Universiteit Utrecht

Self-control and healthy food choice behaviour in social situations

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Wordcount: 6671

08-07-2022

Abstract

Food plays an intricate role in people's everyday life. Making unhealthy choices can lead to obesity. However, choosing healthy food items can be difficult. It can also be influenced by several variables such as your self-control or the people you are eating with. This study aimed to examine if self-control moderates the effect of social norms on making healthy food choices. This was studied through an experiment with 154 participants. The participants were all given two short scripts to read. The first script was the control condition. The participants were either home alone (first script) or eating with healthy/unhealthy friends (second script), and were asked if they wanted to order a burger with fries or a salad. Self-reported self-control was also measured.

Three hypotheses were proposed. The first hypothesis expected that there is a significant interaction between the type of social norm condition and eating alone or eating with friends. The second hypothesis expected that people will adapt to social norms with their food choices when eating alone or eating with friends. The third hypothesis expected that self-control moderates the effect of social norms. The results found that all three hypotheses were significant and supported by literature. It can be concluded that self-control does moderate the effect of social norms on making healthy food choices. Further research is necessary to determine how large the effect is of self-control. A limitation of this study was the unevenly distributed sample. Research like this is important as it may assist in designing interventions to promote healthy eating behaviour.

Keywords: Self-control, Social norms, Food choices, Healthy, Unhealthy

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Introduction

Food plays an intricate role in people's everyday life. With obesity numbers steadily climbing every year (World Health Organization, 2021), it is apparent that making unhealthy food choices can impact your health. Deciding what to eat can be motivated by factors such as the desire to lose weight, the company one surrounds themselves with, or one's self-control. Eating is necessary for bodily functioning, but it also has a social component to it (Higgs, 2014). Food and eating are connected to most people's social lives, as eating often takes place in the presence of others (Rozin, 2005). A social factor that has been linked to making certain food choices is social influence (Renner, 2012). Glass (2015) defines social influence as: "intentional and unintentional efforts to change another person's beliefs, attitudes, or behavior" (p.348). Social influences on eating behaviour are found to be profound, some say even greater than any other influence on eating (Herman et al., 2003). However, when deciding what to eat one is in control to make the final decision. The current study will examine if self-control moderates the effect of social norms on making healthy food choices, by conducting an experiment. When looking at the reasoning behind making food choices, prior studies focused mainly on self-reporting questionnaires and found that people tend to match their food intake to their companions' food intake or to change their normal eating habits to that of the group (Ruddock et al., 2021; Herman et al., 2003). The presence of others has been found to make choosing healthy food options challenging, especially when one is surrounded by individuals who make different choices than them (Cruwys et al. 2015).

Social norm

People tend to be influenced to make certain decisions without even being aware of them (Glass, 2015). There are three categories of social influence: (i) conformity, (ii) compliance, and (iii) obedience (Burger, 2001). This paper focuses on social norms, which is a form of conformity. Social norms can be defined as informal rules, about which behaviours or expressions are appropriate within a group (Morisson, 2006). According to research by Cialdini (2007), individuals study the behaviour of others to determine what social norms are present within a group. These norms are then used to determine what behaviour is considered appropriate or inappropriate. These behavioural standards also play a role in the regulation of the self and one's goals (De Ridder et al., 2013).

Several studies found that social norms can play a role in food choices (Herman et al., 2003; Jackson et al., 2003; Renner et al., 2012). This is because social norms play a role in

modeling (Cruwys, 2014). Modeling is the mimicking of the behaviour of others, in this case eating what your companion eats. Hermans and colleagues (2012) found that social norms led to modeling effects regardless of if these norms were communicated through different portion sizes or actual intake of the group. It was found that individuals directly adapt their food intake to that of their eating companion as if they are complying with the implicit norms set by their eating companion.

According to Herman and colleagues (2003), people tend to refer to cues from the environment to determine when to stop eating if there are no clear signals of satiety. They investigated this by doing a literature study on three articles and applying *the Inhibitory Norm Model of Social Influence on Eating*, to these studies. The model assumes that: 'In the presence of palatable food, and in the absence of inhibitory forces (such as satiety), people continue to eat indefinitely' (Herman et al., 2003, p.874). Firstly, Herman and colleagues (2003) found that social models can override the primal instinct of hunger and satiety and that observers can also induce people to stop eating palatable food. Furthermore, they found that people tend to eat more when they are in the presence of someone who eats more and less when they are in the presence of someone who eats less. König and colleagues (2017) also found similar results. They examined the relationship between the food intake university students ascribed to peers, who varied in popularity, and the students' own self-reported food intake. They also looked at whether this relationship was moderated by identification with the peer group. They measured this by giving the participants vignettes describing a prototypical student from the participant's university. The students were asked: "whether the described student was cool or uncool, popular or unpopular, clever or unintelligent, good or bad, and whether the described student could be one of his/her (best) friends (p.250)." The students were also required to self-report their food consumption. König and colleagues found that the participants who identified more with their peers adapted their eating behaviour to that of their peers.

