The effect of academic performance-related stress of students on meal choices

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Abstract

Introduction

Stress is an important problem in today's society since it may negatively affect one's work-life balance and diet. This research focuses on academic performance-related stress among students. It studies the relationships between stress, meal choice, gender, academic satisfaction, and one's self-evaluation.

Research question

The central research question is: "What is the effect of stress on the choice between healthy and unhealthy meals?".

Methodology

The research question was answered with an experiment in which 73 students took part. There were two conditions. In the stress condition, academic performance-related stress was manipulated with a general knowledge quiz and a presentation. In the control condition, people were not told about a presenation, but did have to make a general knowledge quiz. Afterwards, participants were asked to fill in a survey that measured meal choice, gender, academic satisfaction, and self-evaluation.

Results

It was found that stress did not lead to unhealthier meals. Gender had no effect on the relationship between stress and meal choice. Stress did not impact academic satisfaction, however one's self-evaluation did moderate the relationship between stress and one aspect of academic satisfaction, which was grade satisfaction. Academic satisfaction did not affect meal choice.

Discussion

Very little literature was available on the relationship between academic performance-related stress and academic satisfaction. This study explored the relationship between these two concepts, and has thereby contributed significantly to scientific knowledge about academic performance-related stress and academic satisfaction, but also to knowledge about meal choices and self-evaluations.

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Introduction

Work-life balance is becoming an increasingly more important construct in today's society (Maertz & Boyar, 2011). Multiple definitions for work-life balance exist, but the definition used in this research is that the work-life balance is "an individual's ability to meet their work and family commitments, as well as other non-work responsibilities and activities" (Delecta, 2011). People who work longer work weeks with high stress consume more unhealthy foods than people who work shorter work weeks with less stress (Wardle et al, 2000). These longer work weeks mean a worse work-life balance, since these people have less time left for household activities like cooking and cleaning, but also for leisure and relaxation time. Next to employees, students are also under more time pressure, and a large number of studies have shown that stress levels are rising amongst the student population (Robotham & Julian, 2006). People's perceptions of time shortage may have aided in the increased consumption of ready-to-eat meals and convenience meals (Jabs & Devine, 2006). To somewhat relieve the time pressure people may choose to save time on cooking by consuming meals that require little time to prepare like microwave meals and frozen dishes. However, it is still relatively unknown how people make actual meal choices under stress, as most research has been done on animals, for example on rats (Melhorn et al., 2010) or mice (Kumar et al, 2013)

Prepared foods are typically unhealthier than cooking a meal from scratch (Guthrie et al., 2002). Unhealthy convencience foods like ready-to-eat meals are also linked to health problems like obesity and diabetes (Jabs & Devine, 2006). Cooking a meal yourself is thus often more nutritious, but this means that less time can be spent on other activities at home.

Research has shown that people who experience stress express this more often in snacking behavior than in eating actual meals (Oliver et al., 2000). Therefore it is not

surprising that most research so far has been done on snacking behavior in relation to stress. Also, a lot of research has been done on meal induced stress. For example, high-fat meals increase cardiovascular reactivity to stress (Jakulj et al., 2007). Stress has been shown to increase the intake of sweet fatty foods in meals among emotional eaters, who are more likely to be women. It has also been shown that people under time scarcity are more likely to consume ultra-processed foods like pasta, tacos, ready meals, noodles, and pommes frites (Djupegot et al., 2017). But meal choices based on stress have so far remained relatively unexplored.

Current research on stress and unhealthy food shows that people who experience stress eat more unhealthy, sweet, high-fat, high-energy, dense, snack-type foods, and consume less healthy low fat foods (Oliver et al., 2000; Oliver & Wardle, 1999). Some people eat more because of stress, and others eat less (Zellner et al., 2006). In stressful situations dieters for example have a higher overall intake than other people. Women are more susceptible to this than men, and tend to eat more than men when stressed. Next to gender differences which may moderate stress effects, self-evaluations may also play a role (Judge et al., 1997). Negative self-evaluations may lead to more stress, as one who does not like him or herself may have more to worry about than people who evaluate themselves positively. Therefore it may also moderate the effect of stress on food choices.

It is important to understand how stress influences actual meal choices. Therefore the workings of stress will be investigated in the literature review. Differences between men and women are also important to research as women tend to respond more heavily to stress than men. Self-evaluations will also be included in this study as they may moderate the effect of stress on academic satisfaction, which will be explained further in the literature review. This will all be researched with a digital survey that includes either a stress manipulation or no

emotion manipulation, so that the effects of stress on meal choices can be compared to choices people with no emotion manipulation would make.

This research aims to add to the existing literature on consumer decision making in relation to meal choices made under stress. To examine the effect of stress on eating behavior, the following research question was formed:

What is the effect of stress on the choice between healthy and unhealthy meals?

To help answer this main research question, the following sub questions were formulated:

1. What are differences between men and women with respect to the stress manipulation?

2. Are there differences between men and women in their meal choice?

3. What role do self-evaluations play in the meal choice?

Literature review

To help find an answer to the research and sub-questions, the following conceptual model is proposed. The hypothesized main effect of this study is the negative relationship between stress and meal choice, meaning that as stress increases, meal choice will become unhealthier. A specific type of stress will be chosen, and the meal choice is expressed as either a healthy or an unhealthy choice. The mediator that will be investigated is academic satisfaction. The relationship between stress and academic satisfaction is hypothesized to be negative as well, meaning that as stress increases, academic satisfaction decreases. The effect between academic satisfaction and meal choice is hypothesized to be positive, thus an increase in academic satisfaction will result in a healthier meal choice, and vice versa. Finally, gender and the self-evaluation concept have been identified as possible moderators. The effects of these moderators on the main effect and the relationship between stress and academic satisfaction, as well as a full explanation of every concept in the conceptual model will be offered in this literature review.
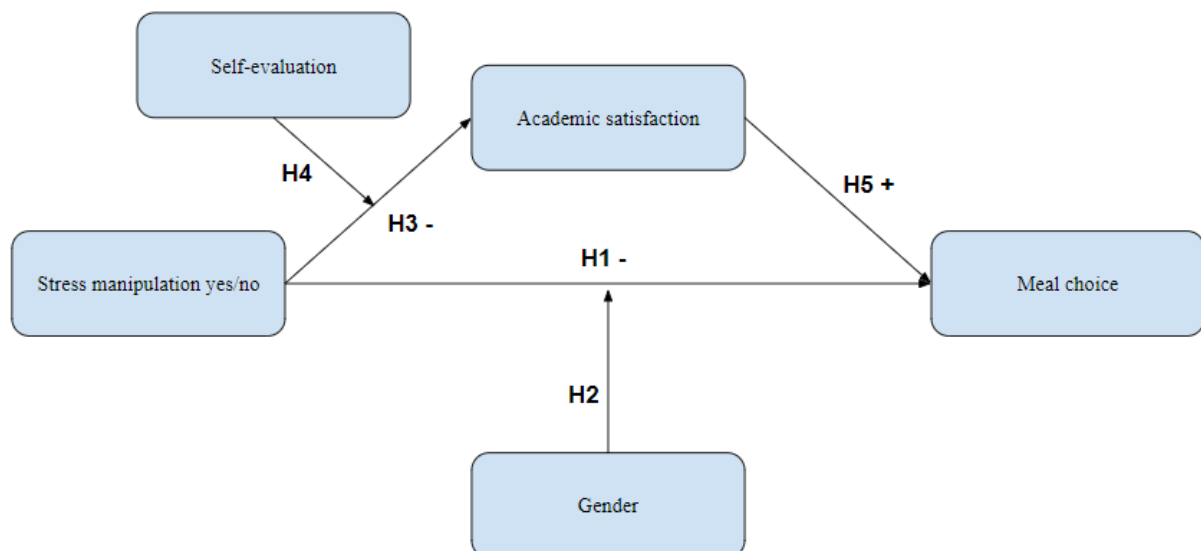

Figure 1: Conceptual model

Stress

Stress can have many different causes. For example, occupational stress may be caused by lack of funding, task overload, poor leadership and management, job insecurity, and a lack of promotion or recognition (Gillespie et al., 2001). This study uses the following definition of stress: stress is a physical, mental, or emotional reaction as a consequence of one's response to environmental tensions, conflicts, pressures and similar stimuli, and it is the result of an imbalance between demands and adaptive capacities of the mind and body (Fontana, 1989). Perceived stress related to students mainly comes from two areas, which are academic expectations and performance, and social factors which includes for example the development of relationships with other people (Heins et al., 1984). More recent research has produced similar findings with making new friends, a lack of social skills, and examinations being identified as important stressors for students at a Malaysian university (Elias et al., 2011).

