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**The interaction of self-control and habit on intention
of healthy eating behavior among students**

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The interaction of self-control and habit on intention of healthy eating behavior among
students

By Emilie Helgesen Pettersen



29. MAI 2015

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Abstract

This study used the Theory of Planned Behavior to examine individual and social factors that influence students at Aalesund University College in Norway to engage in healthy eating behavior. The individual factors included in this study were those already included in the Theory of Planned Behavior (attitude, perceived behavior and intention), as well as subjective norms. However, in order for this study to be relevant today, an attempt was made to also include two additional variables to see if they separately influenced students' intention for healthy eating behavior, but also if the interaction between them did too.

Participants in the study consisted of 117 students at Aalesund University College, all within the age range of 18 to 50 years of age. 54,2% of the respondents were female. The respondents were administered an online questionnaire and were asked to give demographic information (age, gender, level of income and level of education). Included in the questionnaire was also the measures of the Theory of Planned Behavior, Verplanken and Orbell's (2003) Self-Report Habit Index, and Baumeister and Boone's (2004) 10-Item Self-Scoring Self-Control Scale.

Results provided evidence that among Norwegian students, subjective norms, attitudes, habits and the interaction between self-control and habit, significantly predict the intention to engage in a healthy eating behavior for the next three months. These findings support five out of the six stated hypothesis of this thesis. Perceived behavioral control did not show statistically significant results to predict the intention for healthy eating behavior. This study did provide some support to the addition of a habit-measure to the Theory of Planned behavior. That being said, these results can only speak as to the inclusion of this variable when research is focused on healthy eating among students similar to those in this study.

Introduction

Our society today overflowing with commercials, TV programs and social media telling us how to lose weight, how to into shape and how to improve our health. Yet, more than 1.3 billion people are considered either overweight or suffering from obesity worldwide. With close to 20% of the world's population falling into either of these categories, every fifth person will in theory have an increased risk of health problems. These problems could be presented as cardiovascular diseases, strokes, high blood pressure or sleep apnea, diabetes type II or problems reproducing as only a few examples. Since the 1980s, the number of overweight people has tripled due to several reasons, one of them being our eating habits. Research shows that changing these habits could invoke or reduce these health risks.

As a result of the growing numbers of obesity and overweight, professionals within the field of nutrition in Norway, Europe and on a global scale have set guidelines and definitions on healthy eating, and developed recommendations that are summarized in the Nordic Nutrition Recommendations (<http://www.ravitsemusneuvottelukunta.fi/>, 2012)

Many researchers (Chan and Tsang 2011, Grønhøj et al. 2012, Allom and Mullan 2012) have had their focus on the habits established towards eating behavior in our childhood years. It is a known fact that those habits we establish in our earlier years are also those we continue carrying out into adulthood, transfer on to our children and so forth. Only a few has focused on those habit that we adapt during young adulthood. To my knowledge, few authors have researched the topic of young adults and students, especially in Norway (Øygard and Rise 1996, Lee et al. 2011, De Bruijn 2010).

This study is of importance seeing as predicting healthy eating among students in Norway is to some degree uncharted territory. Attending university or college for the first time is for many the first time to be independent, the first time for making their own choices and thereby their first opportunity to develop healthy, or unhealthy, eating habits. It is also worth noting that the life of a student presents some difficulties and challenges when it comes to this development of habits, meaning lack of knowledge of food preparation, tight time schedules and restricted budgets. This often results in unhealthy eating, and what does not make the development of healthy eating habits any easier, is the easy access to unhealthy foods in cafeterias, fast food restaurants and kiosks.

This is why promoting healthy eating behaviors is of importance in general, but maybe more beneficial for this population of students. This study aims to identify factors to promote healthy eating among students, and these factors are believed to be helpful in breaking down barriers towards healthy eating in an environment such as those found at university or college. This study uses a well-known theoretical framework, the Theory of Planned Behavior, to predict the intention for healthy eating behavior among Norwegian students.

Two factors have also been added in order to attempt an extension of this well-known and supported theoretical framework, those being self-control and habits. Previous research have suggested that habits, or past behavior where this study makes no distinction between the two terms, is one of many factors that can be applicable for the Theory of Planned Behavior as extensions. I hope that because of this study, some practices can be put in place in order to change our habits of eating into healthy eating patterns in order to reduce our risk for potential diseases.