Renner and colleagues (2012) also found similar results. They investigated the self-reported motives behind why people eat what they eat in everyday life. They did this by compiling a list, The Eating Motivation Survey (TEMS), which comprised of 15 factors represented by 78 items. The items were categorized in food choices that were made because of: liking, habits, needs & hunger, health, convenience, pleasure, traditional eating, natural concerns, social norms, social image, or sociability. Social norms were measured by asking questions such as: *'I eat what I eat because it would be impolite not to eat it'*. In the end, they found that social norm was indeed a motive behind why people eat what they eat in everyday life.

The aforementioned studies give the expectation that people in the current study will also adapt to the social norms set by their friends:

H1: *People adapt to social norms with their food choices, (i.e., are likely to choose the healthy food when accompanied by friends who choose the healthy food, and the unhealthy food when accompanied by friends who choose the unhealthy food.).*

Self-control

While people tend to adjust their food choices to the norms set by other people's choices, other people are not the only motivation for why individuals make certain food choices. There are several motives for why people choose certain food items, such as price, visual appeal, social situation, and social norms. (Renner et al.,2012). However, it is important to note that regardless of the social motives, one is in control of the choices one makes. Having good self-control could help in making smart choices when it comes to healthy eating. Self-control has been commonly defined as the ability to alter or override impulsive responses and regulate thoughts and behaviour (Salmon et al., 2014). However, another widely used and more fitting definition of self-control for this study is: "The capacity to change and adapt the self so as to produce a better, more optimal fit between self and world" (Tangney et al., 2004, p.275). Self-control can vary across individuals (trait) and across situations (state) (Righetti & Finkenauer, 2011). In the current study, the focus will be on the variation of self-control across individuals.

Studies examining the relationship between food choices and the trait of self-control found that high trait self-control is associated with increased levels of healthy eating, less binge eating, and less consumption of alcohol (Gerrits et al., 2010; Gibson et al., 2004). Researchers also found that low trait self-control was associated with indulgence in alcohol and consumption of sugary and fatty foods (Willis et al., 2007; Gerrits et al., 2010; De Ridder et al., 2013). For example, Gerrits and colleagues (2010) researched whether adolescents' self-control, dietary concerns, and eater prototypes are associated with their dietary practices in different countries. They did this by asking 537 high-school adolescents from the United States, the Netherlands, and Hungary to fill in a survey. They measured the adolescents' socio-economic status, self-control, dietary concerns, eater prototype (people whose eating behaviour they look up to), fruit and vegetable consumption, and fatty food consumption. Gerrits and colleagues (2010) hypothesized that 'higher self-control was related to more fruit and vegetable consumption and lower consumption of fatty foods' (p.1038), and found results supporting this. They found that higher self-control was significantly associated with healthier eating habits such as higher fruit

and vegetable consumption. Furthermore, they found that higher self-control and more diet concerns were related to lower consumption of unhealthy food such as fatty foods. This may support the notion that being aware or concerned about one's diet may be a necessary condition to eat healthily, at least at moderate levels of concern (Gerrits et al., 2010).

The abovementioned studies indicate that having low or high trait self-control can influence the food choices you make. The study by Gerrits and colleagues give the expectation that having high self-control is positively associated with making healthy food choices. It is therefore hypothesized that:

H2: There is a positive correlation between self-control and the likelihood of choosing the healthy food.

Self-control conflict

The current study is based on the idea that the feeling of having to adapt to the environment in order to produce a better fit between the self and the world, while also trying to reach your goals could lead to an internal self-control conflict. Behavioural standards, which can be informed by social norms, play an important role in controlling oneself as they represent the goals that people strive for and how they assess reaching their goals (De Ridder et al., 2018). A conflict arises when behavioural tendencies compete with each other leading to an internal conflict that needs to be resolved rather than simply be overridden by an immediate urge (De Ridder et al., 2018). Many people are confronted with such self-control conflicts on a daily basis. People who monitor their weight need to resolve the conflict of choosing between eating healthy food such as a salad, which is in line with achieving their long-term goal, or a tempting burger, which would satisfy their immediate craving for junk food and make them not the odd one out when all of their friends are eating burgers.

