelenberg and Olivier Corneille**

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Keywords: affective dynamics, food choices, post-consumption satisfaction

JEL Classifications: I

CEB Working Paper N° 16/026  
June 2016

The affective dynamics of hedonic versus healthy food choices:  
Making salient post-consumption affect promotes healthy food choices

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Word count (including abstract and text, but excluding references): 2800

### Abstract

This research provides original evidence for the impact of anticipated affects on hedonic versus healthy food choices. Study 1 and 2 reveal the asymmetric affective dynamics of hedonic and healthy food choices and pave the way for our behavioral prediction: People anticipate more instant than post-consumption satisfaction when choosing hedonic over healthy food, whereas they anticipate more post-consumption than instant satisfaction when choosing healthy over hedonic food. In Study 3, the experiment proper, we further find that orienting people's attention on immediate post-consumption affects helps them redirecting their choice towards a more healthy food option. These findings suggest that a simple affect-focused manipulation may prove very effective in increasing healthier choices. The role of anticipated affect in inter-temporal choices is discussed.

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Evidence has accumulated that people experience difficulties in trading instant rewards for larger long-term goals. Little evidence exists, however, regarding factors that may help people overcoming those difficulties. A review paper by Berns, Laibson and Loewenstein (2007) discussed the role that anticipated affect may play in intertemporal choices, but empirical evidence remains scarce. The present paper aims to contribute to this theoretical and empirical question by providing original evidence for the impact of anticipated affects in inter-temporal food choices. More specifically, we hypothesized that people selecting hedonic (short-term reward) food may anticipate more pleasure during (“That pie looks delicious!”) than after (“Why did I eat the whole thing?”) its consumption, while the reverse should be observed when people select healthy (long-term reward) food. In turn, we predicted that enhancing the accessibility of negative immediate post-consumption affects naturally associated with hedonic food choices would promote healthier food choices.

People often prove unable to trade long-term goals over instant pleasure. Behavioral economics has contributed to the question of why people overestimate immediate rewards over delayed ones (e.g., Loewenstein, Read, & Baumeister, 2003). Similarly, self-regulation research contributed to our understanding of people’s struggles with tempting options (Mann, De Ridder & Kentaro, 2013). More recently, research on affect-based decision making (e.g., Mellers & McGraw, 2001; Van der Pligt et al., 1998) and on affective forecasting (e.g., Wilson & Gilbert, 2003) have advanced our understanding of people’s (mis)estimates about the affective consequences of their choices.

In the present research, we borrowed from the latter literature to examine the affective

dynamics of healthy versus hedonic intertemporal food choices. Unlike research in behavioral economics in general, and the hyperbolic discounting in particular (Shapiro, 2005), we did not seek to examine how people discount those rewards over time. Unlike research on affective forecasting, we did not examine people's inaccuracies in predicting their future affective states. Based on this literature, however, we reasoned that making people anticipating the *immediate* (i.e., and so less discounted) negative affective consequences of their choice would make them switch from hedonic to healthier food choices.

To the best of our knowledge, the latter effect, although it was discussed in the context of the theory of planned behavior research (e.g., Richard, Van der Pligt & De Vries, 1996a, 1996b, Van der Pligt et al., 1998) and in the context of consumer choice between generic and luxury brands (Simonson, 1992), has never been experimentally tested in the context of eating behavior and, more importantly, in the context of intertemporal choices.

Study 1 & 2 examine our affective dynamics hypothesis, namely that people spontaneously anticipate hedonic food to be associated with higher consumption satisfaction whereas they anticipate healthy food to be associated with higher *post*-consumption satisfaction. Study 3 is the experiment proper that examined whether reorienting people's focus towards immediate post-consumption affects may promote healthier choices. We report all measures, manipulations, and exclusions in these studies.

## Study 1

### Method

201<sup>1</sup> participants (64 men, 137 women,  $M_{age}=20.63$ ,  $SD=2.38$ ) were randomly assigned to one of two conditions aimed at balancing possible order effects (i.e., hedonic option first, or healthy option first).