Stress from academic expectations and stress from social factors

Academic stress is stress that is caused by study-related factors (Abouserie, 1994). The most important causes of this type of stress are examinations and their results, too high of a workload, the amount of learning to do, and feeling the need to do well. Stress caused by social factors (social stress) also affects students, however in a lesser manner than academic stress. The most important stressors of social stress are financial problems and a lack of time to spend with friends and family. It was also shown that locus of control and self-esteem have an impact on academic and social stress. An external locus of control means that one seeks explanations for events outside of oneself, whereas an internal locus of control means that explanations are sought within the self (Firth et al., 2004). Locus of control and self-esteem may thus be moderators of the effect of stress (Abouserie, 1994), which will be explained further in the part on the self-evaluation concept.

External locus of control indicated a high level of academic stress, meaning that students who believe that things happen by causes outside their control are more stressed than students who believe in their control of their situations. (Abouserie, 1994). Students with high self-esteem scored lower on both academic and life stress than students with low self-esteem. Thus, students are affected by academic and, to a lesser extent, social stress. This was all measured with help of the Academic Stress Questionnaire, Life Stress Questionnaire, Locus of Control Questionnaire, and Self-Esteem scale.

Academic stress as performance-related stress

The most important causes of academic stress seem to be performance related. In a study exploring the effect of academic stress of 1034 students in junior high school on performance in actual high school, it was found that students in high stress school environments could not deal well with increased personal academic expectations (Kaplan et al., 2005). Rather, such an increase increased perceived school-related stress and impeded their academic performance. Academic stress thus was connected to the students' performance. Multiple studies have pointed out the overall effect of stress on performance. A study on the effect of academic stress as well as learned resourcefulness on academic performance showed that academic stress is related to low levels of academic performance (Akgun & Ciarrochi, 2003). Here, stress was measured with use of the Undergraduate Stress Questionnaire, and performance by GPA (Grade Point Average, the average of all grades one has received). Another study on the relationship between academic stress and course grade found that academic stress is negatively related to course grades (Struthers et al., 2000). So, if a student gets a low grade, it increases their academic stress level. As the nature of academic stress seems to be performance-related, this relationship seems to work both ways. Students thus may enter a negative spiral that could be hard to escape. This research chooses to focus on academic performance-related stress. This type of stress will be induced.

Meal choice

As mentioned in the introduction, people under high stress consume more unhealthy foods than people who are under less stress (Wardle et al., 2000). This may also be influenced by academic satisfaction, as will be explained later in this literature review. Thus, stress may lead to more unhealthy meal choices, which will be investigated in this study.

Stress and food choices

Stress impacts decision making, and the decision making process can be affected by external stress as well as decision-related stress. If both of these types of stress affect the decision, then the decision will in most cases be suboptimal (Starcke & Brand, 2012). Stress aids in the adoption of unhealthy lifestyle behaviors like consumption of unhealthy foods (McEwen, 2008). Only one research was found on exam stress (which I consider to be a part of academic stress, since GPA is the biggest stressor) in relation to food choices, which dates from 1995. It states that among 179 students, no significant effects of exam stress on food intake were observed (Pollard et al., 1995). Stress was assessed at regular levels (so with students who did not have to take an exam), and compared with the stress of students who had an upcoming exam in two weeks. However, the fact that the researchers did not find an effect of stress on food intake may have been due to the way they measured stress. As such, they measured stress two weeks before an exam, but stress may be far lower two weeks prior to an exam compared to moments before an exam. However, this measurement is disagreed with: stress just before an exam may be larger than two weeks before it. So far, most research on academic stress has focused on stress as a constant variable that is measured over longer periods of time (Abouserie, 1994; Huan et al, 2008; Struthers, 2000). This research is different in that it will induce stress, meaning that it is a short-term experience with direct outcomes. The findings of the literature review of this study combined with the logical reasoning that stress leads to more unhealthy choices lead to hypothesis 1:

Academic performance-related stress is negatively related to healthy meal choice.

Gender

Gender as a moderator of the relationship between academic performance-related stress and meal choice

The literature on gender as a possible moderator of the relationship between stress and meal choice is somewhat contradictory. No articles on the relationship between academic stress and meal choice in combination with gender were found. Firstly, it is important to note that most research on the subject has been done with people from a working population, thus not with students (Ford et al., 2012; Wu et al, 2009). Secondly, research with students on the relationship between stress, gender, and meal choice has produced different outcomes. A study with 212 students found that stress (no type of stress was mentioned) resulted in more unhealthy food intake that was mostly expressed in snacking behavior, regardless of gender (Oliver & Wardle, 1999). However, more recent research has produced different findings. A study with 328 Swedish university students showed that women displayed a higher degree of healthy habits expressed in healthier nutritional habits and lower alcohol intake (Bothmer & Fridlund, 2005). Also, women experienced more stress than men. No type of stress was mentioned, but from the article it can be concluded that stress was seen as a constant variable. Other studies have also shown that women are more concerned with healthier eating habits, such as following important eating recommendations like avoiding fat and eating fruit (Wardle et al, 2004) as well as consuming more vegetables, milk, and dairy products than men (Kiefer et al., 2005). Thus, from the literature it may be concluded that as a baseline, women tend to eat healthier than men.

The literature also points towards women having a different stress experience than men. In a study with 675 students, of which 202 were male and 473 were female, women were found to be less resistant to stress than men for both academic stress and social stress

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(Abouserie, 1994). This finding is supported by several other researches. In 2012 the stress levels of medicine students at the Belgrade University were investigated. Half of the female students self-reported moderate to high levels of stress, whereas only one third of the male students reported similar stress levels. Examinations were most often indicated as the highest stressor (Backović et al., 2012). A study with 145 randomly selected undergraduate students from an Ivy-league institution found similar results: 63.8% of the female respondents expressed feeling stress frequently, compared to 36.3% of the male respondents (Hudd et al., 2000). This stress was experienced during a so-called typical semester. Interestingly, a study with 430 secondary school students found no significant interaction between gender and academic stress level, meaning that in that specific research boys and girls did not experience different academic levels of stress (Huan et al., 2008). This research was thus conducted with secondary school students which may explain the results inconsistent with other researches. Academic stress was measured with the Academic Expectations Stress Inventory, which is a questionnaire that captures academic stress caused by self-expectations and the expectations of others. Stress was thus not induced, seen as a stable measure over a longer period of time. Also, the biggest stressor that was found in other researches (GPA) was not included. Still, most literature points towards men being more resistant than women when it comes to academic stress.

In summary, women in general may eat healthier than men, but also may be less resistant to stress than men. It may well be that women, because they eat healthier in general, may let themselves go more than men when they are under stress, which may express itself in eating. Therefore hypothesis 2 is proposed:

The effect of academic performance-related stress on meal choice is moderated by gender, such that when stress leads to an unhealthier meal choice, women choose the unhealthy option more often than men.

Academic satisfaction

According to the Oxford dictionary, satisfaction is (the) "fulfillment of one's wishes, expectations, or needs, or the pleasure derived from this" (Oxford dictionary, n.d.). This is a very broad definition, and it was felt that a more strictly defined definition should be taken since this research does not focus on any type of stress, but on academic performance-related stress. Therefore, the following definition of academic satisfaction is used, which is based on a study of Aitken in 1982: academic satisfaction is the degree to which one feels satisfied with one's academic performance and experience (Aitken, 1982). The variable most important.in judging this is GPA, followed by course satisfaction.