De Ridder and colleagues (2013) argued in their literature review that people make certain food choices in the presence of others because the social norms on what to eat are unclear or not present. This leads to uncertainty on how to behave and makes it necessary to solely rely on your self-regulation competence. According to them: 'in the absence of clear standards, even good self-regulators can regulate their behaviour on their own only to a certain extent and for a short period of time, because self-regulation resources are limited' (p. 149). There have been some studies that looked into the relationship between social norms and self-control (Robinson et al.,2016; Salmon et al., 2014; Gaillot et al., 2021).

Robinson and colleagues (2016) did a cross-sectional study examining if individual differences in the need for social acceptance and self-control moderated whether participants were likely to display similar dietary habits to their peers. They did this by measuring the frequency of the consumption of sugar-sweetened soda (SSS) and sweet pastries (SP) with a food frequency questionnaire, in a group of 1056 young adults. They also measured peer norms for these two food types, by asking participants how often they thought other students have sweet cakes/pastries and sugar-containing soda. To measure trait self-control, participants completed the 13-item self-control scale developed by Tangney and colleagues (2004). They also measured social trait social acceptance with the 10-item 'need to belong' scale. Robinson and colleagues predicted that: 'individuals with low-trait self-control would be more likely to regularly consume SSS and SP if they believed their peers also frequently consumed these foods, in comparison to individuals with high-trait self-control (p.12)'. They found that participants with lower levels of self-control, as opposed to high self-control, were more likely to adhere to perceived peer dietary norms for sweet pastries, but not for sugar-sweetened soda. High self-control was found to be associated with lower consumption of sugar-sweetened soda, but not for sweet pastries.

The study by Robinson and colleagues (2016) gives the expectation that in the current study, people who have low self-control are more likely to make healthy food choices when surrounded by other people because they are more likely to adhere to the perceived norms. In comparison to people who have high self-control, they are less likely to make healthy food choices when surrounded by other people who make the same choices because they are less likely to adhere to perceived norms. These results are expected to be moderated by social norms. Therefore, it is hypothesized that:

H3: Self-control moderates the effect of the type of social norms on the likelihood of choosing a salad, after accounting for the likelihood of choosing a salad in the absence of a social norm. Where the higher the self-control the weaker the effect is of the type of social norms on the likelihood of choosing a salad (i.e., People with higher self-control are less likely to choose the salad, regardless of social norms. People with lower self-control are more likely to choose the burger and fries when accompanied by friends who choose the burger and fries, and the salad when accompanied by friends who choose the salad).

Figure 1 gives a conceptual framework of the variables.

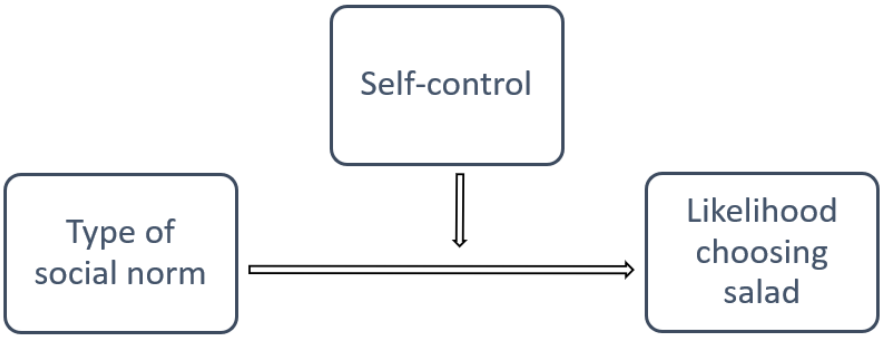

Figure 1. Conceptual framework of the variables

Current study

Obesity has become a worldwide problem, with its number steadily climbing every year (World Health Organization, 2021). According to the World Health Organization, more than 1 billion people worldwide are obese – 650 million adults, 340 million adolescents, and 39 million children. One of the steps that can be taken to prevent getting overweight is making healthy food choices. Depending on one's self-control, making these choices can be challenging. Therefore, it is important to have supportive environments and communities because they are fundamental in shaping people's choices (World Health Organization, 2021).

The current study examines if self-control moderates the effect of social norms on making healthy food choices. While prior research has investigated the relationship between food choices and social situations (Ruddock et al., 2021; Robinson et al., 2011), combining this with the factor of self-control has not been frequently included in research in recent years. Additionally, when it has been combined it was mainly measured with self-report questionnaires. In the current study, it will be measured while conducting an experiment. This study hopes to contribute to the research that has already been done in this area. Understanding why people choose certain food items in everyday life can assist in designing interventions to promote healthy eating behaviour.

