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Cookie or apple?

The effect of emotion, restrained eating and self-licensing on food choice

A thesis submitted in partial fulfilment of the requirements for obtaining the Master degree Applied Communication Science

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Abstract

Background

In the domain of human eating behaviour, it is widely accepted that emotions can affect food choice, however most of studies focus on negative emotions while the effect of positive emotions is less conclusive. This study extends the effects of emotions on food choice by including positive emotions; besides, restrained eating and self-licensing are exported to examine their effects on food choice.

Methodology

Sample was prepared in a natural setting. College students (N=137, 74.3% female) were asked to choose between apple or cookie after finished an exam. After choice, they filled in questionnaire about exam, emotion, eating behaviours and satiety.

Results

Results showed 52.6% (N=72) of the participants chose cookie, and food choice was significantly affected by positive hedonic emotions, negative self-conscious emotions, restrained eating and goal attainment. Gender, age and satiety had no effect. This study revealed both positive and negative emotions affected food choice. Goal attainment, mediated by positive hedonic emotion, led to hedonic food option; it might be explained by self-licensing effect.

Achievements

This study has proved that positive emotions and restrained eating could also affect food choice. Self-licensing might be a possible explanation about goal-attainment's effect on food choice. It suggests future studies further testing association between food choice and positive emotions, and including weight status while testing restrained eating's effect on food choice.

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Introduction

Human eating behaviour has been widely studied. Scientific results are used to inform people for preventing diseases like obesity, diabetes or the metabolic syndrome, which are strongly associated with food consumption and food choice. Likewise, many researchers have attempted to explore ways in which consumers can be encouraged to select healthier food (Bellisle, 2003). Human food intake behaviour involves activities "of selecting and purchasing a wide variety of food, organizing meal patterns, and actual ingestion" (Bellisle, 2003). For decades, scientists from the domain of human behaviour have been doing research to find out what factors influence food choice. Food consumption is a food-related behaviour that people do daily. Food choice implies how people structure their life (Conner & Armitage, 2002). Food can be labelled roughly as "healthy food" and "unhealthy food". "Healthy food" is a general term to describe food that is considered to be beneficial to health, and contain low sugar, fat and salt. By contrast, "unhealthy food" or "junk food", typically contains high level of calories from sugar or fat with little protein, vitamins or minerals, normally in the form of salted snack foods, candy, sweet desserts, fried fast food, and carbonated beverages (O'Neill, 2006). This distinction of healthy and unhealthy food is important, because it is used in many studies related to food intake related diseases, such as obesity (Fraser et al., 2011; Hutchinson et al., 2012; Roberson et al., 2012). Based on the plethora of studies done by researchers, human food intake behaviour is impacted by a large set of factors, including physiological factors, sensory factors, psychological factors and environmental factors.

Several factors influence food choice. One important factor that has been investigated by many researches is emotion. The reason for this is, that researchers believe that emotions play an important role on diseases like obesity and diabetes and the aetiology of these diseases (Canetti et al., 2002). Since, it is commonly accepted that emotions influence food choice (Canetti et al., 2002; Larsson & Hellzén, 2004), it is accepted that food choice is a psychology process. Emotions can be defined as a mental status in a form of action readiness or tendency (Frijda, 1986; Frijda et al., 1989; Reisenzein, 2007; Frijda, 2009). Basically, emotions affect food choice in the form of "emotion-induced" food intake, and it happens during a complex process where other factors can also present, such as eating behaviour, individual characteristics and situational context (Macht, 1999; Lowe & Fisher, 1983).

Emotions are widely studied by researchers in the context of laboratory-setting environments to see how either positive or negative emotions affect food choice, which could be induced by outside stimulus, such as movies (Macht & Mueller, 2007). Other researchers studied the effect of emotions by self-reported participants (Wallis & Hetherington, 2009). In these studies, the participants needed recall the situation and the emotions they experienced at that moment. That study was implemented in a laboratory setting environment, and the result suggested that the different variety of foods could affect the correlation between negative emotions and eating. According to our best knowledge, little research has been done to explore the effect of emotions on food choice in a naturally setting environment. In particular, no studies have been done to better understand the effect that emotions have that are induced by events with high pressure to achieve certain results. Therefore, this study aims to prove how emotion experienced immediately after an exam affect the food choice of students. An exam situation can be characterized as a setting in which a certain cognitive performance is expected from students.

This study aims to examine the key factors that can influence food choice either hedonic or healthy food choice. Immediately after leaving the exam room, students are offered to make choice between a cookie (hedonic option) and an apple (healthy option) and fill in a questionnaire including various questions about their emotional state. Moreover, other factors that can determine the food choice

are also measured, such as restrained eating status, perceived exam performance and satiety status. This approach allows us to disentangle the type of emotions that drive hedonic food choice compared to a more healthy choice. We hypothesize that in a naturally setting environment, not only negative emotions, but positive emotions can affect food choice.

Another factor we also explore in this study is self-licensing. Normally, self-effecting functions of committing good deeds make people feel secure in their moral self-regard; and in that case, people can do potentially indulgent actions without worrying about feeling or being judged improper (Merritt et al., 2010). good deeds make people feel secure in their moral self-regard; and in that case, people can do potentially indulgent actions without worrying about feeling or being judged improper (Merritt et al., 2010). This concept has been widely studied in the domains of political correctness, prosocial behaviour, and consumer choice (Monin & Miller, 2001; Sachdeva et al., 2009; Khan & Dhar, 2007). Among the three domains, self-licensing on consumer choice is the one that is most related to people's daily life. The results show that self-licensing can affect people's consuming choice on either visible goods (luxury items versus necessities) or invisible goods (lowbrow films versus highbrow films), and this concept can lead people to hedonic or indulgent options, such as luxury items or lowbrow films (Dahl et al., 2003; Khan, Dhar, 2006). Lately, there are studies on self-licensing effect in the domain of health (Chiou & Wan, 2011; Finkelstein & Fishbach, 2010; Chiou et al., 2011); the results show that while people valued healthy food intake, they tended to license themselves to stray away from subsequent health-related behaviours but increase self-indulgent behaviours with the disinhibition of self-control. Referring to our current study, we build on this notion, since the food options here also include both hedonic option and healthy option. To our best knowledge, there is so far no sufficient empirical evidence that illustrates how self-licensing can affect food choice. We hypothesize that self-licensing might be a possible explanation to why people chose hedonic food option when they perceived they performed good or better than average.

Theoretical framework

In this theoretical chapter, a general model of factors affecting food choice will be introduced first with the aim to gain an overview of the factors that have been studied regarding to food choice. Next, the factors selected to study in this study are discussed with the findings from previous studies. Among those factors, emotion is discussed as the central focus of this study. In addition, restrained eating is discussed based on its effect on food choice as well as its potential association with other factors relevant to this study, such as weight status or situational goal(s). Finally, a conceptual model is presented to give more clear information about the current study.