Almost all research on satisfaction and stress has been done in a work environment, and is mostly focussed on job or life satisfaction. Thus, not students, but employees were the subjects of research. For example, new employees over the first years of their appointment tend to experience decreasing work satisfaction and increased job-related stress (Olsen, 1993). However, extremely little research has been done on satisfaction with one's own academic performance. As mentioned before, GPA is the biggest determinant of academic satisfaction. It could very well be that as a student experiences more academic performance-related stress, his or her academic satisfaction decreases. From this logical reasoning hypothesis 3 is proposed:

Academic performance-related stress is negatively related to academic satisfaction.

Self-evaluation

A factor that may influence the relationship between academic performance-related stress and academic satisfaction may be personal traits. Relating back to the part on stress from academic expectations and stress from social factors, self-esteem and locus of control were found to be important in academic and social stress (Abouserie, 1994). The variable most important to the feeling of satisfaction with one's own performance is GPA (Aitken,

1982). Thus, some sort of self judgement may influence the relationship between stress and performance. The two just mentioned traits (self-esteem and locus of control) are both part of the core self-evaluations concept, which is a larger personality trait that also includes generalized self-efficacy and neuroticism (Judge et al., 1997) These two concepts will be explained later in literature review on the self-evaluation concept. This concept captures positive and negative evaluations of self-appraisals. A high core self-evaluation consists of good self-esteem, locus of control, and self-efficacy, and low neuroticism. In a study further investigating the core self-evaluation construct, it was found that the four measures mentioned above very likely measure the same construct. When comparing each of these traits with stress, neuroticism stands out as it uniquely contributes to stress predictions. This is in line with other research findings, for example increased life stress and perfectionism leading to increased neuroticism (Flett et al., 1989), and people high in trait neuroticism experiencing a stronger relationship between negative affect and daily stress (Mroczek & Almeida, 2004). Displayed below is a figure of the aspects of the self-evaluation concept, and each of the four traits of the core self-evaluations concept will now be explained.
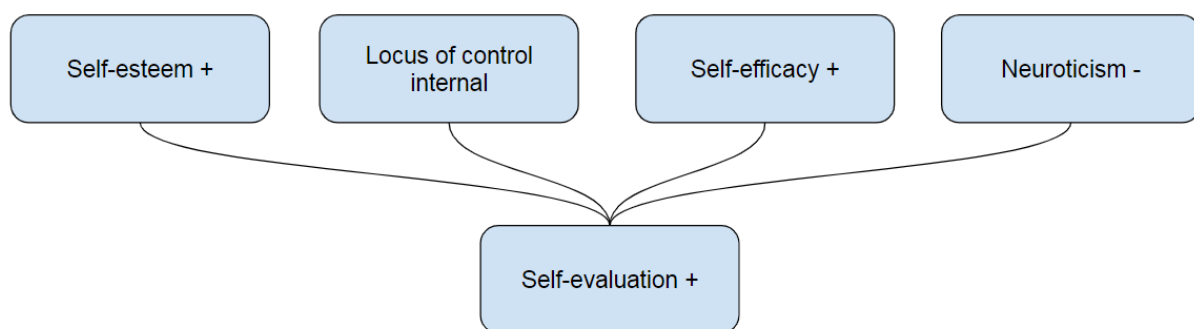

Figure 2: The self-evaluation concept

Self-esteem

      Self-esteem is divided into global self-esteem and selective self-esteem (Guindon, 2002). Global self-esteem is the overall estimate of general self-worth, like respect for oneself, which is a stable and enduring trait. Selective self-esteem is an evaluation of certain

traits and qualities of the self, which are variable depending on the context. Selective self-esteem experiences are weighted, and then combined into global self-esteem. People attach meaning to all different traits and qualities of the self that vary in importance to oneself. Self-esteem can be high or low, and it is possible to have a high self-esteem in general, but to have low self-esteem when it comes to a specific trait (Guindon, 2010). Self-esteem affects one's life satisfaction, behaviour, and well-being during one's lifetime. It is the basis of people's security, and it may well be a basic human need (Greenberg, 2008).

In a study with 112 university students, it was found that self-esteem was positively associated with academic satisfaction (expressed as satisfaction with college), and negatively associated with academic stress (Michie et al, 2001). This suggests that self-esteem may moderate the relationship between academic performance-related stress and academic satisfaction. In other words, when people experience stress and they have little self-esteem it is likely that they will be less satisfied with their academic performance.

Locus of control

Another trait of the core self-evaluation concept is locus of control, which is "the extent to which people believe they or external factors such as chance and powerful others are in control of the events that influence their lives" (Firth et al., 2004, p. 172). Locus of control can thus be internal (focus on oneself) and external (focus on events outside of one's control). An internal locus of control can moderate feelings of stress. In a study investigating the relationship between student's time management and academic performance and stress, it was found that perceived control of time correlated significantly with performance measures and affective stress measures (Macan et al., 1990). Internal locus of control is also associated with lower levels of job stress, and higher levels of job satisfaction and performance (Chen & Silverthorne, 2008), suggesting that it may moderate the relationship between satisfaction and stress.

Self-efficacy

Self-efficacy is defined as "beliefs on one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands" (Wood & Bandura, 1989, p. 408). This essentially means that self-efficacy is that one knows what they want and how to achieve it. Students with high levels of self-efficacy and lower levels of perceived stress are likely to have higher levels of life satisfaction (Coffman & Gilligan, 2002). It is hypothesized that similar effects are apparent for academic satisfaction, as that relates more closely to the academic setting. Self-efficacy may thus moderate the relationship between academic performance-related stress and academic satisfaction.

Neuroticism

The final trait of the self-evaluations concept, neuroticism is defined as "a broad dimension of individual differences in the tendency to experience negative distressing emotions" (Costa and McCrae, 1987, p. 301). People with high neuroticism are thus more likely to experience negative feelings. A study with 213 undergraduate university students found that neuroticism and academic stress had a positive relation with health complaints, which likely meant lower satisfaction (Hystad et al., 2009).

Self-evaluation as a moderator of the relationship between stress and academic satisfaction

It has been shown in the parts above that each trait of the self-evaluation concept can be a moderator for the effect of stress on academic satisfaction. More evidence for this effect was found in an article that related self-evaluation to job satisfaction. It was found that people with positive self-evaluations may be more effective in positions that require stress tolerance, and that job satisfaction was positively related to a the self-evaluation concept (Bono & Judge, 2003). Even though the four traits can be measured individually, in this research it was opted to use the Core Self-Evaluations Scale by Judge et al. (2003). This scale does not measure each item individually, but is a scale of 12 items that measures the core self-

evaluations concept as a whole. However, it was felt that it is still important to fully understand the whole concept of each of the four traits. Considering the four traits of the self-evaluation construct, hypothesis 4 is proposed:

The effect of academic performance-related stress on academic satisfaction is moderated by self-evaluation, such that when people have lower self-evaluation, their academic satisfaction is lower.

<u>Academic satisfaction and meal choice</u>

Extensive studies have been done on satisfaction as a consequence of meal consumption (Arora & Singer, 2006; Cardello et al., 2000; Edwards et al., 2013), yet to the best of my knowledge, no research has been done on meal choices after some sort of satisfaction. It was hypothesized that academic performance-related stress contributes negatively to academic satisfaction. It thus gives one an unpleasant feeling that is related to (momentary) unhappiness. People who experience unhappiness eat more of an unhealthy food, or more types of unhealthy food. For example, in a study which asked participants to complete as many anagrams as possible in 10 minutes, there was the option to eat ice cream during and after completing the task. Participants who were told they did badly ate more of the ice cream than those who did not receive any feedback on their performance (Polivy & Herman, 1998). A qualitative study with 102 university freshman students concluded that unhappiness, loneliness, stress, and boredom were consistently named as reasons for eating (Childers et al., 2011). This leads to hypothesis 5:

Increased academic satisfaction is positively related to healthy meal choice.