The term healthy eating means cutting down on fried or fatty foods, and also eating plenty of fruit, vegetables, and salad, according to a report from the Public Health Agency that was published in 2001 (cited in Lee et al, 2011 p. 3). Recommendations and guidelines are almost as many as there are countries in this world. Some say that you should eat five different colors of fruits and vegetables on a daily basis (Lee et al, 2011, p.5), others that salt intake, fat intake, intake of wholegrains and so forth, should be reduced (Paquette 2005). Because of the many differing opinions within the field of psychology on the definition of healthy eating behavior or a healthy eating diet, I have made my own for the purpose of this study:

“Eating five fruits and vegetables a day, two days a week eating fish, a diet including wholegrain, low-fat alternatives of dairy and meat, and in general a limited intake of red and processed meat, sugar, salt and alcohol per week”

Theoretical framework

Choice of theoretical framework

The Theory of Planned Behavior was chosen as a theoretical framework for this thesis for a number of reasons. Firstly, because it is well-supported and well-known in the field of psychology for predicting intention for performing a behavior. Secondly, the theory is one of few that considers the variables of attitudes, subjective norms and perceived behavioral control. It has also been used in a number of research areas regarding consumption and usage of different behaviors ranging from condom-use to milk or fruit and vegetable consumption. Thirdly, it has not only been used in a wide range of behaviors, but also in many different populations.

Another reason for choosing the Theory of Planned Behavior is that its variables are somewhat related to previous and similar models, which makes it easier to argue for my attempt to extend the model using self-control and habit as new variables. While others have tried including the self-efficacy (Armitage and Conner 2001, Allom and Mullan 2012) variable and past behavior (Danner, Aarts, and de Vries 2008, Sommer 2011), this study aims at including past behavior through habits, and a new control aspect through self-control. It also focuses on the interaction between the two and its relationship and influence on intention to perform behavior.

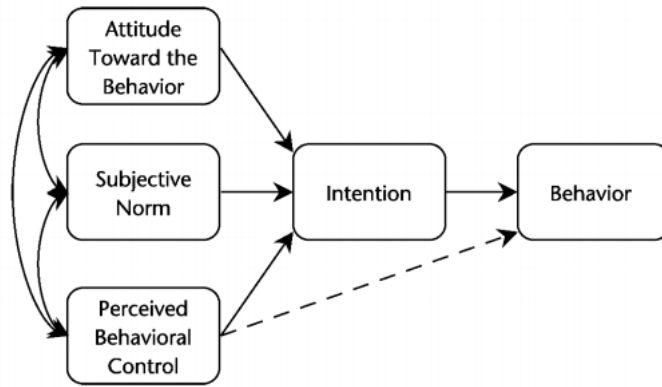
Theory of planned behavior

The Theory of Reasoned Action (Ajzen and Fishbein 1980), was designed to understand human volitional behavior. The theory suggests that an individual's intention to perform a certain behavior is on its own the most important factor for predicting actual control. Meaning that the individual was concerned with the causal antecedents of intentions to perform behaviors over which people have sufficient control (Ajzen 1988). The Theory of Planned Behavior (Ajzen 1991) developed as an extension of this model, in order to address the possibility of incomplete volitional control by adding one additional construct – the perceived behavioral control (Ajzen 1991). The Theory of Planned Behavior has received much attention in different fields, including literature on healthy eating, with regard to how to predict outcomes of behavior.

In line with the Theory of Reasoned Action (Ajzen and Fishbein 1980), the Theory of Planned Behavior assumes that human beings act or behave in a sensible manner by taking into account available information and use this information, explicitly or implicitly, to implicate an action (Ajzen 1988). Furthermore, it suggests a focus on the individual's intention to perform a behavior (Ajzen 1991). Intentions tries to capture all motivation factors that has influence on behavior, meaning they are *“indications of how hard people are willing to try, of how much of an effort they are planning on exert, in order to perform a behavior”* (Ajzen 1991, p. 181). The same theory assumes that intentions are believed to be influenced by the attitudes an individual has towards a behavior, and also by subjective norms, attitudes others, of importance to the individual, have towards the behavior.

The theory further assumes that attitude of relative importance is dependent upon the intention being investigated. Sometimes attitudinal intentions weigh more heavily than normative considerations and vice versa. In other situations or occasions, perceived behavioral control could be more influential than normative considerations. The number of factors needed to explain intention could sometimes differ, and this does not only have to do with the situation, but also the individual person or population (Ajzen 1988). It is important to mention that actual control is not what we are dealing with in any given situation, rather the perceived behavioral control in order to reach behavioral goals.