General model of factors affecting food choice

In order to gain an overall picture of the factors that influence food choice, Conner and Armitage (2002) presented a general model based on earlier research. According to their model (figure 1), the factors that impact food choice can be divided into three categories: one category is the food itself; the second is the environment in which individuals live; the third is the individual him or herself. Among these factors, food characteristics refer to the information that the food itself communicates to an individual (Conner & Armitage, 2002).

Important to note is that within different environments, information can be interpreted differently. For example, people may see pork as alternative of beef in most countries, but it is a forbidden food in Muslim countries due to religious practices. The factor that interests psychologists especially is the individual, which can be further divided into sensory, psychological and physiological factors. These three individual factors are likely to interact with food and the external environment. Physiological factors influence the food choice based on the reasons more physically related to food choice, such

as hunger and satiety. An individual who is hungry may make different food choice than an individual who is not. Besides, other physiological factors, such as allergy to certain food ingredients, can also influence food choice. Psychological differences between individuals also lead to different food choice. For instance, personality differences may have an impact on self-control while making a food choice (Larsson & Hellzén, 2004). Mood is also a factor that influences the food choice of one individual. For decades, researchers have been studying how emotion or mood impacts food choice.

Palatability is the hedonic reward provided by foods or fluids that are agreeable to the "palate" in regard to the homeostatic satisfaction of nutritional, water, or energy needs (Friedman & Stricker, 1976). Living in this food-rich environment, people can have more food choice than ever; another fact is that obesity becomes a serious problem of health, “estimated to be the fifth leading cause of mortality at global level” (Al-Rethaiaa, 2010). Meanwhile, due to the decades-long campaigns on health and healthy food, people are more concerned about their own food intake; dieting, restrained eating are some of the eating behaviours that people adopt to achieve their long-term goal of health. On the other hand, people face more emotion-related challenges, which can be stress, depression or joy and ecstasy (Evers et al., 2009). Emotion and food are not totally different stories, conversely, "food affects the way we feel, and researchers have included mood as a key variable determining food choices" (King & Meiselman, 2009). In other words, there is a relationship between emotion and eating behaviour (Canetti et al., 2002).

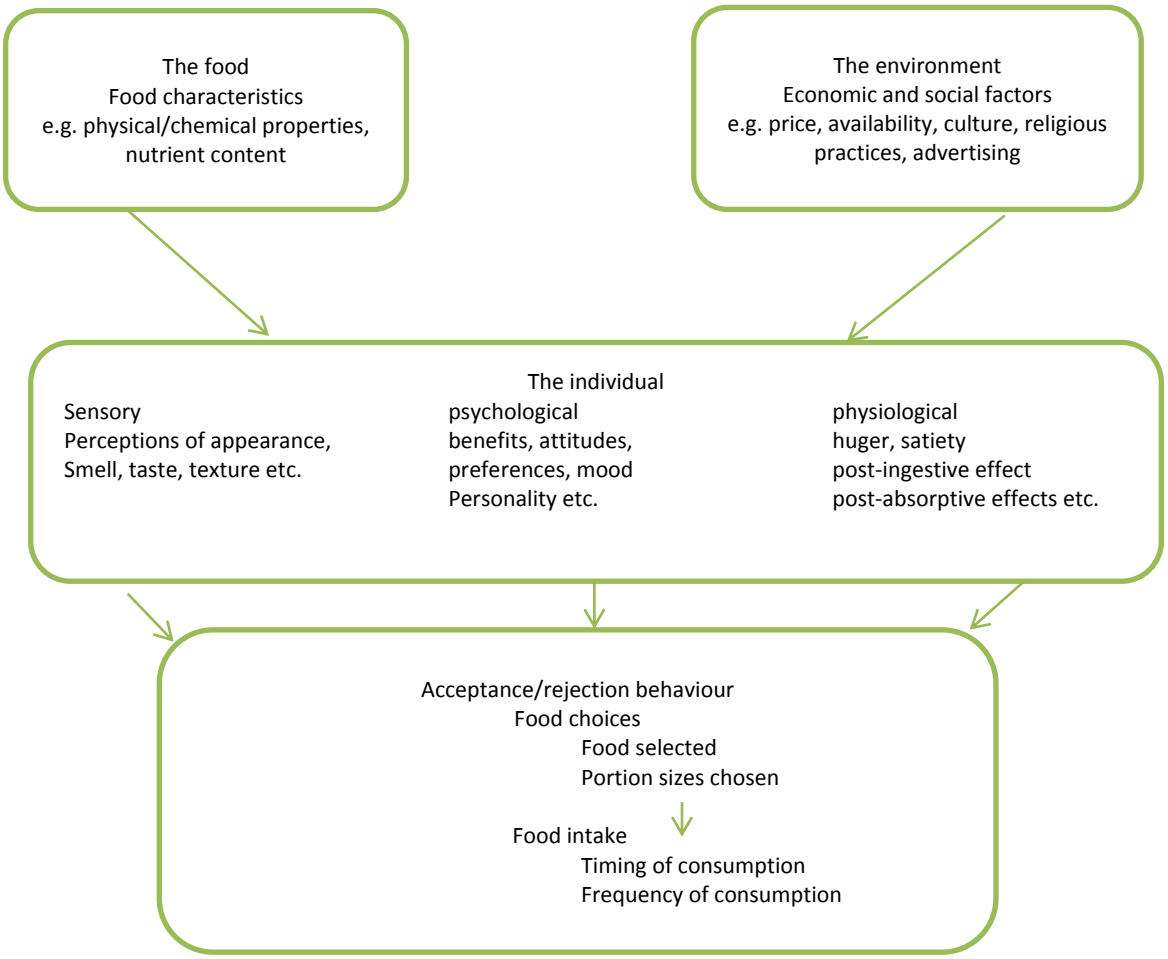

Figure 1: the major influences on our choice of food (Cornner & Armitage, 2002, P6)

Emotions and food choice

In humans, emotion involves "physiological arousal, expressive behaviours, and conscious experience" (Myers, 2004). It is a general term that is associated with mood, temperament, personality and disposition. It is widely admitted that emotions and food choice have association with each other. They generally interact with each other, which varies from strong and obvious to subtle and unconscious. Emotions can impact food choice while food choice can also induce certain emotions (Gibson, 2006). Normally, mood and emotion are discussed together; however, they are defined differently by researchers. A mood is a relatively long lasting emotional state. Moods differ from emotions because they are less specific, less intense, and less likely to be triggered by a particular stimulus or event (Thayer, 1998). An emotion is defined as short-term affective responses to “appraisals of particular stimuli, situation or events having reinforcing potential” (Gibson, 2006).