Methodology

Participants and design

73 participants (M_{age} = 22.19, SD_{age} = 2.598, 50.7% male) were randomly assigned to one of two conditions: the stress condition (N = 35) or the control condition (N = 38). The experiment was conducted in a computer room in the Forum building of the Wageningen University. The procedure was as follows. Participants were seated at a computer, which had the survey pre-loaded on it. Upon sitting down, they were handed out instructions for the experiment depending on the condition they were assigned to (Appendix B & C), which the experimenter also read out loud to avoid any confusion. Participants had the opportunity to ask questions before the experiment began and had to give informed consent (Appendix A) in order to take part in the experiment.

Procedure

Participants first had to complete a general knowledge quiz that was handed out on paper. People in both the stress condition and the control condition were asked to complete the same general knowledge quiz of 20 questions that were purposely made hard (Appendix D). Participants were randomly assigned to either the stress condition or the control condition by a coin toss. In the stress condition, participants had to complete the experiment in groups of four. Academic performance-related stress was induced by telling the participants before the quiz started that there was a time limit of two minutes to complete the quiz, and that the person with the lowest grade would have to do a 3 minute presentation about the Gaza strip in front of all people present in the room. He or she would be given 2 minutes to prepare. This manipulation is a modified version of the Trier Social Stress Test (TSST) (Kirschbaum et al., 1993). The time limit of 2 minutes to complete the general knowledge quiz was based on a pilot study with four people, which showed that the time it took to complete the quiz ranged from 1 minute and 41 seconds to 2 minutes and 7 seconds. The researcher notified

participants of the remaining time after one minute and after one and a half minute had passed. The quizzes were collected after the two minutes had passed. Participants in the control condition were not told about any presentation or time limit, and were asked to raise their hand once they had completed the quiz.

In both conditions participants were asked to fill in a short survey after the quiz had been completed. This survey measured the concepts introduced in the literature review. The researcher would pretend to grade the quizzes in the stress condition while people filled in the survey. At the end of the survey there was a message that stated that once the survey had been completed, participants should come to the side of the room where the researcher was seated until everyone was done.

After completing the survey, everyone was debriefed by the researcher (Appendix E), and people were allowed to leave. The reward for participation in the experiment was a €20 gift card for Bol.com, which was later raffled among the participants who had filled in their email address.

Measurements

Meal choice

In the introduction, it was mentioned how stress may cause people to eat more unhealthy, sweet, high-fat, high-energy, dense, snack-type foods, and consume less healthy low fat foods (Oliver et al., 2000; Oliver & Wardle, 1999). It was opted for respondents to have to make 3 choices between healthy and unhealthy meals. Fat contents were added to give participants some sort of indication as to how unhealthy a meal was. Fat contents were either derived from the website they were found on, or were estimated based on the fat contents of individual components.These meals were not served to the respondents after their choice, thus the choice was not "real". A total of three meal choices were offered because it was felt that one meal choice could not fully represent the meal choice concept. The choices

respondents had to make were between a schnitzel dish, a pasta dish, and a vegetarian nut roast (Appendix F). To check if the choice was made simply because the respondent did not like a certain meal, the following question was added:

'Did you make this choice based only on absolutely not liking one of the two options?'

To check if the choice was made because of religious beliefs, the following question was added:

'Did you make this choice based only on religious beliefs?'

Academic performance-related stress and emotion measures

Academic performance-related stress was evaluated along with five emotions to check how strongly participants experienced this feeling. The emotions selected were calm, anger, happy, proud and fear. The item included to measure stress and the emotions is "Right now, I feel...". These had to be evaluated on a 1-5 Likert scale, with 1 meaning "not at all", and 5 meaning "very much". Even though participants had to give a score for "stressed", and not "academically performance-related stressed", the source of the stress was academic performance related. Therefore, it was felt that the "stressed" item could measure academic performance-related stress.

Academic satisfaction

To the best of my knowledge, no good scale has been developed to measure academic satisfaction. However, many job satisfaction scales have been developed, and reviewed in one relatively recent article (Van Saane et al., 2003). It was found that the Measurement of Job Satisfaction (MJS) was the most reliable scale. This scale contains 38 items, but due to time constraints and to improve the flow of the study, two items were included to measure academic satisfaction. The stem question of the MJS is "how satisfied are you with this aspect of your job?" For this research, this question was framed into an academic satisfaction context, which resulted in the following two questions to measure academic satisfaction:

1. How satisfied are you with your grades?

2. How satisfied are you with your courses?

The questions had to be answered on a 1-5 Likert scale with 1 being "extremely dissatisfied" and 5 being "extremely satisfied". These two items are based on an article mentioned in the literature review that found that GPA and course satisfaction were the two most important variables in measuring academic satisfaction (Aitken, 1982).

<u>Self-evaluations as measured with the Core Self-Evaluations Scale (CSES)</u>

The measurement of respondents' self-evaluation concept was based on an article by Judge et al. (2003), who first thought of the self-evaluation concept. The article discusses the development of a measure of a 12-item core self-evaluations scale (Judge et al., 2003) (Appendix G). Participants get one score on self-evaluation, so no separate scores for self-esteem, neuroticism, self-efficacy, or locus of control were given. 6 of the items on the scale were positively framed, and 6 were negatively framed. Of course the scores on these 6 negatively worded items had to be reversed. The questions had to be answered on a 1-5 Likert scale, where 1 indicated 'Strongly disagree', and 5 indicated 'Strongly agree'. Items with an '**R**' behind them have to be reverse-scored. Examples of items included in the scale are "I am confident I get the success I deserve in life" and "Sometimes I feel depressed **R**".

<u>Demographic variables</u>

Demographic variables that will be measured in this study are age and gender. Respondents were asked to select their age from a dropdown menu, and select one of the following options for gender: 'Male', 'Female', 'Other'. A control question was also added to see if the respondent was a student, which was: "Are you a student at the Wageningen University?".

Dataset preparation and internal consistency of scales

Before any analysis was done, the preview results were deleted from the dataset. Based on missing items, no respondents were removed. This meant a dataset with a total of 73 valid responses was worked with. 3 respondents were not students of the Wageningen University but were very likely students from another academy since there was a master's open day at the time the experiment was conducted. Therefore, it was opted to keep these three respondents in the analysis. Then, the reliability of two scales was analyzed: that of the academic satisfaction scale, and that of the CSES.

For the Academic Satisfaction scale, the two items (satisfaction with grades and courses) were measured on the same 1-5 Likert scale. The items have relatively low reliability, *Spearman-Brown Coefficient* = .642. Therefore, when analyzing academic satisfaction in relation to other concepts of the conceptual model, these two items were evaluated separately.

For the CSES, some preparation had to be done before the scale's reliability could be evaluated. The scores of items 2, 4, 6, 8, 10, and 12 had to be reversed because these items were framed negatively. After this, the internal consistency was evaluated. All items were measured on the same 1-5 Likert scale, and had high reliabilities, *Cronbach's α* = .792. This value could be improved the most by deleting the item "I determine what will happen in my life". However, this would only yield an improvement of .006 in the α value, which was felt to be too low, and thus it was opted not to remove any items from the scale. Because the scale was reliable, a new variable was created which added up the scores for all items of the CSES and divided that number by twelve (the number of items included in the scale). This meant that each respondent now had one score on a 1-5 scale for the CSES.

Results

The assumptions for regression and ANOVA analyses were all checked and were not violated.

Manipulation check

Therefore there were no methodological objections for the analyses in this section.

To check if the stress manipulation was succesful, a one-way ANOVA was run with the scores on stress, calm, angry, happy, afraid, and proud as dependent variables and the experimental condition as independent variable. Table 1 summarizes the results:

Emotion	Stress condition mean and SD	Control condition mean and SD
Stress	3.29[a] (1.250)	2.45[b] (1.179)
Calm	2.69[a] (1.022)	3.45[b] (0.978)
Angry	1.83[a] (1.124)	1.37[b] (0.751)
Happy	3.06[a] (0.906)	3.32[a] (0.662)
Afraid	2.66[a] (1.327)	1.61[b] (0.823)
Proud	2.00[a] (0.840)	2.50[b] (0.952)

Table 1: Manipulation check

The letters "a" and "b" indicate whether the difference between the means scores per condition per emotion were significant at the p = 0.05 level. "a" and "a" indicate a nonsignificant difference, whereas "a" and "b" indicate a significant difference.