Method

Design

This study is experimental, cross-sectional, and quantitative. It also adopts a mixed design with two independent variables and one dependent variable. The first independent variable (between

subjects) was the type of social norm. The second independent variable (within-subjects) was eating alone (absence of social norm) vs eating with friends (presence of social norm). The dependent variable was the likelihood of choosing a salad in the different conditions.

Participants

A total of 180 participants took part in this survey and provided their consent to participate in the study (appendix 1). Participants were recruited via Facebook groups. To participate in this study participants needed to be at least 18 years old. It was required to fill in your age on the survey. Out of the 180 participants that took part in the study, 24 participants did not include their age. These participants were not excluded because it was assumed that they were above the age of 18, because of their recruitment environment. However, a total of 26 participants were excluded as they did not provide answers to the questions concerning the variables of interest. The 154 participants, that were included in the study, were aged between 18 and 73 years old ($M = 36.45$, $SD = 9.83$). The participants consisted of 128 people who identified as female and 26 who identified as male. In terms of dietary preference 127 were meat-eaters, seven were vegan, five were vegetarian and 15 participants had other dietary preferences. The participants were also asked if they are trying to eat healthily. Of the 154 participants, 6 participants were always trying to eat healthily, 79 said they were mostly trying to eat healthily, 52 participants said sometimes, 14 said a little and 3 participants said not at all. During the online survey, everybody was required to fill in the questions in the control condition of eating alone, in the absence of social norms. The participants were then randomly assigned to one of two types of social norm conditions: healthy norm condition (friends choosing salad; N = 74) and unhealthy norm condition (friends choosing the burger and fries; N = 78).

Ethical considerations

This study was approved by the ethics board of the Faculty of Social and Behavioural Sciences of Utrecht University. Utrecht University works according to the code of ethics of the Netherlands Institute of Psychologists. They reviewed the research proposal and made sure that the study was going to be carried out according to the code of ethics of the Netherlands Institute of Psychologists.

Participants were given an informed consent to sign before they were able to fill in the survey. The informed consent stated that the collected data would be processed anonymously

and only used for research purposes. The obtained research data was going to be treated confidentially and the results were only reported at group level. Results can therefore never be traced back to the participant as an individual. If the participant did not want to be part of the study, they could stop at any time and their answers would not be included.

Measures and materials

Brief Self Control Scale.

To measure the trait of self-control, the Brief Self Control Scale (BSCS; Tangney et al., 2004) was used. This scale consisted of 13 items (appendix 5), including questions such as: *'I am good at resisting temptation'* and *'I have a hard time breaking bad habits'.* The items were measured on a five-point Likert scale (1= Not at all like me, and 5 = very much like me). Of the 13 items, 9 items were recoded so that all items were formulated in the same direction (Cronbach's α =. 832). The total score is calculated by adding the raw scores from each item. A high score on the BSCS meant a high level of self-control.

Social norm sensitivity.

To measure if the participants were influenced by social norms in general, a three-item survey was administered. The questions were: *'Other people's choices affect my own choice'. 'When others all choose one option, it feels odd to choose the other option.' 'I tend to choose what I like, regardless of other people's choices.'* These three items were measured on a five-point Likert scale (1= not at all, and 5 = very much like). Item 3 was recoded so that all items were formulated in the same direction (Cronbach's α = .726). The total score is calculated by adding up the scores from the first two items and the recoded score for item 3.

Demographic information.

Certain demographic information was also asked from the participants. They were asked about their gender, age, dietary preference, and their eating habits, on whether or not they are trying to eat healthily.

Experimental Manipulation

The participants were all given two short scripts to read and then answer a question. In the first script, they had to imagine that they were home alone and asked what food they were likely to order when given the choice between a burger with fries or a salad. After reading the script they then had to fill in what they would likely order, using a slider scale ranging from 0 (very likely

burger and fries) to 100 (very likely salad). All the participants were given this script as a control condition (appendix 2). Then the participants were randomly assigned to either the healthy friend's condition or the unhealthy friend's condition. They were randomly assigned a script depending on the condition they were in. They had to imagine that they were at home with friends and that they all wanted to order food (appendix 3 and 4). The participants' friends either preferred to eat healthy food (i.e., a salad; appendix 3) or they preferred to eat unhealthy food (i.e., burgers and fries; appendix 4). The participants then had to slide to the side of the dish they were most likely to order, using a slider scale ranging from 0 (very likely burger and fries) to 100 (very likely salad), how likely they were to also choose the burger with fries or the salad.