Researchers tend to divide emotions roughly in two clusters, namely positive emotions and negative emotions. Researchers at earlier stages have put more focus on the influence of negative emotion on eating behaviour. It is widely accepted that negative emotions can lead to food overconsumption while positive emotions related to food choice have not been studied as thoroughly as negative emotions (Layman, 1982; Macht, 1999; Patel & Schlundt, 2001). However, there are studies done to explore the relationship between positive emotions and food choice. Canetti et al.(2002) did a study to test the hypothesis that mood effects, whether positive or negative, or both could lead to a change on the amount of food intake. The results from that study showed that both positive and negative emotions could make people consume more food; while “the influence of emotions on eating behaviour is stronger in obese people than in non-obese, and it is stronger in people on diets than in non-diets” (Canetti et al., 2002). Besides Canetti’s study, Patel and Schlundt (2001) also found that food consumption increased in both positive and negative moods, compared to in a neutral mood.

The influence on eating behaviour, induced by emotions, appears to vary among different individuals. For instance, emotion may increase food intake in a group of restrained eaters, but decrease food intake in a group of normal eaters (Macht, 2008; Canetti et al., 2002). Furthermore, different emotions may increase or decrease food consumption in the same group of individuals. Stress, one of the emotions frequently studied by researchers, may increase food consumption in restrained eaters while decrease in the normal eaters. Studies show that stress affects health not only through direct physiological processes but also through changes in health behaviour such as food choice and consumption (Wallis and Hetherington, 2009).

As mentioned, previously people cluster emotions simply into positive emotion and negative emotions. However, in this study, we cluster emotions additionally into hedonic emotions and self-conscious emotions (Ramanathan & Williams, 2007). The concept of hedonic and self-conscious emotions was first distinguished and discussed with the topic of food choice by Giner-Sorolla (2001). The hedonic emotions are emotions that arise immediately and automatically after a stimulus, “due to a heightened accessibility of such emotions because of a longer developmental history of experience” (Ramanathan & Williams, 2007).The self-conscious emotions are emotions that arise more consciously and slowly, requiring time to process the emotions with efforts and thoughts (Ramanathan & Williams, 2007), and more relate to individual sense of oneself and his/her consciousness of others' reactions to him/herself. Among the hedonic and self-conscious emotions, some of them are often studied emotions, such as stressed (negative hedonic emotion, Lowe & Kral, 2006) and guilty (negative self-conscious emotion, Steenhuis, 2009). Lowe and Kral’s study (2006) showed that stressful emotion impacts food choice, and its effect was different on restrained eaters and unrestrained eater; the restrained eaters tended to increase and unstrained eaters to decrease the food intake when felt stressed. Steenhuis’ study (2009) on guilty feelings on female college

students showed that participants mainly felt guilty while took between-meal snack in the afternoon and in the evening; besides, they also felt guilty at certain social situations, such as at friend's place, because those occasions easily led to "overeating". The possible explanation on why studies on negative self-conscious emotions (such as guilty) focus on feeling after taking food might be because self-conscious emotions are usually less immediate , and more accessible after a while (Ramanathan & Williams, 2007).

In sum, based on the results done by numerous researches, emotion is a significant factor that can influence food choice. It is accepted that negative emotions can lead to food overconsumption; and the effect of positive emotions on food choice and food consumption is realized and proved by certain researches, but this is less conclusive.

Eating behaviour and restrained eating

For human beings, eating is a daily activity. The increased awareness of health has brought various eating patterns like fasting, dieting, binge eating or emotional eating (Eldredge & Agras, 1994). Some eating practices are more related to the goal of health concern, such as restrained eating and dieting; and some eating practices are unhealthier, such as eating disorder, emotional eating or binge eating. In this section, we further elaborate on restrained eating.

Restrained eating is a concept introduced by Herman and Mack (1975), and it is one the three eating factors to measure food intake behaviours (TEFQ, Stunkard & Messick, 1985), the other two factors are disinhibition and hunger.It describes that people are strict in food intake for the purpose of weight control. In response to restrained eating, restrained eaters are defined as individuals who concerned with their weight and using dieting behaviours' to achieve the goal of their "ideal weight". However, in most cases, such dieting behaviours end unsuccessfully (Mumford et al., 2008). Restrained eaters can be clustered as "restrained eaters with normal weight" and "restrained eaters with overweight". The mechanisms for these two clusters of restrained eaters are not the same. Normally, a restrained eater with normal weight has lower tendency to choose unhealthy food under negative emotion, such as stress; while a restrained eater with overweight has higher tendency to choose unhealthy food under the same emotion (Pierce et al., 1996; Macht et al., 2002; Evers et al., 2009). Ruderman (1986) and Lowe (1993) also gave credits to this point that whereas normal-weight restrained eaters counter-regulate, obese restrained eaters merely fail to regulate, suggesting that the restraint-disinhibition relationship may vary according to weight status and the relationship between restraint and weight status may not be mediated by disinhibition eating. Referring to earlier studies about restrained eating, weight status has been frequently considered by researchers. According to Ouwehand and Papies (2010), living in an environment where cues of attractive and high-calorie food around, overweight and restrained eating could hardly succeed because of failures of self-control against food temptation. They also indicated that tempting food cues trigger processes of successful self-regulation in restrained eaters with a lower body weight, leading them to make healthier choices (Fishbach et al., 2003; Fishbach& Shah, 2006).

Besides weight status, the context can be a factor that affects the effectiveness of restrained eating. Very often, individuals adopt restrained eating not only because of health concern, but also as a result of the social context, such as peer pressure, social standards on beauty (Bublitz et al., 2010). The motivation of adopting restrained eating can be diverse. Decisions made by restrained eaters can vary with the changes of situational context, especially when they live in a food-rich environment that may enlarge the chances that they can encounter food temptation or decrease the possibilities to be prudent restrained eaters. Making a decision on food choice is affected by several factors. In terms of behaving restrained eating, one is the differences/similarities of food alternatives (Bublitz et al., 2010). Also, the situational goal or the context can also play a role on making a food choice. For example, if a person has to a quick breakfast while running to his work, the person can give different

credits to the foods; in this context, some forbidden foods may be seen as acceptable substitutes (e.g. Chocolate bar or apple) to situation when there is enough time for a normal breakfast. Another factor that can affect the effectiveness of restrained eating is different levels of self-control (Poynor& Haws, 2009). Nowadays, restrained eaters living in a food-tempting environment with multiple social tasks often face situations of conflict between food temptation and dieting goals. Individuals have different levels of self-control, and the ability to exercise self-control in order to maintain the dieting goal is different among people. Due to that, different people may label foods differently with "acceptable alternatives", "healthy choices" or "hedonic foods". To take chocolate as example, a restrained eater with high level of self-control may label chocolate as "hedonic foods"; however a restrained eaters with normal level of self-control may label chocolate as "acceptable alternatives"; while a restrained eaters with low level of self-control may label chocolate as "healthy choices" compared to candy or cookie. However, no matter what, the conflict faced by most restrained eaters is the conflict between "the immediate rewarding" and "the long-term dieting goal". And "the immediate rewarding" is not only the food pleasure or hedonic eating, but can also be time efficiency (fast and handy breakfast on the way to job), and "the long-term dieting goal" may not only be health concern, it can also be social influence, such as peer pressure and social standard on beauty (Bubitz et al., 2010). Without high and consistent self-control, restrained eaters can easily face a cycle of strict restrained eating period and disinhibition of hedonic indulgence.