Intentions usually reflects ones willingness to try enacting any given behavior, while perceived control take into account those barriers or constraints that exist. This is why Ajzen (1991) suggested making the construct of perceived behavioral control. This factor represents ones' perception about constraints and facilitators, barriers if you will, that could impede the ability to perform a behavior. Whether or not an individual have complete volitional control depends upon his or hers perception of availability of resources and opportunities (Ajzen 1991). *“A person may believe that, in general, her outcomes are determined by her behavior (internal locus of control), yet at the same time she may also believe that her chances of becoming a commercial airplane pilot are very slim (low perceived behavioral control)”* (Ajzen 1991, p.183). Perceived behavioral control (PBC) could have predicting powers on the same level as attitudes and subjective norms on intent, however, when PBC is not complete, it can by itself be a predictor of behavior.



Ajzen created the model you see above, in his book “Attitude, personality and behavior”, published in 1988. The model suggest that perceived behavioral control could influence behavior either directly or indirectly. Looking at the model above, you can see the dashed arrow this indicates that perceived behavioral control directly influences behavior. The solid arrow on the other hand, shows us that PBC could indirectly influence behavior, by influencing the behavioral intention to perform a behavior, it then influences on the same level as attitude towards behavior, and subjective norms. In short, the model shows us that an individual is more likely to perform a behavior when 1) his or her intentions to perform the behavior as well as perceived behavioral control are strong, and 2) when he or she has a positive attitude, desirable subjective norm, and high perceived control. It is also worth noting that when perceived behavioral control is equal to actual behavioral control, PBC can directly influence behavior (De Bruijn et al. 2007). The model portrayed above is attempted extended in this study.

Self-control

Self-control is often defined as our capacity to change or override the dominant response tendencies put in place in order to regulate behavior, emotions and thoughts (de Ridder et al. 2012). This goes to ones adaptation of behavior, the capacity one has for changing this behavior in order to meet certain standards, either they are social expectations, morals or ideals. (Baumeister, Vohs, and Tice 2007). While many do not differ between the term self-regulation and self-control, this study focuses on self-control because self-control is a deliberate action.

In the field of psychology self-control is an important topic seeing as it helps us understand human nature. Theory suggests that self-control is a limited resource, and by repeatedly using

self-control, one will “use up” the resource, and the result would be ego-depletion (Salmon et al. 2014). This in turn would typically lead to impulsive decision-making. Low self-control and low impulse-control in relation to food often leads to unhealthy choices. Salmon et al. (2014) states that traditional approaches to health promotion such as the Theory of Planned behavior has only had little success when facing the challenges of unhealthy consumption. This is why self-control has been added as an extension in this paper.

Ajzen (1991) has argued that the Theory of Planned Behavior could accommodate any other measure, however, this argument has been criticized because findings using the Theory of Planned Behavior only partially explained the effect of low self-control on alcohol use. (cited in Wolfe and Higgins, 2008 p.116). Wolfe and Higgins (2008) states that linking the self-control construct in the Theory of Planned Behavior to criminological theory allows for determining if individuals with lower self-control and their likelihood of overestimating their skills and ability to drink alcohol in a safe manner.

In a wide range of behaviors, empirical findings have shown that those of us who have a high level of self-control are better at controlling thoughts, emotions and impulses than those with lower levels of self-control (de Ridder et al. 2012).

Habit

Most people are creatures of habit. By that, I mean that most of us take the same road to work, often buy or groceries at the same store and prefer our coffee made the same way every morning. Habit could be explained as frequently doing a behavior in the same way for the same reason (Danner, Aarts, and de Vries 2008). When frequently and consistently performing a behavior, one will eventually and without forming an explicit intention, be able to perform the behavior without planning or initiation of the behavior.

According to Adriaanse et al. (2014), in a study on habit as mediating factor for the relation between self-control and unhealthy snack consumption, trait self-control promotes health behavior because people develop adaptive habits. In an attempt to predict future behavior, many researchers have focused on past behavior through habits and attitude-behavior models. In the attempt, a long variety of behaviors have been researched such as different consumptions (alcohol, milk, condoms etc.), finding that habit largely influences the behavior by direct influence of past behavior. In Danner et al (2008) it was suggested that there is an

interaction between habit and intention. When habit is strong, the relationship between intention and behavior is weaker.

Ajzen (2002a) suggests that the theory of planned behavior does not see a necessary link between past behavior and the habit of that behavior (cited in Brujin et al 2006. p.901) He further states that other and unexplained factors that are stable over time, and thereby influence behavior, could predict future behavior.