After giving informed consent, participants were invited to take part in a survey about

food consumption at the local university cafeteria. They first completed the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988) and answered a few cover questions about the cafeteria (e.g. “I think the canteen offers enough variety in products”). Then, participants reported their preferences for sweet and savory items served at their canteen, and were provided with two food alternatives (i.e., an apple versus a chocolate pie; a pizza versus a salad). For each alternative one item was pretested to be high in desirability but low in healthiness (i.e., chocolate pie and pizza slice) and the other item to be low in desirability but high in healthiness (i.e., apple and salad).

For each item composing the food alternatives (i.e., the apple vs. the chocolate pie; the pizza vs. the salad), participants first reported how satisfied they expected to feel if they would choose it, using a slider going from 0 to 100 with five labels: very unsatisfied, unsatisfied, neutral, satisfied, and very satisfied. After reporting their expected satisfaction with the food items, participants were asked to report which food item they would chose to eat. Next, they were asked some complementary cover questions about the cafeteria. Finally, they were asked to think back of their food choices and to report how satisfied they think they would actually feel after having consumed the food and having left the canteen. Demographic data (age and gender) were also collected at the end.

## **Results and discussion**

More participants chose for pizza ( $N = 125$ ) than for salad ( $N = 76$ ),  $\chi^2(1, N = 201) = 10.99, p < .001$ , while they showed no clear preference for the chocolate pie ( $N = 101$ ) over the apple ( $N = 100$ ). There were no order or gender effects.

We tested our hypothesis by focusing on consumption versus post-consumption satisfaction differences for each of the four items, separately. Three of them supported our hypothesis, and the effect was marginal for the fourth one. Specifically, participants choosing for the pizza (over the salad) expected more satisfaction at consumption ( $M=73.54$ ;

$SD=16.79$ ) than after consumption ( $M=65.03$ ;  $SD=19.54$ ),  $t(123) = 5.14$ ,  $p < .001$ ,  $d = 0.46$ . Likewise, participants choosing for the chocolate pie (over the apple) expected more satisfaction at consumption ( $M=72.17$ ;  $SD=15.58$ ) than after consumption ( $M=59.08$ ;  $SD=20.96$ ),  $t(100) = 7.36$ ,  $p < .001$ ,  $d = 0.76$ . In contrast, participants choosing for the salad (over the pizza) expected marginally more satisfaction after consumption ( $M=75.51$ ;  $SD=11.99$ ) than at consumption ( $M=72.93$ ;  $SD=13.10$ ),  $t(76) = -1.16$ ,  $p = .11$ ,  $d = 0.18$ . And participants choosing for the apple (over the chocolate pie) expected more satisfaction after consumption ( $M=67.91$ ;  $SD=16.92$ ) than at consumption ( $M=64.04$ ;  $SD=16.65$ ),  $t(99) = -2.07$ ,  $p = .041$ ,  $d = 0.23$ . The effects remained the same when controlling for BMI.

Study 1 thus provides preliminary support to our affective dynamics hypothesis. This implies that anticipated consumption and post-consumption satisfaction ratings show opposite trends when it comes to consuming hedonic or healthy food. Study 2 is aimed to generalize this effect by replicating the design and using a different scenario, different foods (this time involving food alternatives showing closer caloric contents), a different data collection setting, and different set of affective measures.

## Study 2

### Method

148 participants (91 women, 54 men, 3 unspecified;  $M_{\text{age}}=30.55$ ,  $SD=12.39$ ) were recruited through Facebook and completed the study on Qualtrics.