Self-licensing and self-control

Most people indicate that healthy eating is of key importance to them. However, consumers frequently face self-control dilemma's when choosing what and how much to eat. When tempted with a palatable food, the temptation can be too pervasive. There are different ways in which individuals may deal with temptations in daily life. In some situations, people may feel entitled to indulge. For example, a person who just worked out at the gym may feel that he successfully fulfilled the goals to exercise and be healthy and feel permitted to indulge on a chocolate bar. Recent research suggests that individuals license themselves to indulge in temptations when they have earlier acted in line with a desirable goal. A perfect track record of good choices increases the propensity of individuals to engage in otherwise not so good behaviors. Various studies have demonstrated this licensing effect. For example moral self-licensing occurs when past moral behavior makes people more likely to do potentially immoral things without worrying about feeling or appealing immoral (Merrit et al., 2010).

Licensing can be defined as people's perception that they are permitted to take an action or express a thought without fear of discrediting themselves. Even in unrelated domains, virtuous acts can license subsequent behaviors. For example, Khan and Dhar (2006) showed that intentions to engage in virtuous activities (e.g. volunteering or making a charitable donation) led individuals to select more indulgent goods in subsequent choice tasks. Based on earlier studies, the process underlying the licensing effect is largely unconscious, and prior task with good intension or results can easily license people to hedonic or indulgent options, with reducing the guilty feeling (Khan & Dhar, 2006; Okada, 2005).

Self-control, or self-regulation in psychology, is the ability to attain goals with a purpose to select and focus on behaviour, and normally with an attempt to end with an improvement (Cullen et al., 2010). Self-control has a classic dilemma between short-term benefits and long-term benefit (Kroese et al., 2011); especially when the dilemma is a temptation, immediate pleasure and long-term goal are the good reflections of short-term benefit and long-term benefit. Most studies on eating self-control behaviour have focused on its relationship with eating behaviour, especially with restrained eating behaviour and disinhibition. Within that two, disinhibition is one of the three factors of TEFQ (Three Eating Factors Questionnaire, including restrained eating, disinhibition and hunger, Stunkard &

Messick, 1985), and is associated with less healthful food choices and a tendency of overeating (Bryant, 2008). Supported by the study done by Borg et al. (2004), people who scored higher on disinhibition tended to intake less amount of high-fibre bread and fruit. While facing palatable food, the impulse of eating palatable food is "at odds with personal health goal" (Hofmann et al., 2007), such as weight control or dieting, in this case, a conflict between impulse and self-control arises. It is a tug-of-war, and emotional suppression can deplete one's ability of self-control, which is a frequently seen consequence in restrained eating and dieting behaviour (Vohs & Heatherton, 2000). It means eating self-control is also associated with emotion. Based on the study done by Berman (2005), low eating self-control, combined with a negative emotion, tended to end with eating problems such as eating disorders or gaining weight. Besides, self-control ability is also related to weight fluctuations; research done by Toray and Cooley (1997) indicated that people with low self-control ability tended to experience more server weight fluctuations, and also scored higher on the EDI (Eating Disorder Inventory); moreover, people who had experience weight fluctuations felt less confident on their self-control ability, especially while facing negative emotions. However, there are also studies showing positive impact of self-control on eating behaviours, by improving the self-control ability, people normally ended with a decrease of unhealthy eating (Gooderick et al., 1999). Some studies gave indication that self-control ability was important in terms of leading to healthier eating attitude and behaviour (Berman, 2005).

On the basis of literatures on self-licensing, there are two versions of self-licensing: one is self-licensing due to the moral credits, and another is self-licensing due to moral credentials. For the moral credits (Nisan, 1991), it refers to one individual feels fine to commit an indulgent or immoral deeds because their prior good deeds "earn them the right to stray some from the shining path while still retaining a positive balance in their moral bank account" (Merritt et al., 2010). The second version of self-licensing is moral credentials, it means prior good deeds give casual influence on the subsequent behaviours, so that the prior good deeds would license the immoral behaviours afterwards (Merritt et al., 2010). One research done by Chiou and Wan (2011) showed that "health credentials" (dairy supplement) made people tend to reduce self-regulation of subsequent healthy-related behaviours and increase their self-indulgent behaviours. In their study, it is found out that when people did intake dietary supplement, they took this action as gaining "health credentials" so that they perceived themselves more invulnerable to diseases; as a result, they tended to reduce self-regulation of subsequent healthy-related behaviours, and they more possibly ended with self-indulgent behaviours.

Goal attainment is related to emotions, and the two factors can interact within a goal system; generally, successful goal attainment leads to positive emotion while unsuccessful goal attainment leads to negative one (Fishbach et al., 2004). This concept has been used to promote healthy food intake and parenting skills with an aim to prevent obesity (Cullen et al., 2010). That study showed the goal attainment and self-control interaction for achieving the more consumption of healthy food, the participants who attained more goals also scored higher on self-control and planning for healthy food; results showed that participants who reported attaining more goals felt better for consuming more healthy food to prove that goal-attainment was related to good changes in food choice. However, to our best knowledge, the studies related to both goal attainment and food intake are widely about taking healthier food as the goal, and to test whether goal-attaining can be used to positively affect food intake; in other words, there is no clear study to see how goal attainment of one separate task can impact food choice in a subsequent scenario. In this study, we take goal attainment on exam as the good deeds committed by participants, which is the moral credits they earned from the exam. We are to examine whether this moral credits would trigger the self-licensing effect, which probably lead participants to an indulgent behaviour, i.e. hedonic food option (cookie).

The current study

This study aims to test the relationship between emotion and food choice. Besides, this study also aims to test whether eating behaviour can affect food choice and how situation or event experienced by a person can play a role in food choice. Moreover, whether self-licensing can also affect food choice is one of our aims. As shown in the figure below, conducted in a natural setting, and it is examined whether goal attainment in an exam can initial a self-licensing effect on food choice. Besides, we also exam whether the selected factors correlate with each other, and together affect food choice.

To be specific, in this study, we make two hypotheses:

we hypothesize that in a natural setting, not only negative emotion, but also positive emotions can affect food choice. We hypothesize that the goal attainment here, as a good deeds committed from an exam, serves as "credits" that participants earned from an exam, and it will license participants to choose the hedonic food option (cookie).