This table shows that people in the stress condition indicated to experience significantly more stress than people in the control condition, $t(71) = -2.95$, $p = .004$, $\eta^2 = .109$. Also, stress had the highest score compared to the other measured emotions. It is notable that there are many

significant differences between the conditions: only the difference in "happy" was not significant. In summary, people in the stress condition experienced stress the most of all asked emotions, and were less calm, more angry, more afraid, and less proud than people in the control condition. It can thus be concluded that the stress manipulation was successful.

Main effect

The main effect was analyzed in two ways. Firstly, the effect of stress (independent variable) on each individual meal choice (dependent variable) was analyzed with a binary logistic regression. Figure 3 shows what percentage of people chose the healthy option per condition. This allows for easy comparison between the conditions. Table 2 shows the results of the binary logistic regression.
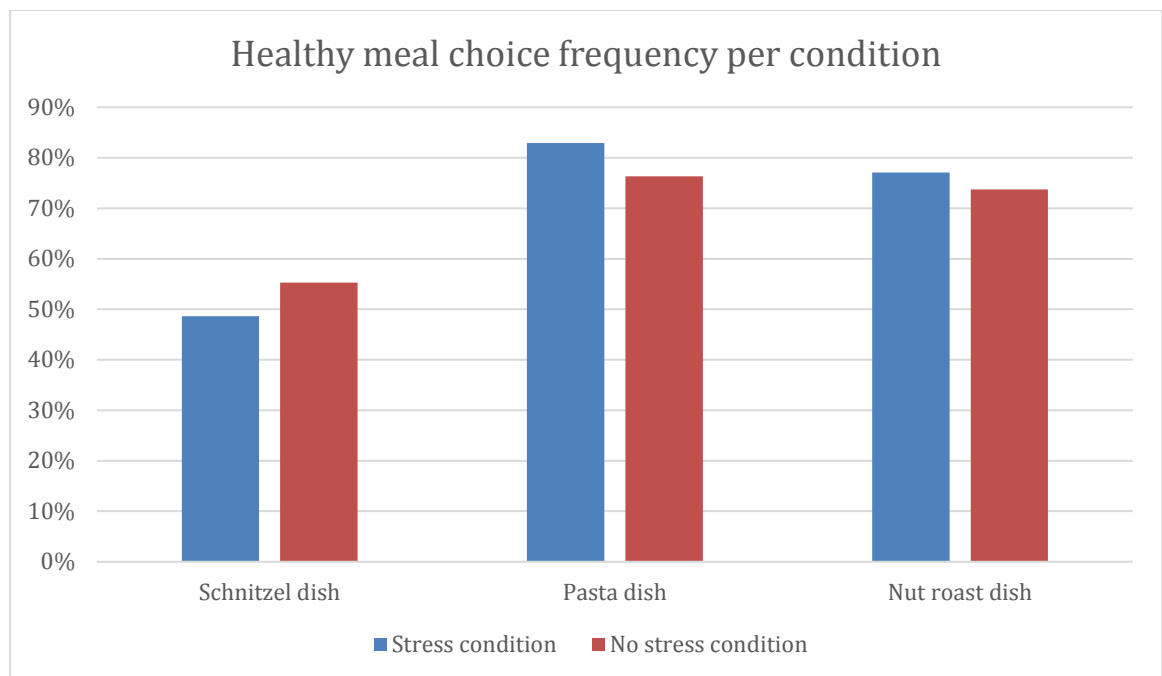

Figure 3: Healthy meal choice frequencies per condition

Meal choice	Variable	b	95% CI for Odds Ratio			Wald	p-value	Nagelkerke R square
			Lower	Odds	Upper			
Schnitzel dish	Constant	0.326	0.403	0.765	1.920	0.326	0.568	0.006
	Control question	-0.268				0.188	0.665	
Pasta dish	Constant	-1.981	0.473	1.500	4.757	4.130	0.042	0.010
	Control question	0.405				0.474	0.491	
Nut roast dish	Constant	-1.403	0.414	1.205	3.512	2.512	0.113	0.002
	Control question	0.187				0.117	0.732	

Table 2: Binary logistic regression for stress and meal choice

No significant effect of stress on any of the meal choices was found. Thus, stress had no influence on any of the individual meal choices.

Respondents were asked two control questions per meal choice, one that asked if they made their choice based on not liking one of the two products, and one that asked if their choice was made based on religious beliefs. Table 3 summarizes these results per condition and per meal choice.

			Schnitzel dish	**Pasta dish**	**Nut roast dish**
Stress condition	Choice made based on not liking?	Yes	8 (22.9%)	13 (37.1%)	7 (20%)
		No	27 (77.1%)	22 (62.9%)	28 (80%)
	Choice made based on religious beliefs?	Yes	35 (100%)	35 (100%)	35 (100%)
		No	0 (0%)	0 (0%)	0 (0%)
	Total		35	35	35
Control condition	Choice made based on not liking?	Yes	12 (31.6%)	9 (23.7%)	12 (31.6%)
		No	26 (68.4%)	29 (76.3%)	26 (68.4%)
		Missing	0 (0%)	0 (0%)	0 (0%)
	Choice made based on religious beliefs?	Yes	2 (5.3%)	1 (2.6%)	0 (0%)
		No	34 (89.5%)	36 (94.7%)	38 (100%)
		Missing	2 (5.3%)	1 (2.6%)	0 (0%)
	Total		38	38	38

Table 3: Frequency table of control questions in the stress and control condition

Meal choices were based only on not liking one of the two options between 20% and 37.1% of the time in the stress condition, and between 23.7% and 31.6% of the time in the

control condition. As for the meal choices based on religious beliefs, only three meal choices were made based on such beliefs. This is not enough for any analysis. Therefore, even though these two items may provide useful information for explaining why certain meal choices were made, they were not included in further analyses.

Secondly, the effect of stress on meal choice as one variable was measured with an independent samples t-test. The three items that measured meal choice first had to be added together. Each healthy choice was given a score of 0, and each unhealthy option a score of 1. This meant respondents were given a score between 0 and 3, where a score 0 meant the healthy option was chosen three times, and where a score of 3 meant the unhealthy option was chosen 3 times. Table 4 shows these results.

Condition	Mean and SD meal choice	Levene's test
Stress	0.914 (0.818)	0.861
Control	0.947 (0.837)	

Table 4: Independent samples t-test for stress and meal choice scale

The main effect was not significant, $t(71) = -0.171$, $p = 0.865$. Thus, stress did not cause differences in meal choice. For any further analyses including the meal choice concept, the variable in which the scores for meal choice were added up were used. Hypothesis 1 was: *Academic performance-related stress is negatively related to healthy meal choice.* Based on these analyses, hypothesis 1 was rejected.

Gender moderation analysis

Table 5 shows the mean stress score and mean meal choice score on a scale of 0 to 3 per gender per condition.

Gender	Condition	N	Mean and SD stress score	Mean and SD meal choice score
Male	Stress	16	2.63 (1.20)	1.188 (0.91)
	Control	21	2.14 (1.11)	1.0476 (0.80)

Female	Stress	19	3.84 (1.02)	0.684 (0.67)
	Control	17	2.82 (1.19)	0.8235 (0.88)

Table 5: Descriptives of stress and meal choice per gender per condition.