After giving informed consent, participants were asked to imagine the following (“*Your day is over. You had dinner already. Now it’s time for your favorite TV show. You are still a little bit hungry. You know that two snacks are left in the kitchen: a bag of chips and a banana*”). They were asked to rate (1 = *Not at all*; 7 = *Very much*) how satisfied, fulfilled and content they expected to be about consuming the banana (i.e., a healthy but not so desirable

food item;  $\alpha = .80$ ) and about consuming and the bag of chips (i.e., a desirable but unhealthy food item;  $\alpha = .76$ ) in that situation. Rating order for the two food items was randomized across participants. Next, they were asked which item they would choose to eat (*at the time of commercials*). Finally, they were invited to again report how satisfied, fulfilled and content they would feel, but this time *after* having consumed the food item (*and the TV show is now over*;  $\alpha_{\text{chips}} = .88$ ,  $\alpha_{\text{banana}} = .90$ ). Participants then completed ego depletion and long-term goal measures (results can be found in the supplementary materials). Finally, demographic data were collected and participants were thanked for their participation.

### **Results and discussion**

Participants chose the chips ( $N = 93$ ) more often than the banana ( $N = 55$ ),  $\chi^2(1, N = 148) = 9.75, p = .002$ , which is consistent with the primacy of instant reward options. No effect of gender was found.

Participants who had chosen the chips expected more satisfaction (computed as the mean of satisfied, fulfilled, content) during consumption ( $M = 5.12$ ;  $SD = 1.14$ ) than after consumption ( $M = 4.72$ ;  $SD = 1.35$ ),  $t(92) = 3.97, p < .001, d = 0.42$ . Conversely, participants who had chosen the banana expected more satisfaction after consumption ( $M = 5.55$ ;  $SD = 0.94$ ) than during consumption ( $M = 5.25$ ;  $SD = 1.15$ ),  $t(54) = -2.12, p = .038, d = 0.29$ . Study 2 shows again that anticipated affect for hedonic food is higher during consumption than after consumption, while the opposite is true for more healthy food. This supports our affective dynamics hypothesis in the context of intertemporal food choices.

### **Study 3**

Study 1 and 2 provide initial support for the asymmetric affective dynamics of hedonic and unhealthy food choices. People anticipate more instant satisfaction when choosing hedonic food, but more post-consumption satisfaction when choosing healthy food. This



pattern is consistent with our main prediction that orienting people towards the immediate affective consequences of their consumption may lead them to choose healthy over hedonic food items. This is what we examine next.

Making salient post-consumption affects may have two advantages. First, it should distract people from the competing hedonic food. Second, it should make them realize that choosing the hedonic option may put them in an aversive affective state. Because this aversive state is not delayed in time (e.g., as health problems would be) but rather directly follows the actual food consumption, it should not suffer from a significant discounting effect. Hence it may be a more proximal and strong motivator for choosing healthy food.

## **Method**

124 participants (34 females and 90 males;  $M_{age} = 20$  years old;  $SD_{age} = 3.02$ ) were approached at the university canteen, participated voluntarily. They were randomly assigned to a choice or post-consumption salience condition.

The study was presented as a study dealing with food choices and food justification. We used the same scenario as in Study 2, but changed the food alternatives to make them more comparable in terms of type of consumption they elicit, namely a bag of chips and a branch of grapes (easy to “nibble” in front of the TV). In the *choice salience condition*, participants were asked to focus on their affective reactions about their choice when answering questions. In the *post-consumption salience condition*, they were asked to focus on their affective reactions following food consumption (i.e., ‘How *satisfied / content / pleased* do you think you will be *if you would choose / after choosing and eating the grapes / potato chips*’). All participants reported their evaluation for both food items (rating order was counterbalanced). After reporting their affective reaction to the two food items, participants indicated their true choice, and were asked to provide reasons for choice. Finally, measures of self-control were also collected (see supplementary material). After demographic measures

were collected, participants were debriefed and thanked for their participation.

## Results and discussion

Participants in the choice salience condition chose more chips ( $N = 41$ ) than grapes ( $N = 21$ ), while in the post-consumption salience condition participants reversed their choices from chips ( $N = 28$ ) to grapes ( $N = 34$ ),  $\chi^2(1, N = 124) = 5.52, p = .016$ . This is in line with our hypothesis and suggests that by focusing participants on their post-consumption affects, the choice of unhealthy food is reduced by 21%.