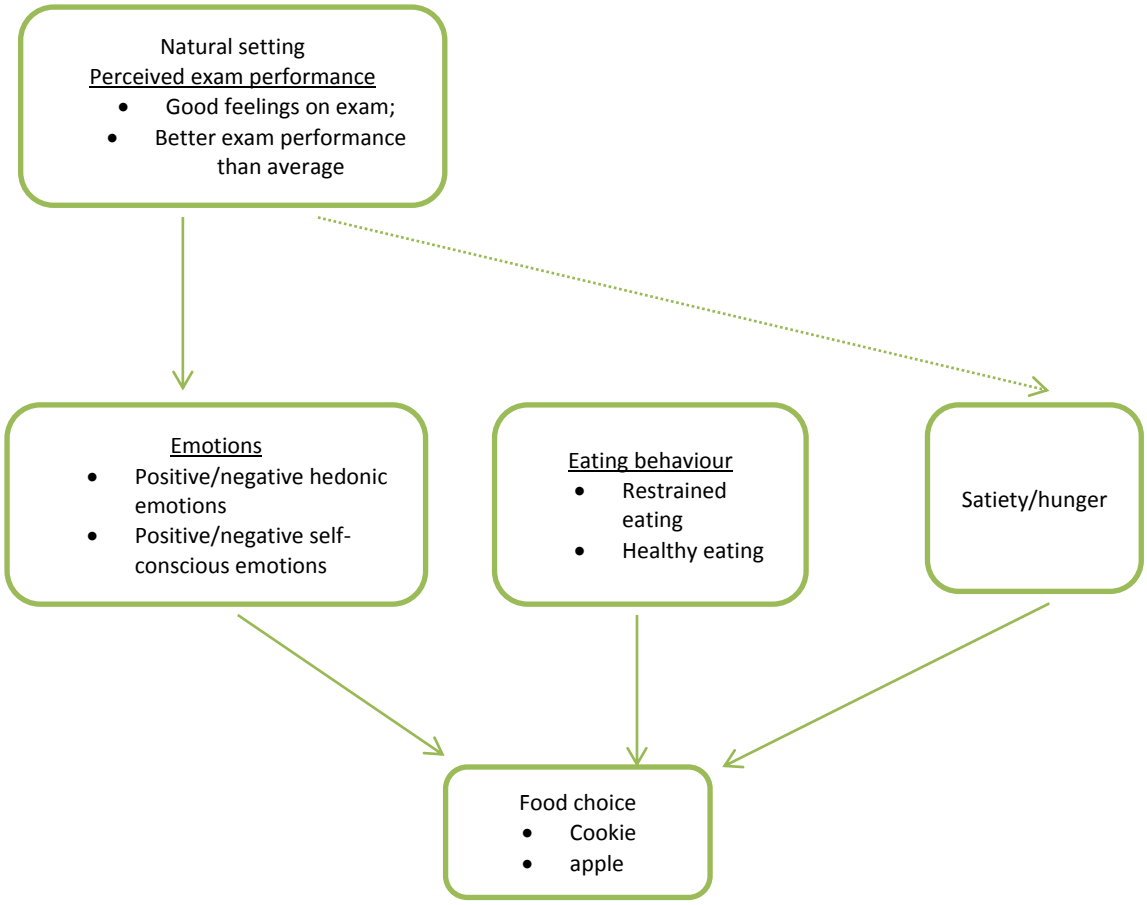

Figure 2: the conceptual model to test in the current study

Methodology

In order to test the conceptual model listed above and fulfil the purpose of this study, an experiment was conducted in which the impact of emotion on food choice was assessed in an as much as possible natural context.

Participants and procedure

This sample consisted of 140 (valid cases=137) college students of Wageningen University who just finished an exam. The average age of the sample was 20.10 years (SD=1.80). Of the participants, 25.7% were male (N=36) and 74.3% female (N=104). The experiment was conducted in the hall outside of the exam rooms. The exams started at 14.00 and ended at 17.00. Students were free to leave the exam room after they handed in the exam papers. When they stepped out of the exam room, they were asked whether they were willing to participate in a short survey for which they would receive a small reward in the form of an apple or a cookie. After having their agreement, they were asked to make a choice between the apple and cookie.

Immediately after their food choice, they were asked to fill in a questionnaire. It is 51-item questionnaire, consisting of five subscales measuring the constructs of feelings on the exam (6 items), emotion status at the moment (18 items), satiety (2 items), eating behaviour (15 items) and emotion induced by food choice (4 items).

Measures

Emotion: emotion was measured by 18 items on a 7-point Likert scale (varying from “no=1” to “very=7”) as described by Ramanthan & Williams (2007). The emotion items were categorized in two ways: one is the classic way of dividing emotions into “positive emotions” (8 items, cronbach’s α=0.86) and “negative emotions” (10 items, cronbach’s α=0.90); another is the more detailed way of dividing into four subgroups (Ramanathan & Williams, 2007), including positive hedonic emotion (6 items, cronbach’s α=0.80), negative hedonic emotion (5 items, cronbach’s α=0.83), positive self-conscious emotion (2 items, cronbach’s α=0.68) and negative self-conscious emotion (5 items, cronbach’s α=0.84).

Eating behaviour: Two types of questions referred to eating behaviour. Healthy eating behaviour was assessed with 3 (self-developed) items (cronbach’s α=0.79) and restrained eating behaviour was assessed with the 10-item Restrained Eating Scale by van Strien (1986) (cronbach’s α=0.92). The healthy eating behaviour was measured using a 7-point rating scale, varying from “totally disagree=1” to “totally agree=7”. The restrained eating behaviour was measured by a 5-point rating scale from the Dutch Restrained Eating, including “never=1”, “seldom=2”, “sometimes=3”, “often=4” and “very often=5”.

Satiety: Feeling of satiety/hunger were assessed with 2 items (cronbach’s α=0.49). These 2 items are measured on a 7-point rating scale, varying from “no=1” to “very=7”.

Feelings on exam: three items were used to measure good feelings about the exam (cronbach’s α=0.65). the first one was the feeling as an individual, i.e. “I performed well”; the second was the feelings compared to individual’s expectation, i.e. “I performed better than expected”; the third was the feeling regarded to enjoyment, i.e. “I enjoyed the activity”. Another two items were used to measure the bad feelings induced by the exam (cronbach’s α=0.40), i.e. “I felt under pressure”, “It was an intensive activity. Besides, another variable to measure feelings about exam is better exam

performance than average, which was computed by using own expected grades (mean=6.05) minus mean expected grades of the class (mean=6.62). Good feelings on exam and better exam performance than average were combined into a measure of success in taking exam, which is the result of goal attainment in this case. Both items were measured by means of a 7-point rating scale, varying from "totally disagree=1" to "totally agree=7".

Data analysis

All analyses were carried out by SPSS version 19 (SPSS Inc., Chicago). Firstly, a descriptive analysis was done to gain an overall view of the data. Secondly, point-biserial correlation analyses were done between each measure and food choice to test the relationship between each pair. Thirdly, bivariate correlation analysis was conducted to see whether there would be a significant association between emotion status and feelings on exam, as well as better exam performance than average. Following, a logistic regression analysis was done to see how the studied variables play roles on food choice. The reason to conduct logistic regression analysis is that it is a regression analysis to predict the outcome of a binary dependent variable, i.e. a variable which can only take two possible outcomes (Garson, 2002; Knnear & Gray, 2010). Finally, a mediation analysis was conducted on variables food choice, goal attainment and positive hedonic emotions. The dependent variable here was the food choice, a nominal variable with only two outcomes (apple=0, cookie=1).