To analyze the effect of gender on the relationship between stress and meal choice, aN ANOVA was conducted with the score on stress as the dependent variable, and the condition and gender as independent (fixed) factors. There was a significant main effect of condition on stress score, $F(1, 69) = 8.032$, $p = .006$, $\eta^2 = 0.104$, indicating that participants in the stress condition scored significantly higher on experienced stress than participants in the control condition. There was also a significant main effect of gender on stress score, $F(1, 69)$, $p = .001$, $\eta^2 = .157$, indicating that women scored significantly higher on experienced stress than men. However, there was no significant interaction effect of gender and stress condition on stress score, $F(1, 69) = 1.026$, $p = .315$, $\eta^2 = .015$. Thus, even though stress condition and gender both had a significant impact on stress score, one's score on stress was not moderated by gender.

Furthermore, a one-way ANOVA was run with gender and stress condition as independent variables, and meal choice as dependent variable. There was a non-significant main effect of stress on meal choice, $F(1, 69) = .000$, $p = .999$, $\eta^2 = .049$. There was also a non-significant main effect of gender on meal choice, $F(1, 69) = 3.584$, $p = .063$, $\eta^2 = .000$. There was no significant interaction between stress and gender on meal choice, $F(1, 69) = .528$, $p = .470$, $\eta^2 = .008$. This indicates that males and females were not affected differently by stress. Hypothesis 2 was: *The effect of academic performance-related stress on meal choice is moderated by gender, such that when stress leads to an unhealthier meal choice, women choose the unhealthy option more often than men.* Based on this analysis, hypothesis 2 was rejected.

Academic satisfaction mediation analysis

The effect of stress on both items of academic satisfaction was analyzed with two independent sample t-tests. Table 6 shows the results of the independent sample t-tests.

	Condition	Mean and SD	Levene's test
Satisfaction with grades	Stress	3.49 (0.781)	0.646
	Control	3.37 (0.852)	
Satisfaction with courses	Stress	3.57 (0.884)	0.588
	Control	3.42 (0.758)	

Table 6: Independent sample t-tests for grade satisfaction, course satisfaction, and stress

The main effect of stress on grade satisfaction was not significant, $t(71) = 0612$, $p = .543$, and neither was the main effect of stress on course satisfaction, $t(71) = .782$, $p = .437$. Thus, stress did not have an impact on either aspect of academic satisfaction. Hypothesis 3 was: *Academic performance-related stress is negatively related to academic satisfaction.* Based on these analyses, this hypothesis is rejected.

CSES moderation analysis

As a measure of the core self-evaluations concept, the CSES was used to test the effect of self-evaluation on academic satisfaction. To test this effect was analyzed with two ANOVAs, with the items of academic satisfaction as the dependent variable(s), stress as the independent variable, and the CSES score as covariate.

Grade satisfaction

Firstly, there was a significant main effect of condition on grade satisfaction, $F(1, 69) = 4.497$, $p = .038$, $\eta^2 = .061$, meaning that people in the stress condition scored significantly

higher on grade satisfaction than those in the control condition. Secondly, there was a significant main effect of the score on the CSES on grade satisfaction, $F(1, 69) = 12.167$, $p = .001$, $\eta^2 = .150$, meaning that people with higher CSES scores also had higher grade satisfaction. Lastly, there was a significant interaction effect between the control condition and CSES scores as can be seen in table 7. This means that people in the control condition with positive self-evaluations tend to score higher on grade satisfaction than people in the stress condition with positive self-evaluations.

Parameter	B	Std. Error	t	p-value	95% Confidence Interval		η^2
					Lower Bound	Upper Bound	
Intercept	0.206	0.789	0.261	0.795	-1.369	1.781	0.001
Stress condition*CSES	0.252	0.248	1.015	0.314	-0.243	0.747	0.015
Control condition*CSES	0.923	0.228	4.053	p < 0.001	0.469	1.378	0.192

Table 7: ANOVA moderation analysis for stress, CSES, and grade satisfaction

Course satisfaction

Firstly, there was a non-significant main effect of condition on course satisfaction, $F(1, 69) = 0.414$, $p = .522$, $\eta^2 = -.006$, meaning that people in the stress condition did not score higher on course satisfaction than people in the control condition. Secondly, there was a significant main effect of the CSES scores on course satisfaction, $F(1, 69) = 6.829$, $p = .011$, $\eta^2 = .090$, meaning that a higher score on the CSES meant a higher score on course satisfaction. Lastly, there was a non-significant interaction effect between condition and

CSES scores, $F(1, 69) = 0.655$, $p = .421$, $\eta^2 = .009$, meaning that CSES scores did not moderate the effect of stress on course satisfaction.

In conclusion, the CSES had a significant effect on both grade and course satisfaction. Stress did not impact course satisfaction, but scores on grade satisfaction were higher in the stress condition than in the control condition. There was a nonsignificant interaction effect between condition and CSES scores on course satisfaction, but there was a significant interaction effect between condition and CSES scores on grade satisfaction. People with positive self-evaluations in the control condition scored higher on grade satisfaction than people with positive self-evaluations in the stress condition. This is also true the other way around: people in the stress condition with positive self-evaluations scored lower on grade satisfaction than people in the control condition. Hypothesis 4 was: *The effect of academic performance-related stress on academic satisfaction is moderated by self-evaluation, such that when people have lower self-evaluation, their academic satisfaction is lower.* Based on these analyses, this hypothesis was partly accepted.

Academic satisfaction mediation analysis – 2

To analyze the effect of academic satisfaction on meal choice, a linear regression was run. The results from the regression analyses are shown in tables 8 and 9.

	R Square	F	B	t	p-value	df regression	df residual
Constant	0.051	3.802	1.710	4.168	p < 0.001	1	71
Grade satisfaction			-0.227	-1.950	0.055		

Table 8: Regression analysis of grade satisfaction and meal choice

This table shows that grade satisfaction had a marginally non-significant effect on meal choice: for every point increase in grade satisfaction, meal choice decreased by .227. Thus, for every increase in grade satisfaction, meal choice got healthier. Meal choice and grade

satisfaction are thus positively related, as a higher score on meal choice indicated unhealthier meal choices.

	R Square	F	B	t	p-value	df regression	df residual
Constant	0.013	0.939	1.332	3.137	0.002	1	71
Course satisfaction			-0.115	-0.969	0.336		

Table 9: Regression analysis of course satisfaction and meal choice

This table shows that course satisfaction also had a non-significant effect on meal choice. Hypothesis 5 was: *Increased academic satisfaction is positively related to healthy meal choice.* Based on these analyses, this hypothesis was rejected.

CSES and stress relationship

Even though it was not expected that stress had an impact on self-evaluation, to rule out that stress had an impact on self-evaluation, this effect was also tested. The effect of stress on CSES-scores was investigated with a independent samples t-test. Table 10 shows the results of this analysis.

Condition	Mean	Levene's test
Stress	3.333	0.685
Control	3.425	

Table 10: Independent samples t-test for stress and the CSES

The effect of stress on the CSES scores was not significant, $t(71) = -.749$, $p = .456$. Thus, stress did not affect people's scores on the CSES.

Discussion

People under academic-performance related stress may consume more unhealthy foods than people who do not experience such stress. So far, meal choices under stress remained relatively unexplored, even though they may have serious health consequences like obesity. Therefore, the following research question was formulated: "*What is the effect of stress on the choice between healthy and unhealthy meals?*". The influence of self-evaluations, gender, and academic satisfaction was also investigated.

Academic performance-related stress and meal choice

In this research, people who experienced academic performance-related stress did not eat unhealthier than people who were not manipulated to feel a specific emotion. This is in line with the study of Oliver et al. (2000), who stated that people who experience stress express this more often in snacking behavior than in eating actual meals. However, this was the only article found by the researcher that compared meal choices to snack choices under stress. Thus, this study adds to the very limited available literature on stress in relation to meal choices as it compares options within meal choice instead of looking at a comparison between snack-type foods and meal choices. It has been concluded by different studies that people who experience stress eat more unhealthy, sweet, high-fat, high-energy, dense, snack-type foods (Oliver et al., 2000; Oliver & Wardle, 1999). These findings combined with the results of this study lead to the conclusion that academic performance-related stress is expressed only in snacking behavior, and not in actual meal choices.