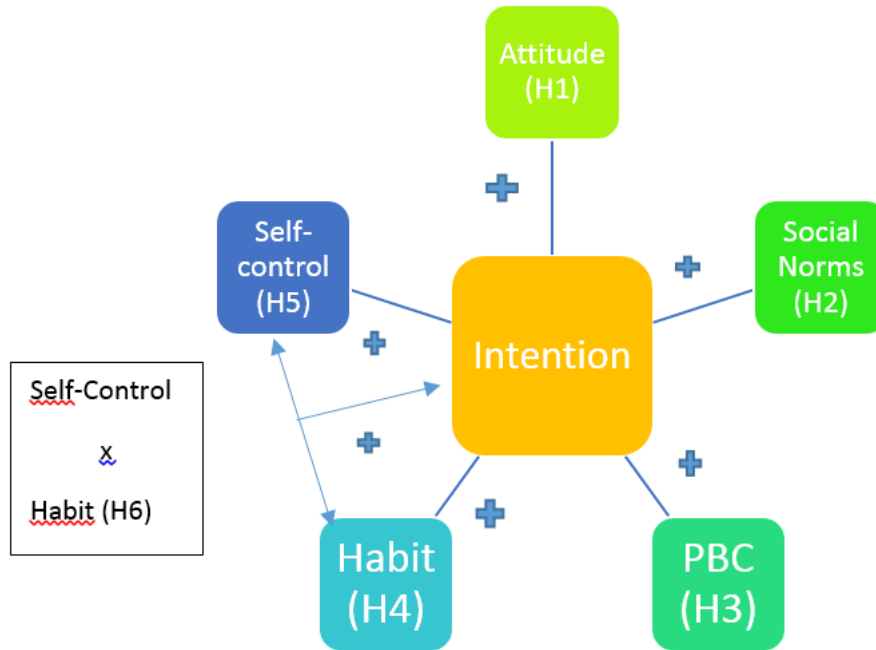
In a study by Sommer (2011) it is stated that under special circumstances there is an relation between past behavior, or habit, and intention. When there is lack of habit, in specific situations, the predictive power of intention is high. This does however assume that there is a constant supporting environment for performance.

Hypothesis

Even though the Theory of Planned Behavior has previously been used as theoretical framework to investigate healthy eating behaviors among a range of populations, it has never to my knowledge been used in the manner thought out for the current study. In prior research the theoretical framework has often been used to focus on health related behaviors, however, to my knowledge never in the setting of habit and self-control's influence on intention. Because much of the relevant research on the Theory of Planned Behavior is in the field of psychology, a range of differing definitions on healthy eating has been introduced. For a three month period I have therefore used some of the recommendations from prior research as well as some recommendations from the Nordic Nutrition Recommendations of 2012. The definition of healthy eating or a healthy diet for the purpose of this study was therefore defined as:

“Eating five fruits and vegetables a day, two days a week eating fish, a diet including wholegrain, low-fat alternatives of dairy and meat, and in general a limited intake of red and processed meat, sugar, salt and alcohol per week”

The model of my theoretical framework should look something like the model attempted below.



An attempt at making a model showing the six hypothesis was made, however, the skills of the author as far as model making in Microsoft Word goes, are strongly lacking. Below they are therefore explained in more detail:

- H1: Attitude positively influences intention among students for healthy eating behavior
- H2: Social norms positively influences intention among students for healthy eating behavior
- H3: Perceived behavioral control positively influences intention among students for healthy eating behavior
- H4: Habit positively influences the intention among students for healthy eating behavior
- H5: Self-control positively influences the intention among students for healthy eating behavior
- H6: Habit and self-control significantly and positively interact to predict students intention for healthy eating behavior

As the three first hypothesis previously have been supported to influence intention these three will be computed in one regression analysis later on, while self-control and habit will be independent variables in one separate linear regression, and interaction will be computed in a final analysis using linear regression.

Review of literature

This section will present an overview of the existing literature and the impact of the Theory of Planned behavior for investigating healthy eating behavior. The first part of the literature review will include the impact of the Theory of Planned Behavior on general health-related behaviors. The second part of the review will focus more on findings pertinent to healthy eating behavior in light of the Theory of Planned Behavior, then some findings on self-control and habit in relation to health-related behaviors in general will be included with the inclusion of healthy eating behavior.