Results

In this section, we aim at examining whether studied variables selected in the conceptual model can affect food choice. In the descriptive analysis, we test whether age and gender can affect food choice even though they are not among the studied variables in the conceptual model. The reason to do so is to further confirm that even though gender and age are not included, conceptual model is still valid because those two factors have no strong association with food choice.

Descriptive analysis

Firstly, a descriptive analysis was done to examine the internal validity and consistence of selected variables, including mean and standardized deviation (SD). An overview of the statistical information is showed in table 1.

Table 1: descriptive analysis on the studied variables

Variables	Male		Female		Total	
	Mean	SD	Mean	SD	Mean	SD
Positive emotions	4.49	0.93	3.93	1.11	4.07	1.10
Negative emotions	2.40	1.06	2.67	1.16	2.60	1.14
Positive hedonic emotions	4.58	0.97	4.06	1.11	4.19	1.09
Negative hedonic emotions	2.35	1.11	2.75	1.17	2.65	1.16
Positive self-conscious emotions	4.22	1.14	3.53	1.36	3.71	1.34
Negative self-conscious emotions	3.16	0.93	3.06	1.08	3.08	1.04
Restrained eating	1.77	0.78	2.63	0.73	2.41	0.83
Healthy eating	3.80	0.88	4.15	0.93	4.06	0.93
Satiety	4.71	1.77	4.42	1.56	4.50	1.61
Good feelings on exam	3.58	1.05	3.34	1.20	3.40	1.16
Bad feelings on exam	3.73	0.96	4.04	0.91	4.56	1.20
Better exam performance than	-0.67	1.12	-0.72	1.07	-0.70	1.08

average						
Age	20.42	1.93	19.99	1.75	20.10	1.80
Food choice (cookie=1)	0.57	0.50	0.51	0.50	0.53	0.50

Although in this study, gender is not one of the variables in the conceptual model; we present a crosstab analysis to see the relationship between gender and food choice to further prove the reliability of the conceptual model.

Table 2: a crosstab between gender and food choice

			Food choice		Total
			Apple	Cookie	
Gender	Male	% of total	10.9% (N=15)	14.6% (N=20)	25.5% (N=35)
	Female	% of total	36.5% (N=50)	38.0% (N=52)	74.5% (N=102)
Total		% of total	47.4% (N=65)	52.6% (N=72)	100.0% (N=137)

As seen, there were 72 of the participants chose cookie (52.6%), and 20 were male (14.6%) and 52 female (38.0%). The statistical results from table 2 could not give clear indication on whether there are strong relationships between the two variables. Therefore, to test whether gender could affect food choice, chi-square analysis was conducted. The results showed that there is no significant relationship either between food choice and gender (p=0.53).

Point-biserial correlation analyses

As indicated by Field (2009), the point-biserial correlation analysis is used to measure the correlations between variables that one of the two variables is "dichotomous", i.e. it is categorical with only two categories. Thus point-biserial correlation analyses were conducted between each selected variable and the food choice to see whether there was a correlated relationship between each pair; and the characteristic of point-biserial correlation analysis decides that it would be a one-tailed correlation analysis. Table 3 gives summarized information.

Table 3: point-biserial correlation analyses

Variables	Choice apple or cookie (cookie=1)	
	r	p
Positive emotions	*.22***	*.01*
Negative emotions	-.12	.08
Positive hedonic emotions	*.24***	*.00*
Negative hedonic emotions	*-.18**	*.02*
Positive self-conscious emotions	.13	.07
Negative self-conscious emotions	.05	.27
Restrained eating	*-.16**	*.03*
Healthy eating	-.10	.12
Satiety	*.15**	*.04*
Good feelings on exam	*.17**	*.02*
Bad feelings on exam	.13	.06
Better exam performance than average	*.15**	*.04*
Age	*-.14*	*.06*
***p<0.01; *p<0.05**		

According to the results from the point-biserial correlation analyses, positive emotions were significantly correlated to food choice ($p<0.05$). Within positive emotions, positive hedonic emotions, compared to positive self-conscious emotions, were significantly correlated to food choice ($p<0.01$). Moreover, hedonic emotions, overall, showed significant association with food choice. Further positive hedonic emotions, negative hedonic emotions had negative correlation to food choice ($p<0.05$). However, positive and negative self-conscious emotions did not show significant association with food choice.

Besides emotions, restrained eating also showed significant but negative correlation to food choice ($p<0.05$). satiety was also positively related to food choice ($p<0.05$). "Good feelings on exam" showed a significant correlation to food choice ($p<0.05$), as well as better exam performance than average ($p<0.05$). Age did not show any significant correlation to food choice ($p>0.05$).

So, food choice (cookie in this case) was positively correlated to positive emotions, positive hedonic emotions, food feelings on exam and better exam performance than average. This suggests that when one individual with positive emotions (especially positive hedonic emotions) or has good feelings on exam or perceives better exam performance than average, he/she tends to choose cookie. Besides, physiological satiety is also another factor related to food choice. When one individual feels hungry or less full, he/she tends to choose cookie as his/her food.

On the other hand, food choice (cookie in this case) was negatively correlated to negative hedonic emotions and restrained eating. This suggests that when one individual with negative emotions, or scoring high on restrained eating, the possibility for him/her to choose cookie tends to be lower.

After defined the variables correlated to food choice, table 4 gives a picture about how these variables correlate among each other.

Table 4: correlation analysis between selected variables related to food choice

		Positive hedonic emotions	Negative hedonic emotions	satiety	Good feelings on exam	Restrained eating	Positive emotions
Positive hedonic emotions	r	1	*-.60***	*.20**	*.67***	*-.60***	*.98***
Negative hedonic emotions	r	*-.60***	1	-.12	*-.43***	.13	*-.56***
Satiety	r	*.20**	-.12	1	*.30***	-.05	*.18**
Good feelings on exam	r	*.67***	*-.43***	*.30***	1	.000	*.71***
Restrained eating	r	-.06	.13	-.05	.00	1	-.05
Positive emotions	r	*.98***	*-.56***	*.18**	*.71***	-.05	1
Better exam performance than average	r	*.48***	*-.39***	*.22***	*.54***	.09	*.52***
***p<0.01**							
***p<0.05**							

Referring to table 4, it is clear that positive hedonic emotions, satiety, good feelings on exam and better exam performance than average are positively related to each other; negative hedonic emotions and good feelings on exam are negatively related, as well as negative hedonic emotions and better exam performance than average; restrained eating has significant association with positive hedonic emotion in a negative way.

Referring to this table, it implies that when an individual scored higher on better exam performance than average, he/she tended to have good feelings on exam, or be more sensitive to hunger, or had stronger positive hedonic emotions, less strong negative hedonic emotions.