Procedure

The participants were approached through the researchers' social network. They were given a URL link to open. The survey could be filled in via smartphone, laptop, or tablet and took about 10 minutes to fill in. They were first required to read the informed consent form and provide their consent should they agree to participate in the study (Appendix 1). After providing their consent, the participants were asked their age and if they are trying to eat healthily. After answering these questions, the participants were given two scripts to read (Appendix 2,3 & 4). After reading each script they had to indicate what food choices they are likely to make, first when eating alone and then when eating with friends, where participants were randomly allocated to think about eating with friends who chose the healthy food versus friends who chose the unhealthy food. The participants then had to answer the *Brief Self-Control* scale and questions regarding social norms. Finally, participants were thanked for their participation and given the chance to leave a remark or withdraw from the study.

Statistical analysis

Before analyzing the data of the participants, the input from Qualtrics was imported to the computer program Statistical Package for the Social Science (SPSS) version 28. To test H1, a factorial analysis of variance (ANOVA) was performed. The independent variable was the type of social norm condition and the dependent variable was the likelihood of choosing the salad. To test H2, a Pearson correlation analysis was performed to find out if there is a positive correlation between self-control and the likelihood of choosing the salad. To test the third

hypothesis, a moderation analysis was performed using PROCESS macro (Hayes, 2012). The independent variable (X) for H3 was the type of social norm condition. The dependent variable (Y) was the likelihood of choosing the salad in the presence of social norms. Co-variate was the likelihood of choosing the salad in the absence of social norms. The moderator variable for H3 was trait self-control.

Results

The goal of the current study was to examine if self-control moderates the effect of social norms on making healthy food choices.

Descriptive statistics

For this study, self-control scores ranged between 21 and 60, with an average score of M = 43.22 (SD = 8.78). A high score on the self-control scale meant that the participant had high self-control. This indicates that self-control of this sample was quite high compared to the maximum score. The participants' effort to try and eat healthily was measured on a five-point Likert scale (1: Not at all, 5: Always). The average effort to try and eat healthily was M = 3.46 (SD = .79). This indicates that the participants were mostly trying to eat healthily.

The participants also had to select on a slider scale (ranging from 0 = very likely burger and fries to 100 = very likely salad), whether they wanted a burger and fries or a salad, under the different conditions. A score between 0 and 50 meant choosing the burger and fries, and a score between 50 and 100 meant choosing a salad. In the 'eating alone' control condition, the average score was M = 40.00 (SD = 40.46). This implies that the average choice in the control condition was a burger and fries. In the eating with 'unhealthy' friends condition the average score was M = 27.56 (SD = 36.17). This implies that the average choice in the control condition was burger and fries. In the eating with 'healthy' friends condition the average score was M = 51.70 (SD = 40.68). This implies that the average choice in the control condition was a salad.

Inferential statistic

To test the first hypothesis, a mixed Analysis of Variance was performed to see if people adapt to social norms with their food choices, *(i.e., are likely to choose the healthy food when accompanied by friends who choose the healthy food, and the unhealthy food when accompanied by friends who choose the unhealthy food.).* The main effect of eating alone or eating with friends was found to be not significant, F (1, 152) = .10, p = .747. However, the focus of interest was to perform a mixed ANOVA analysis, to see if there was a significant

difference between the type of social norm condition and eating alone or eating with friends. This led to the following results: F (1, 152) = 11.48, p = <.001. Post hoc analysis with a Bonferroni adjustment revealed that people in the unhealthy eating condition are significantly more drawn to the burger and fries (7.17 (95% CI [2.55, 16.95], p = .008), and people in the healthy eating condition are significantly more drawn to the salad (4.52 (95% CI [.57, 15.54], p = .035) compared to the eating alone condition.

To test the second hypothesis, Pearson correlation analyses were performed to examine if there was a positive correlation between self-control and the likelihood of choosing the healthy food (the salad; H2). Results indicated that there was a significant positive correlation between self-control and the likelihood of choosing the healthy food when eating alone (r (153) = .19, p = .021), as well as when eating with friends (r (153) = .17; p = .035).