Next we compared satisfaction with grapes and chips as a function of the salience condition. In line with Study 1 and 2 findings, but this time reflecting an experimental effect, a mixed-ANOVA confirmed the predicted reversal,  $F(1, 122) = 8.596, p = .004$ . The satisfaction with chips (i.e., the hedonic food item) was rated more positively in the choice salience condition ( $M = 4.73; SD = 1.07$ ) than in the post-consumption salience condition ( $M = 4.21; SD = 1.19$ ) condition,  $t(122) = 2.529, p = .014, d = 0.46$ . Conversely, the satisfaction with grapes (i.e., the healthy food item) were rated more positively in the post-consumption ( $M = 5.04; SD = 0.96$ ) than in the choice salience condition ( $M = 4.65; SD = 1.13$ ) condition,  $t(122) = -2.056, p = .040, d = 0.37$ .

Finally, we analyzed the reasons that participants provided for their choice (18 did not provide any). The 116 reasons were categorized as hedonic when pointing to taste (e.g., *I find potato chips more tasty*) or to another hedonic advantage (e.g., *I'm too lazy to wash the grapes*). They were categorized as health-related when pointing to a health advantage (e.g., *Grapes are much healthier than chips*) or nutritional advantage (e.g., *Grapes take away some of my thirst too*). Two coders were used and they discussed their few disagreements regarding the categorization. Hedonic justifications were more frequent among participants selecting chips ( $N = 93$ ) than grapes ( $N = 19$ ) whereas health-related justifications were more frequent among participants selecting grapes ( $N = 81$ ) than chips ( $N = 7$ ),  $\chi^2(1, N = 124) = 51.03, p$

< .001. Interestingly, the salience condition did not influence type of justification participants. This might imply that the justifications were construed after they choice, rather than motivating their choice. If that is the case, people may have limited introspection in their choice processes (Nisbett & Wilson, 1977). This would allow simple reminders of post-consumption affect to influence behavior, without people deliberating about it.

### **General Discussion**

The three studies reported here provide original empirical evidence both to our affective dynamics hypothesis regarding the intertemporal affective consequences of hedonic versus healthy food choices and to its behavioral implications for healthier food choices. Specifically, we reasoned and found (1) that people anticipate more satisfaction during than after hedonic food consumption, whereas the reverse is true for healthy food consumption, and (2) that making salient post-consumption affects helps people redirect their food decisions towards healthier food options.

The present research suggests that people anticipate different affects for different food choices at different points in time. More importantly, it suggests that making salient those anticipated affects has a strong impact on people's food choices, such that simple anticipatory affective manipulations can change people's food consumption decisions. This is consistent with recent work by Cornil and Chandon (2015) showing that having people focus anticipatorily on multi-sensorial experiences associated with the consumption of energetic food helps them choosing smaller portions. In the same vein, Dassen, Jansen, Nederkoorn, and Houben (2016) found that the induction of episodic future thinking lead to more restricted caloric consumption.

The present findings have important theoretical and practical implications. At the theoretical level, they provide evidence that anticipated affects plays an important role in intertemporal food choices. The role of anticipation received little consideration in

economical research because mental simulations are not considered as utility sources (Loewenstein, 2006). Behavioral economists acknowledged the role of anticipated affect (Berns et al., 2007), but little empirical evidence exists in the context of intertemporal choices. Clearly, one interest of the current *immediate* affects approach is to overcome delay-discounting issues that make people choose little short-term rewards over larger long-term ones. Of importance too, anticipated affects seem to be a stronger predictor of people's actual food choices than self-control and long-term goals (see supplementary analyses).