Logistic regression analysis

In this study, a logistic regression is used because the dependent variable is dichotomous. The dependent variable is food choice with value 0/1 for apple and value 1/0 for cookie. The nine independent variables include positive hedonic emotions, negative hedonic emotions, positive self-conscious emotions, negative self-conscious emotions, restrained eating, healthy eating, good feelings on exam, better exam performance than average and satiety. Table 3 showed that the variables negative self-conscious emotions and healthy eating had no significant association with food choice. However, since these variables are part of the conceptual model, it is considered as two of the independent variables of the logistic regression.

The results from the -2 log likelihood decreased from 186.55 to 167.81, which meant the logistic regression model did a good performance, and meanwhile the percentage correct increased from 53.3% to 67.4%. For the significance of the variables, adopting the conditional backward model of logistic regression analysis, there were 5 steps in total. Positive hedonic emotions and negative self-conscious emotions were consistently affecting food choice significantly; then good feelings on exam and healthy eating were dropped out respectively in step 2 and 3; satiety was dropped out in step 4, and significance of restrained eating was at 0.05 in this step; and in step 5, five dependent variables still existed. Table 5 gives information on the final results of logistic regression analysis.

Table 5: logistic regression analysis _ final step results

	B	p-value	Exp (B)
Positive hedonic emotions	0.76	0.01**	2.14
Better exam performance than average	0.48	0.06	1.61
Restrained eating	-0.47	0.04*	0.63
Positive self-conscious emotions	-0.45	0.08	0.64
Negative self-conscious emotions	0.53	0.02*	1.70

Table 5 shows that positive hedonic emotions have a significant and positive effect on choosing hedonic food option ($p<0.01$). Restrained eating has strong but negative effect on choosing hedonic food option ($p<0.05$). Interestingly, negative self-conscious emotions also has significant and positive effect on choosing hedonic food option ($p<0.05$), even though it shows no significant association with food choice in bivariate correlation analysis. Positive self-conscious emotions did not show a strong effect on food choice; however, the better exam performance than average shows almost strong and positive effect on choosing hedonic food option ($p=0.06$).

The results as described above can be interpreted as: when one individual has stronger positive hedonic emotions or negative self-conscious emotions, he/she tends to choose hedonic food option; whereas if he/she scores higher on restrained eating, he/she less tends to choose hedonic food option. Although a feelings of better exam performance than average did not show a direct effect on food choice, it could be that this factor affects food choice indirectly via mediation by positive hedonic emotions. Because the p-value of better exam performance than average is almost significant, and it is strongly correlated to positive hedonic emotions and hedonic food choice, as seen in table 3 and 4.

Mediation analysis

Based on the results from correlation analysis and logistic regression analysis, it is expected that better exam performance is a factor affecting food choice, mediated by positive hedonic emotions. According to Baron and Kenny (1986), to explore the mediation required a series of regression to test the effects among dependent variable, independent variable(s) and mediator(s), as shown in the figure below:

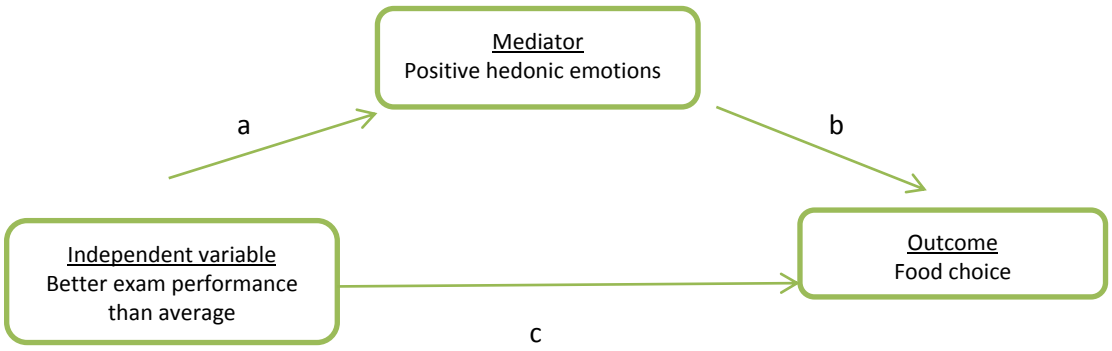

Figure 3: Mediation diagram extracted from Baron and Kenny (1986)

A logistic regression analysis was conducted to predict the dependent variable (food choice) from the variables that showed a significant association from the bivariate correlation analyses (the independent variables). Considering the characteristics of independent variables and the mediator of better exam performance than average, the regression estimations between these two groups of variables would be linear regression since they are continuous variables (Field, 2009).

Referring to the recommendations on mediation from Baron and Kenney (1986), three regressions need be done, i.e. regressing the mediator on independent variables, regressing the dependent variable on the independent variable, and regressing the dependent variable on both mediator and independent variable. Therefore, firstly, a linear regression was conducted between mediator (positive hedonic emotions) and independent variable (better exam performance than average); the result showed that there was a significant effect from better exam performance than average on positive hedonic emotions (p=0, unstandardized B=0.48). Secondly, a logistic regression analysis was conducted between the dependent variable (food choice) and the independent variable (better exam performance than average); the result showed that better exam performance than average significantly predicted food choice (p=0.01, Exp(B)=0.16). Thirdly, a logistic regression analysis was conducted between the dependent variables (food choice) and both mediator (positive hedonic emotions) and independent variable (better exam performance than average). The result showed that positive hedonic emotions still contribute strongly to food choice (p=0.01, Exp(B)=1.60), and better exam performance than average (independent variables) had no effect in the third regression (p=0.72, Exp(B)=1.07) when the mediator (positive hedonic emotion) was controlled. These results meet the requirements to establish mediation (Baron & Kenney, 1986).

Discussion

The current study aims to test the association between food choice and emotions, and to explore whether positive emotions can also affect food choice. The study also test the relationship between restrained eating behaviour and food choice to see whether restrained eating can impact the food

choice. The influence of satiety is also tested. Besides the factors selected in the conceptual model, gender and age are also studied on the association with food choice, with a result that there is no strong relationships either between food choice and gender or between food choice and age in this case. Considering the characteristic of this data pool, point-biserial correlation analysis and logistic regression analysis were used to test out the affecting factors on food choice. Moreover, a mediation analysis was conducted to explore the relationship between goal attainment and food choice, via mediated by positive hedonic emotions.

The results show that emotions can impact food choice, i.e. positive hedonic emotions and negative self-conscious emotions contribute to hedonic food option. Based on the results of this study, negative self-conscious emotions do not show association with food choice (bivariate correlation analysis). But negative self-conscious emotions in combination with other variables do show association with hedonic food option (logistic regression analysis). In the first place, it can conclude that the findings of this study are consistent with the results from the earlier studies (Larsson, Hellzén, 2004; King, Meiselman, 2009; Gibson, 2006; et al). other studies like Canetti (et al., 2002), Patel and Schlundt (2001) show that, besides negative emotions, positive emotions can insert influence on food choice. The findings of this study are similar to the results as the studies from Canetti (et al., 2002), Patel and Schlundt (2001).