In testing the final hypothesis, a PROCESS v3.5 moderation analysis (Hayes, 2012) was performed to see if self-control moderates the effect of the type of social norm on the likelihood of choosing a salad, after accounting for the likelihood of choosing a salad in the absence of a social norm. The independent variable (X) was the type of social norm condition. The dependent variable (Y) was the likelihood of choosing the salad in the presence of social norm The moderator variable for H3 was trait self-control. The Likelihood of choosing the salad in the absence of social norm was added as a covariate to account for baseline choices and this effect on the dependent variable was significant, b = .62, 95% CI [.51, .74], t = 10.64, p <.001. The effect of the type of social norm condition on the dependent variable was also measured, b = 68.95, 95% CI [22.48, 115.42], t = 2.93, p = .004. Additionally, the effect of self-control on the dependent variable was also measured, b = .77, 95% CI [.08, 1.46], t = 2.22, p = .028. For the third hypothesis, it was expected that the higher the self-control, the weaker the effect of the type of social norm condition. The moderation analysis result indicated a significant moderation effect of self-control on the effect of social norms, b = -1.12, 95% CI [-2.18, -.06], t = -2.09, p = .038. Furthermore, results indicate that when people have low self-control there is a significant positive effect of the type of social norm on the likelihood of choosing a salad b = 29.80, 95% CI [17.29, 42.31], t = 4.71, p < .001. When people have average self-control, there is a significant positive effect of the type of social norm on the likelihood of choosing a salad, b = 19.73, 95% CI [10.52, -28.94], t = 4.23, p <.001. When people have high self-control, there is no significant effect of the type of social norm on the likelihood of choosing a salad,

Explorative analyses

Besides testing for the above-mentioned hypotheses, several other analyses were performed to see if other variables could also play a role in the effect found of self-control. To see if there was a relationship between self-control and gender, an ANOVA was performed. Results of the ANOVA indicated that there was no significant association between self-control and gender, F (1, 152) = .004, p = .947. It was also measured if there is a relationship between self-control and age. According to the Pearson correlation analysis, there was no significant correlation (r (153) = .09, p = .315), between self-control and age. Additionally, it was measured if there was a relationship between trying to eat healthily and self-control. The Pearson correlation analysis indicated that there was a weak significant correlation (Schober & Schwarte, 2018) between trying to eat healthily and having self-control (r (153) = .30, p <.001).

Discussion

This study aimed to examine if self-control moderates the effect of social norms on making healthy food choices. Results indicate that self-control does indeed moderate the effect of social norms on making healthy food choices. The three hypotheses that were previously formulated were found to be supported by this study. Firstly, people did adapt to social norms. Secondly, there was a positive relationship found between self-control and the likelihood of choosing a salad. Lastly, self-control does moderate the effect of the type of social norms on the likelihood of choosing a salad, after accounting for the likelihood of choosing a salad in the absence of a social norm.

People adapt to social norms

For the first hypothesis, it was expected that people adapt to social norms. According to the results, people did indeed adapt to social norms. The participants were more likely to choose the salad when accompanied by friends who also chose to eat a salad, but the burger and fries when accompanied by friends who also chose the burger and fries. A possible explanation for people adjusted their eating behaviour in this way, is that people want to be liked by their companions and not be the odd one out. Therefore, they comply to the norm.

Current findings correspond with prior research by König and colleagues (2017) who found that participants who identified more with their peers adapted their eating behaviour to

that of their peers. In addition, Renner and colleagues (2012) also found a relationship between social norms and food choices. They did qualitative research into the motives behind why people eat what they eat in everyday life. They found that social norm was a reason why people choose to eat certain things. Receiving the same result in the current study as König, Renner and colleagues found, although measured differently, indicates that there is indeed a relationship between social norms and food choices.

Relationship between self-control and healthy food

Concerning the second hypothesis, it was expected that there is a positive correlation between self-control and the likelihood of choosing healthy food. According to the results, there was indeed a positive correlation between self-control and the likelihood of choosing the salad. This positive relation implies that the higher the self-control is the higher the likelihood of choosing healthy food. This result is comparable with the results in prior research by Gerrits and colleagues (2010), who studied if higher self-control was related to more fruit and vegetable consumption and lower consumption of fatty foods. They found that higher self-control was indeed significantly associated with higher fruit and vegetable consumption, and lower consumption of fatty foods. This is in accordance with the current study that the higher self-control was, the more people were likely to choose the healthy food (i.e., the salad). A possible explanation for this is that people with high self-control are more focused on having control over all aspects of their life, including having a healthy lifestyle.