Gender

Women were found to be more susceptible to stress than men in this study. Bothmer & Fridlund (2005) found that women experienced more constant stress than men. Their research adds to this study since it now has also been proven that women are more susceptible to academic performance-related stress manipulations than men. It was not

proven that women make more healthy meal choices than men. This does not necessarily disprove the findings of Wardle et al. (2004) and Bothmer & Fridlund (2005), from whose findings it may be concluded that as a baseline, women tend to eat healthier than men. Even though women did not eat healthier than men in this study, it may well be that this healthier behavior expresses itself in different meal choices than the ones presented in this study. It may also be so that this healthier behavior is expressed in choices between different products/meals instead of between different versions of the same meal.

Academic performance-related stress and academic satisfaction

This study found that stress did not impact academic satisfaction. Still, it does not rule out that academic performance-related stress and academic satisfaction have nothing in common. The relationship between these two concepts needs to be researched further as very limited literature is available about it. However, comparisons to a workplace environment can be drawn. As Olsen (1993) pointed out, it is not uncommon for new employees to experience decreasing work satisfaction and increased job-related stress in their first years of appointment. It may thus very well be that academic performance-related stress and academic satisfaction are connected through another, unidentified variable, like they are in the work environment. As extremely little research has been done on satisfaction with one's own academic performance, this finding provides theoretical contributions in that the relation between academic performance-related stress and academic satisfaction has now been explored further. Thus, dissatisfaction with one's own academical performance is not caused by academic performance-related stress, but may also be influenced by other concepts such as outcome expectations (Lent et al., 2007).

CSES

In this research it was once again proven that the CSES is a measure of the core self-evaluations concept. This is an addition to the research of Judge et al. (2003) by once again

confirming the legitimacy of the scale. Furthermore, it was found that increased stress decreases one's self evaluation. This may explain the findings of Bono & Judge (2003), who found that people with positive self-evaluations are more effective in positions that require stress tolerance. It may thus be so that people with a low self-evaluation do not have the right self-esteem, locus of control, self-efficacy, and neurotic properties to function in high-stress environments. This research focused on academic performance-related stress, while the research of Bono & Judge focused on job-related satisfaction. The article of Bono & Judge was used due to a lack of available literature on academic performance-related stress and academic satisfaction. Therefore, the concepts of stress and satisfaction were searched for in a different context. The difference in origin of the stressors is cause for caution, since this research clearly studies a different type of stress than the research of Bono & Judge. This means that the conclusions drawn by this research should only apply to academic performance-related stress, and not to stress in general.

Furthermore, it was also found that a combination of one's core self-evaluations and stress affects aspects of academic satisfaction. In this study, people with positive self-evaluations in the control condition had higher grade satisfaction than people with positive self-evaluations in the stress condition. This may be due to the negative associations that stress has, such as feelings of tension and anxiety (Firth, 1986). This negativity could perhaps cause students with positive self-evaluations to feel more dissatisfied with their grades than they usually would.

Academic satisfaction and meal choice

Just like the relationship between academic performance-related stress and academic satisfaction, this relationship had so far remained relatively unexplored. This research concluded that academic satisfaction did not impact meal choice. This finding contradicts the study of Childers et al. (2011), who stated that among others unhappiness and stress were

consistently named as reasons for eating. Low academic satisfaction may be related to unhappiness, but it does not cause people to start eating the unhealthier meals that were used in this study. Perhaps low academic satisfaction may cause some other type stress, which may in turn affect meal choice. It may also be possible that meal choices are just not affected by academic satisfaction, but that low academic satisfaction, like stress, expresses itself in snacking behavior.

Theoretical contributions

This study focused on the effects of academic performance related stess on academic satisfaction and healthy meal choices. It has implications for the field of consumer behavior and psychology in that it adds to the existing knowledge of how a mental state (stress) affects consumer preferences of meal consumption. The findings from this research show that academic performance-related stress does not lead to unhealthier meal choices within the choice set used in this study. It also has implications for the nutritional field as the relationship between stress and meal choices is now better understood. This research also has implications for the field of social academic research, since it explores the relationship between academic performance-related stress and academic satisfaction. This relationship was previously unexplored, but this study has proven that there is no relationship between stress and grade and course satisfaction. However, other aspects of academic satisfaction could still be affected. In the literature review it was found that each individual aspect of the corse self-evaluations concept had an effect on stress and satisfaction, but the whole concept had not yet thoroughly been studied in relation to academic performance-related stress and academic satisfaction. These concepts and their relations are now understood better. This study has proven that academic performance-related stress impacts grade satisfaction, and that the core self-evaluations impacts both grade and course satisfaction.

Practical contributions

The practical relevance of this study mostly lies in what was not found to be significant. Its results can be used by marketeers to improve their understanding of consumer decision making and to help make better advertisements. It is now understood that academic performance-related stress does not cause people to start eating unhealthier. However, previous literature suggests that stress does cause people to start eating unhealthier. Therefore, marketers of the meals researched in this study should not adopt a strategy based on academic-performance related stress, and marketers of snacks should focus on people who are stressed (Oliver et al., 2000).

Nutritionists now know that influencing people to start consuming healthier meals should not take an academic-performance related stress strategy. It is of no use to make one feel stressed about their academic performance to help them pay attention to which meals they consume. Also, influencing someone to feel dissatisfied with their academic performance will not cause them to start eating healthier. Therefore, any efforts to help people make healthier meal choices should avoid any academic stress or satisfaction influences.

Limitations and recommendations for future research

Several limitations of the study were identified. For instance, the item that measured whether a choice was made based only on not liking one of the two options was not thorough enough. It was intended for people who absolutely could not stand (the taste of) one of the two choices and would never eat it. However, it is likely that some respondents filled in that they did not like one of the two choices purely based on the fat content that was written under it. They would still be able eat it, but just disliked one aspect of the meal. This item did however provide insight into why some meal choices were made.

The emotion "happy" was relatively high in both the stress and control condition. As was explained in the literature review, happiness is not an emotion that is logically connected

to stress. Thus, even though the manipulation was successful, the high levels of happiness in both conditions may be cause for concern. This finding may be explained by that happy could have been interpreted as either momentary happiness, so a short feeling of being happy, or as long-term happiness, perhaps in the form of internal luck. This discrepancy in interpretations could be the reason for the generally high levels of happiness.

The stress manipulation could also have been longer and could also have been modified to be even more effective. Once the experiment had been completed, some people said that they did not truly believe they had to do a presentation. Others stated that they were quite afraid of the presentation, and that it caused them stress. Thus, for some people the manipulation may be more successful than for others, depending on the credibility of the researcher. This may have been influenced by the fact that some of the participants were friends of the researcher, which may have caused them to be more relaxed than they would otherwise be with another experiment. For future research it is recommended that the manipulation has more relevance to the participants. For example, the manipulation could involve a presentation for a course. This way the effects of academic performance-related stress on both grade and course satisfaction may also become more apparent, since people would receive a grade that actually matters to them, which in turn may affect course satisfaction.

For future research it is suggested that the exact relationship between academic performance-related stress, academic satisfaction, and meal choices is explored further. Even though this study found no significant relationships between these three concepts, it does not have to mean that there is no relationship at all. Meal choice was measured only by three meal choices, but this number can be expanded upon in studies where more time is available. Thus, for future research it is recommended to increase the amount of meals studied.

Furthermore, the scale for academic satisfaction did not prove to measure the same concept, but two separate items (grade and course satisfaction). For future research it is advised to use a more thorough scale with more items. These adjustments may, despite the nonsignificant results of this study, prove a relationship between academic performance-related stress, academic satisfaction, and meal choice after all. Also, it is recommended to alter the manipulation to include all items of academic satisfaction. In this study, grade satisfaction may have been more important to people since those in the stress condition would receive a grade for their quiz. However, course satisfaction was not as relevant, since it did not appear in the manipulation in any form. This may also explain why different results were found for the effects of core self-evaluations and stress on grade and course satisfaction.