The results also show that the restrained eating behaviour can insert negative influence on food choice, which decreases the possibility of choosing an unhealthy food. This is consistent with the results from other researches that restrained eating is associated to food choice, and can increase the self-control on palatable food consciously and lead people to healthier food choice (Ouwehand & Papies, 2010; Fishbach et al., 2003; Fishbach & Shah, 2006). However, the findings from other researches take weight status as a consideration; it is mainly because the effect of restrained eating on food choice can differ due to the weight status. According to Ouwehand and Papies (2010), weight status can be a crucial factor that affects the food consumption, restrained eaters with overweight increased their food consumption while restrained eaters with normal weight decreased theirs. Fishbach et al. (2003) and Fishbach & Shah (2006) show that restrained eating can lead restrained eaters to healthier food choice mostly when they are with normal weight.

Interestingly, other factors that were positively associated to food choice of cookie are better exam performance than average and good feelings on exam. In other words, participants with an idea of success in taking exam tend to choose cookie as food. It is understandable because success in taking exam can trigger positive emotions. Besides, based on Fishbach and Labroo (2007), the achievement of goals can interact with positive emotion, “positive feelings are sometimes attributed to a person’s level of goal performance”, with a possible result of hedonic reward. In our study, goal attainment (the success in taking exam), especially the better exam performance than average, is a high level of goal performance (in terms of taking exam); and it can be expected that a positive emotion may follow, which has been proved to be able to impact food choice. Besides, the goal attainment, especially the perceived better exam performance than average here serves as credits earned from exam, which leads participants to choose hedonic food option, and mediated by positive hedonic emotions. The possible explanation might be: perceived better exam performance (goal attainment) initialled self-licensing effect on participant, which made them feel deserved an indulgent act, i.e. choosing hedonic food. This finding is consistent to the results of self-licensing effect in prior studies (Nisan, 1991; Merritt et al., 2010; Chiou & Wan, 2011).

So far, there is evidence from earlier studies to show that positive emotions and food choice are significantly associated. Results of this study show that positive hedonic emotions contribute significantly to hedonic food choice. These results are similar to findings of scientific studies. The associations between goal attainment and food choice, and between goal attainment and positive self-conscious emotions, are also supported by this study and other studies. However, this study

cannot give conclusive indication whether positive self-conscious emotions are directly related to food choice (even though there are significant association with factors that directly related to food choice). Referring to Fishbach et al.(2004), successful goal attainment typically results in positive emotions, and failure in negative emotions.

It is expected that positive self-conscious emotions are strongly but indirectly associated with food choice. That is because goal attainment also motivates individuals to attain positive emotional consequences (Baron, 2000; Mellers et al., 1999), and positive emotions make individuals more careful about action to take with a tendency to a hedonic reward (Fishbach & Labroo, 2007). The reason for no direct and clear indication on positive self-conscious emotions' impact on food choice can be three: one is indeed positive self-conscious emotions cannot directly impact food choice; two is positive self-conscious emotions cannot immediately show the effect on food choice due to its characteristics, since self-conscious emotions arise more slowly, requires more time to process, and more related to being aware of other's reaction (Ramanathan & Williams, 2007); third is because there were only two items to measure positive self-conscious emotions in the questionnaire, which undermines the reliability of the construct as measured in this study.

Summarizing the findings from this study, the final conceptual model can be revised accordingly, as presented in figure 4.

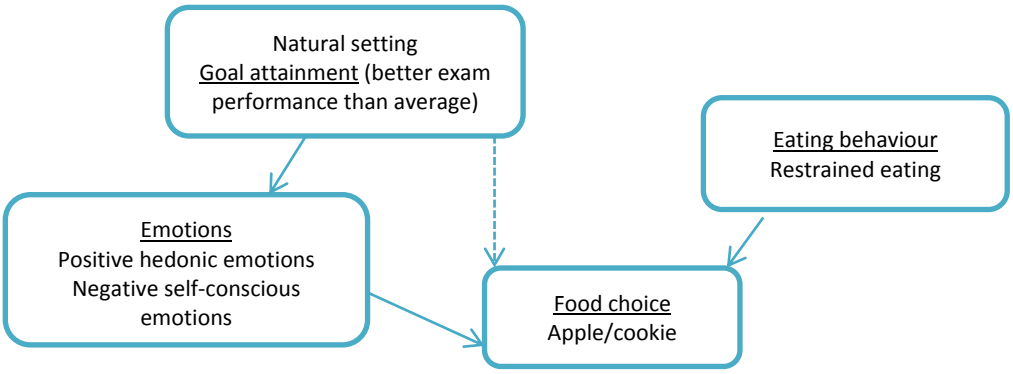

Figure 4: revised conceptual model based on the findings from the current study

This study is conditioned by several limitations. The first limitation is the design of the experiment. The participants were asked to make the food choice and then fill in the questionnaire. However, the food choice may have had an impact on the answers. Therefore, one suggestion for the future study would be that some information shall be asked before participants making their food choice, and some information shall be asked after that.

The second limitation is about the items for measuring emotions, there were only 2 items used to test positive self-conscious emotions, which led to the comparatively low internal reliability of positive self-conscious emotions (cronbach's α=0.682). This value is still valid, according to statistical guidelines (Maltotra, 2010), only when cronbach's α is less or equal to 0.6, the internal consistency reliability is not satisfactory. Because α tends to increase when more number of scale items are involved. It is suggested for future studies that more items are involved to test the relationship between food choice and positive self-conscious emotions, such as self-respectfulness. Because self-conscious emotions with food choice is that "self-regulatory function as the most unique characteristic of self-conscious emotion" (Beer & Keltner, 2004). The lack of enough items to measure positive self-conscious emotions might be a reason that this study cannot show there is a direct association between positive self-conscious emotions and food choice.

The results from this study and other earlier studies state that restrained eating is significantly correlated to food choice. However, one important detail is missing in this data pool is the weight status of participants. This is an important factor, because many studies show that the effect of restrained eating on food choice can differ due to weight status differences (Runderman, 1986; Lowe, 1993; Fishbach et al., 2003; Ouwehand & Papies, 2010; Appelhans et al., 2011). So taking weight status into consideration, such as Body Mass Index (BMI), while exploring the relationship between food choice and its influential factors, is necessary.

Conclusion

This study tests the association between emotions and food choice, and confirms that there is an association between the two. The results of this study also support to the view that positive emotions can also significantly impact food choice. With more detailed categorization, positive hedonic emotions are significantly impact food choice; while the effect of positive self-conscious emotions are less conclusive. The results from this study also show that goal attainment might be associated with food choice, with an explanation that probably because people license themselves by taking goal attainment as “health credits”, which allow them to stray away from the improper feeling of choosing hedonic food. Age and gender have no strong association with food choice.

One of the implications for future studies is to further test the association between food choice and restrained eating by considering the weight status to see whether overweight can influence the association between the two. Another implication is that more experiments are needed to test the association between food choice and positive emotions, especially with the purpose to explore the effect of positive self-conscious emotions on food choice. As a recommendation for future research, it is suggested to include more positive self-conscious emotion items.

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