Moderating effect of self-control on type of social norms

The last hypothesis expected that self-control moderates the effect of the type of social norms on the likelihood of choosing a salad, after accounting for the likelihood of choosing a salad in the absence of a social norm. The third hypothesis was also supported. Results found that there was a significant moderation effect of self-control on the effect of the type of social norms condition. Thus, the level of self-control moderates how sensitive a person is to social norms. The results showed that the higher self-control is, the weaker the effect of the type of social norms was on the likelihood of choosing a salad. It also showed that the lower self-control is, the stronger the effect of the type of social norms was on the likelihood of choosing a salad. So, there was indeed a moderation effect. A possible explanation for this is that people with low self-control are more adaptive to their environment compared to people with

high self-control. As well as that people with high self-control could be less affected by the social norms because they adhere more to their own principles of healthy eating despite of the social norms.

The current findings are comparable with the results in prior research by Robinson and colleagues (2016), where they examined if individual differences in the need for social acceptance and self-control moderated whether participants were likely to display similar dietary habits to their peers. They found that participants with lower levels of self-control were more likely to adhere to perceived peer dietary norms for sweet pastries and high self-control was found to be associated with lower consumption of sugar-sweetened soda. This is comparable to the current study that found that having low self-control leads to a significant positive effect of the type of social norm on the likelihood of choosing a salad. Where is having high self-control, leads to no significant effect of the type of social norm on the likelihood of choosing a salad.

Additional explorative analyses

Further explorative analyses found that there was no significant relationship between self-control and gender or between self-control and age. A weak significant relation between self-control and trying to eat healthily was found. This positive relationship could indicate that having higher self-control can lead to trying to eat healthily. A possible explanation for this is that people who have higher self-control also have more control over the decision to make healthy food choices.

Explanations and Limitations

Based on the literature, it was expected that self-control moderated the effect of social norms on making healthy food choices. This effect was indeed found for all three hypotheses. While the current results were expected, it is also possible that there are other explanations for these findings. A possible reason for these results can be attributed to the experimental manipulation. It is possible that the experimental manipulation was too obvious for the participants which may have led them to give socially desirable answers. Social desirability was tried to be reduced by making the survey available online and letting the participants know that their answers were anonymous. However, the main objective of the study may have been too clear. If this study is replicated, it is advisable to change the design of the study from mixed methods to between

subjects. The reason for this is that it was probably the within-subjects aspect of the study that made it clear what the study was about. Changing the design, it will make the main objective more ambiguous, which could possibly lead to a different result. The study also had a limitation, the study sample. The sample was not an exact representation of the society because it consisted of more female than male participants. Several studies found that women tend to be more influenceable, especially by their friends and close peers (Eagly, 1978; Minton & Schneider, 1980; Han & Li, 2009). Han and colleagues (2009) studied the influence of peer relationships on Chinese students living in dormitories. They observed that only women respond to roommates' peer influence. Therefore, because women are more affected by social influence, and the current study consists mainly of women, it is possible that the social influence effect found in this study is not actually this large.

Future research

The current findings of this study offer an interesting perspective for follow-up studies. The current study found an association between self-control and social norms, but further research is necessary to determine how big the influence of self-control is on social norms.

If this study is replicated, it is recommended to do this in a modified form by changing the sample and adjusting the design of the study. It is recommended to change the sample in a follow-up study. First, by making sure there is an equal distribution of female and male participants. As prior research has shown that women are more influenced by their peers than men (Han & Li, 2009). Making it possible that an even distribution of male and female participants in the sample could lead to different results. Second, it is recommended to enlarge the sample in a follow-up study. Research by Hackshaw (2008), which examined the key considerations regarding the use of small samples, found that results, in particular confidence intervals and *p*-values, from smaller samples are more difficult to interpret. These intervals and values are used to estimate the true effect and errors of interpretation herein can lead to wrong assumptions about the true effect and assumptions or not. In addition, larger samples also lead to fewer false-positive results, which can contribute to the reliability of the study (Hackshaw, 2008). A larger sample could potentially lead to different results. In addition, it is recommended to change the study to a between-subject design to make participants less aware of the main objective of the study.

Theoretical and Practical Implications of the study

This study shows that social norms and self-control both play a role when making healthy food choices. Understanding why people choose certain food items in everyday life may assist in designing interventions or protocols that promote healthy eating behaviour, and eventually reduce the number of obesity cases.

For people who want to eat healthily, it would be wise to consider the company they have with them. The company they keep may influence their eating behaviour. It could also be beneficial to practice strengthening one's self-control. The reason behind that is that research shows that having high self-control leads to being less influenced by social norms.

Conclusion

This study aimed to examine if self-control moderates the effect of social norms on making healthy food choices. This was indeed found. However, this study also showed that while self-control does play a role in making healthy food decisions, people's food intake is largely determined by social norms. Research like this study is important because, understanding the reasons behind why people choose certain food items in everyday life, can help us to create specific interventions to promote healthy eating behaviour.