Conclusion

In conclusion, this research studied the effect of academic performance-related stress on meal choices. Even though the stress manipulation increased the experienced stress among participants, it did not lead to different meal choices compared to people whose stress levels were not manipulated. Thus, even though academic performance-related stress does not seem to have an effect on meal choice, is does influence people's satisfaction with their own grades. The relationship between academic satisfaction and academic performance-realted stress has been explored further, which had not been done thoroughly in the available literature thus far. Also, it has now been proven that among people with positive self-evaluations, academic performance-related stress leads to lower grade satisfaction. In this regard, this study has contributed significantly to scientific knowledge about academic performance-related stress, meal choices, self-evaluations, and academic satisfaction.

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Appendices

Appendix A - Informed consent

Welcome! Thank you for participating in this research. Please circle "yes" if you understand and agree with the following statements:

- My personal data will be used only by the researcher and his supervisor, and will not be provided to third parties

- My data will be used in this research

- Individual results will remain confidential, and my response is anonymous

Yes   **No**

Please do not flip this page over until you are instructed to begin.

Appendix B - Instructions stress condition

Dear Sir or Madam,

Welcome! You are going to participate in a scientific research study for my Bachelor's thesis. Your participation is important for reliable data, and your participation is voluntary. If you do not wish to participate, or if you later wish to withdraw your participation, you can do so at any time without penalty.

You will first be making a general knowledge quiz. The quiz consists of 20 multiple choice questions, and for this quiz there is a time limit of 2 minutes. After these 2 minutes, your answers will be collected and you will be asked to fill in a short survey.

You will receive a grade for this quiz. The person with the lowest grade will have to do a presentation of 3 minutes about the Gaza strip in front of the rest of the people in this room. It is thus in your best interest to make the quiz to the best of your ability. You will be given 2 minutes to prepare this presentation. If the presentation is not good enough in the eyes of the researcher, it will have to be done again, until it is good enough in the eyes of the researcher.

You will have a chance to win a €20 gift card for Bol.com as a reward for your participation in this research. The experiment and survey will likely take around 10 to 15 minutes. Your individual data will only be analysed by the researcher and his supervisor, and will not be provided to third parties. While the aggregate results will be shared, individual results will remain confidential. Your response will be anonymous.

For further information about this study, please contact tren.vanleijden@wur.nl. I really appreciate your participation in this research study!

Do you have any questions?

Appendix C - Instructions control condition

Dear Sir or Madam,

Welcome! You are going to participate in a scientific research study for my Bachelor's thesis. Your participation is important for reliable data, and your participation is voluntary. If you do not wish to participate, or if you later wish to withdraw your participation, you can do so at any time without penalty.

You will first be making a general knowledge quiz. The quiz consists of 20 multiple choice questions. Once you have finished the quiz, your answers will be collected and you will be asked to fill in a short survey.

You will have a chance to win a €20 gift card for Bol.com as a reward for your participation in this research. The experiment and survey will likely take around 10 to 15 minutes. Your individual data will only be analysed by the researcher and his supervisor, and will not be provided to third parties. While the aggregate results will be shared, individual results will remain confidential. Your response will be anonymous.

For further information about this study, please contact tren.vanleijden@wur.nl. I really appreciate your participation in this research study!

Do you have any questions?

Appendix D - The general knowledge quiz

General knowledge quiz

Epsom (Engeland) is the place associated with:

    a. Snooker

    b. Football

    c. Cricket

    d. Horse racing

Grand Central Terminal, Park Avenue, New York is the world's...

    a. longest railway station

    b. highest railway station

    c. largest railway station

    d. none of the above

The Gulf cooperation council was originally formed by...

    a. Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates

    b. Second World Nations

    c. Third World Nations

    d. Fourth World Nations

Golf player Vijay Singh belongs to which country?

    a. Thailand

    b. USA

    c. Fiji

    d. United Kingdom

Entomology is the science that studies…

    a. Insects

    b. The origin and history of technical and scientific terms

    c. Behavior of human beings

    d. The formation of rocks

Galileo was an Italian astronomer who

    a. developed the telescope

    b. discovered that the movement of pendulum produces a regular time measurement

    c. discovered four satellites of jupiter

    d. all of the above

Exposure to sunlight helps a person improve his or her health because

    a. the infrared light kills bacteria in the body

    b. the ultraviolet rays convert skin oil into Vitamin D

    c. the pigment cells in the skin get stimulated and produce a healthy tan

    d. resistance power increases

The First China War was fought between…

    a. China and Portugal

    b. China and France

    c. China and Britain

    d. China and Spain

For which of the following disciplines is a Nobel Prize awarded?

    a. Literature, Peace, and Economics

    b. Physiology or Medicine

    c. Physics and Chemistry

    d. All of the above

What is the best-selling Album of all time?

    a. ACDC - Back in Black

    b. Take That - The Circus

    c. Michael Jackson - Thriller

    d. Elton John - Made in England

In Snooker, what is the quickest time recorded for a 147 maximum break?

    a. 5 minutes and 43 seconds

    b. 5 minutes and 20 seconds

    c. 6 minutes and 53 seconds

    d. 4 minutes and 54 seconds

In what country was former UK Prime Minister Tony Blair born?

    a. Wales

    b. England

    c. Scotland

    d. Northern Ireland

Who is the Patron Saint of Spain?

a. St. George

b. St. James

c. St. Peter

d. St. John

Which of these is known as little Russia?

a. Ukraine

b. Kazakhstan

c. Finland

d. Norway

Pigs can't fly, but which one of these CAN they do?

a. Swim

b. Grow a 3rd ear in the winter

c. Stand on their back legs with their front ones in the air for up to 48 minutes

d. Run 45 km/hour

Who was John Cleese married to?

a. Amy Kingman

b. Audrey Palmer

c. Doris Shephall

d. Connie Booth

Where are the Nazca lines?

a. Germany

b. Peru

c. Sweden

d. Spain

Ralph, Jack, Simon, Piggy, and Roger are all characters of which classic novel?

    a. Animal Farm - George Orwell

    b. A Tale of Two Cities - Charles Dickens

    c. Lord of the Flies - William Golding

    d. 1984 - George Orwell

Which of the following planets rotates clockwise?

    a. Jupiter

    b. Neptune

    c. Venus

    d. Earth

In what year was WhatsApp founded?

    a. 2004

    b. 2005

    c. 2007

    d. 2009

This is the end of the quiz.

Appendix E - Debrief

Once again I would like to thank you for your participation. The true purpose of this research is to investigate the effect of academic performance-related stress on healthy meal choices. It is important to know that you will not receive a grade for the general knowledge quiz you made, and no-one will have to do a presentation.

It is essential for my study and the validity of my results that you do NOT tell others about the true purpose of this study as long as it is running. Also, it is of critical importance that you do not tell others about the presentation part of this study. This may compromise my results. It is however encouraged to tell many people about this research so that I can get enough respondents. I would like to thank you once more for your participation. You will now receive your snack and then you can leave. Best of luck studying for your exams!

Appendix F - Meal choice

Schnitzel with mashed potatoes and vegetables

Total amount of fat per serving: 15 grams

Fried schnitzel with fries and vegetables

Total amount of fat per serving: 50

grams

Tortellini with pesto and roasted vegetables

Fettuccine alfredo

Total amount of fat per serving: 24 grams

grams

Total amount of fat per serving: 50 grams

Vegetarian nut roast

Total amount of fat per serving: 19 grams

grams

Vegetarian nut roast

Total amount of fat per serving: 54

Appendix G - The Core Self-Evaluations Scale (CSES)

1. I am confident I get the success I deserve in life.

2. Sometimes I feel depressed. **R**

3. When I try, I generally succeed.

4. Sometimes when I fail I feel worthless. **R**

5. I complete tasks successfully.

6. Sometimes, I do not feel in control of my work. **R**

7. Overall, I am satisfied with myself.

8. I am filled with doubts about my competence. **R**

9. 1 determine what will happen in my life.

10. I do not feel in control of my success in my career. **R**

11. I am capable of coping with most of my problems.

12. There are times when things look pretty bleak and hopeless to me. **R**