At a more practical level, the current paper suggests that subtle affective forecasting manipulations may prove highly effective – and so may usefully complement - more classic approaches opposing long-terms health-related goals to instant pleasure. Overweight has become a worldwide problem that negatively impacts both developed and emerging countries. Nowadays, about two-thirds of the US population aging more than 20 is considered overweight or obese and childhood overweight is growing rapidly in the US and in low and middle-income countries (Lobstein et al., 2015). As indicated in President Obama's recent executive order to " Using Behavioral Science Insights to Better Serve the American People », social scientists are invited to join forces in solving timely a social issue that lowers the physical, psychological and social well-being of billions around the globe (Wardle & Cooke, 2005) and deteriorates economies and natural environments (Roux & Donaldson, 2004).

There are a number of social factors contributing to weight gain in the normal population. Among those are the availability and convenience of highly palatable and energetic – yet, nutritionally poor – food (Lee, 2012). To a large extent, the problem boils down to a very simple issue: people's inability to choose healthy food promoting long-term health goals over high caloric hedonic foods granting instant pleasure. By examining here the role of anticipated affects in intertemporal choices, the present study suggests a simple

effective way that may help people choosing for healthier food options: making salient their immediate post-consumption affects, which are less likely to suffer from delay discounting. Future research may examine whether this mechanism proves equally effective in the long-term and can be extended to other consumption domains (e.g., binge drinking, gambling).

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## Footnotes

<sup>1</sup> The sample size was determined using the effect size of the study published by Richard, Van der Pligt, and de Vries (1996a) in which they investigated the anticipated negative effect of thinking about or after having unprotected intercourse. With a  $d = 0.32$  and 95% power, we determined that the minimum sample needed to detect the effect is 108 participants (using G\*Power). The same technique was used for Studies 2 and 3.

## Supplementary material

Beyond the main focus of the paper, we also tested the role of factors such as self-control and goals (to be healthy) on peoples' choices toward hedonic and healthy food. In line with the decision affect theory (Meller & McGraw, 2001), we tested whether anticipated satisfaction influences food choices beyond self-control and goals. We regressed choices on the three factors in Studies 2 and 3 (where self-control and goals were measured).

In Study 2, self-control was measured with a short version of the State Ego Depletion Scale (Ciarocco, Sommer, & Baumeister, 2001). On a seven-point scale (1 = not true; 7 = very true), participants indicated whether: "I feel mentally exhausted", "Right now, it would take a lot of effort for me to concentrate on something", "I feel sharp and focused" ( $\alpha = .88$ ). Long-term goals measure included four items ( $\alpha = .79$ ) such as "It is important for me to be healthy" on a seven-point scale from 1 (strongly disagree) to 7 (strongly agree).

Results revealed that the choice for chips (2) over banana (1) was influenced by the anticipated satisfaction with chips,  $B = .98$ ,  $SE = .21$ , Wald  $\chi^2(1, N = 145) = 22.33$ ,  $p < .001$ , by the anticipated satisfaction with banana,  $B = -.77$ ,  $SE = .22$ , Wald  $\chi^2(1, N = 145) = 12.01$ ,  $p < .001$ , marginally by the goals to be in good health,  $B = -.46$ ,  $SE = .26$ , Wald  $\chi^2(1, N = 145) = 2.98$ ,  $p = .08$ , and not by self-control (ego-depletion), Wald  $\chi^2 < 1$ .



In Study 3 self-control was measured with the Brief Self-Control Scale (Tangney, Baumeister, & Boone, 2004) - 10 items of on a seven-point scale from (1) not at all to (7) very much ( $\alpha = .730$ ). Goals were not measured in this study. Results revealed that the choice for chips (2) over the grapes (1) was influenced by the anticipated satisfaction with chips,  $B = .87$ ,  $SE = .23$ , Wald  $\chi^2(1, N = 124) = 14.62$ ,  $p < .001$ , by the anticipated satisfaction with grapes,  $B = -1.17$ ,  $SE = .29$ , Wald  $\chi^2(1, N = 145) = 16.07$ ,  $p < .001$ , and not by the self-control,  $B = -.43$ ,  $SE = .30$ , Wald  $\chi^2(1, N = 124) = 2.03$ ,  $p = .15$ .