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Appendices

Appendix 1. Informed Consent

Universiteit Utrecht

Food choices in Social situations

Welcome and thank you for your interest in participating in this study on food choices in social situations.

The research
Food plays an important role in people's daily lives. Food and eating are connected to most people's social life as eating often takes place in the presence of other people. The aim of this research is to gain more insight into the choices people make when they eat alone or when they eat with friends. The research is being conducted under the responsibility of K van Geene of the Department of Social, Health, and Organizational Psychology at Utrecht University. During the research, we ask you to read a scenario and answer some questionnaires.

Confidentiality
Utrecht University works according to the code of ethics of the Netherlands Institute of Psychologists. The data that you provide electronically during this research will be processed anonymously and used for research purposes. The obtained research data is always treated confidentially and the results are only reported at group level. Results can therefore never be traced back to you as an individual. You have the right to have your research data excluded from the analysis. If you decide after the survey that you do not want us to include your research data (your answers to the questions) in the analysis of the research, you can indicate this at the end of the online survey in the appropriate field.

Participation
You can participate in this survey if you are 18 years of age or older. If you do not want to participate, you do not have to give a reason. Even if you give permission now, you can stop the study at any time. Participation takes about 10 minutes and takes place entirely online.

Contact
If there is anything afterward that you would like to discuss or express as a result of this research, you can contact K van Geene, k.c.d.vangeene@students.uu.nl

Declaration of Consent
If you are willing to participate in this survey, please tick that you consent and click Next to continue to the next page.

- o I consent
- o I do not consent

Appendix 2. Script 1 Eating Alone

Script Condition 1 Eating Alone

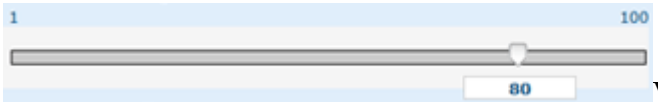
Imagine that you are sitting at home alone and you do not want to cook today. So you decide to order some food. You can choose between ordering :

A Burger and fries

or

A Salad

Which one are YOU more likely to choose?

Very likely the burger 

Very likely the salad

Appendix 3. Script 2 Eating with healthy friends

Script Condition 2 Eating with healthy friends

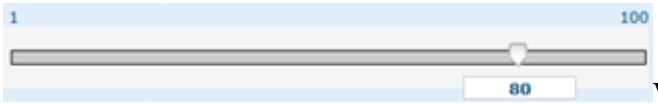
Imagine that you are sitting at home with a group of friends and you all decide to order some food. Three of your five friends like to eat healthily, so they decide to order a salad. The rest of you can choose between ordering:

A Burger and fries

or

A Salad

Which one are YOU more likely to choose?

Very likely the burger 

Very likely the salad

Appendix 4. Script 3 Eating with unhealthy friends

Script Condition 3 Eating with unhealthy friends

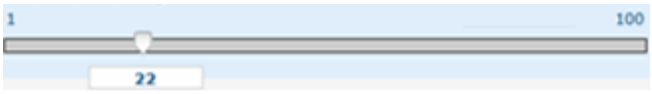
Imagine that you are sitting at home with a group of friends and you all decide to order some food. Three of your five friends like to eat junk food, so they decide to order a burger and some fries. The rest of you can choose between ordering:

A Burger and fries

or

A Salad

Which one are YOU more likely to choose?

Very likely the burger 

Very likely the salad

Appendix 5. Brief Self-Control Scale

Brief Self-Control Scale

Read the following statements carefully.
For each statement check the box that applies best to you.

	Not at all like me	A little like me	Somewhat like me	Mostly like me	Very much like me
I am good at resisting temptation.	○	○	○	○	○
I have a hard time breaking bad habits.	○	○	○	○	○
I am lazy.	○	○	○	○	○
I say inappropriate things.	○	○	○	○	○
I do certain things that are bad for me, if they are fun.	○	○	○	○	○
I refuse things that are bad for me.	○	○	○	○	○
I wish I had more self-discipline.	○	○	○	○	○
People would say that I have iron self-discipline.	○	○	○	○	○
Pleasure and fun sometimes keep me from getting work done.	○	○	○	○	○
I have trouble concentrating.	○	○	○	○	○
I am able to work effectively toward long-term goals.	○	○	○	○	○
Sometimes I can't stop myself from doing something, even if I know it is wrong.	○	○	○	○	○
I often act without thinking through all the alternatives.	○	○	○	○	○