Theory of Planned Behaviors impact on health-related behaviors

Among the range of different health-related behaviors reviewed by Godin and Kok (1996) was smoking, drinking, exercising and condom use. Out of the 58 behavioral applications obtained for the review, fifty-six were used. They all provided information to either fully or partially verify the efficiency of the Theory of Planned Behavior. The authors classified the 58 applications into different categories; addictive, automobile, clinical and screening, eating, exercising, HIV/AIDS and oral hygiene.

The review published in 1996 (Godin and Kok) found that the theory on average gave a good explanation of intention, on average R^2 of 0.41 was observed. For health related behavior, attitude toward behavior as well as perceived behavioral control were the variables that most often showed predictive power on intention. Predicting behavior was found on average as $R^2=0,34$. While intention was the most important predictor, half of the studies showed that perceived behavioral control added to the prediction. The significant findings of the perceived behavior contributed 11.5% of variance above intention.

Several meta-analytic reviews and studies have focused on the Theory of Planned Behavior for predicting both intention and behavior. For a general health-related behavior, a great example of a meta-analytic review was written by (Armitage and Conner 2001). This study reviewed 185 independent studies within a range of different health-related behaviors such as violent behavior by abusive men, learning with disabilities, job search behavior, but also in healthy eating behaviors such as predicting the consumption of a low fat diet. The study found that for the 185 studies reviewed, the variables of the Theory of Planned Behavior accounted for 27% and 39% of variance in behavior and intention.

When behavior was measured through self-reporting, TPB accounted for 11% more of variance in behavior than when the behavior measures were observed. ($R^2 = 0.31$, and 0.21 , respectively). The perceived behavioral control construct explained significant variance in intention and behavior. PBC in correlation with attitude and subjective norms accounted for a significantly higher variance in individuals' desires than intention or self-predictions; however, the latter were better predictors of behavior.

One study examined the ability of the Theory of Planned Behavior to predict patterns of change in behavior associated with health screening (Sheeran, Conner, and Norman 2001). Never-screened patients at one medical practice in England posed as a random sample in this study. Over a 13-month period, data was collected at three time points. At time 1 variables of the Theory of Planned Behavior were measured, one month after the questionnaire was distributed, the participant got an invite for health-screening attendance, time 2 was measured for those who attended and recorded in their medical records. A year later, participants received a new invitation for attendance. 49,8% of the 818 patients returned the questionnaire. At time 2, attendance was 56% and 64% one year later.

The results showed that the Theory of Planned Behavior predicted attendance at all three times, and also predicted the frequency in attendance. The model was however not able to reliably distinguish among those attendees who consistently attended, those who delayed attending and those who originally attended but relapsed. In summary, however short the review for general health-related behaviors has been, it appears that the empirical evidence in the two above-mentioned reviews justify the use of the Theory of Planned Behavior as theoretical framework.

Theory of Planned Behaviors impact on healthy eating behavior

To my knowledge, there has not been done many studies on healthy eating behavior in relation to the Theory of Planned Behavior in Norway. However, a study I do recognize is one predicting the intention for healthy eating among young adults (Øygard and Rise 1996). The study was carried out as a questionnaire among 527 adults within the age range 23-26 in Oslo. The survey was constructed using the Theory of Planned Behaviors attitude, intention, subjective norms, perceived behavioral control as variables. The components accounted for 32% of variance in behavioral intentions. Furthermore, attitude was the strongest predictor, followed by perceived behavioral control. Subjective norm was the weakest predictor of

behavioral intention towards healthy eating. An analysis of the underlying structures revealed that the predictors that discriminated strongly between those who intended to eat healthier, those undecided, and those of no intention, were that healthier food would improve body shape, increase food enjoyment and reduce weight. Between the three intender groups, the control beliefs that discriminated the most were weight, able to make healthier dishes, social eating and busy.

The Theory of Planned Behavior was also applied to healthy eating in a study that examined health promotion attendees (Conner, Norman, and Bell 2002). 144 respondents completed a self-report survey constructed using TPB measures after the clinic (time 1), and six months later (time 2) as measure of past behavior. Six years later (time 3) the respondents were asked to complete the measures of healthy eating intentions and behavior. Intention was predicted by all constructs of the Theory of Planned Behavior, as well as perceived past behavior. Healthy eating behavior (six years later) was predicted by intentions (six months after). Increased intention stability resulted in both intention and perceived past behavior becoming stronger and weaker predictors of behavior, respectively.

The results of this study showed that the variables of the Theory of Planned Behavior explained 43% of variance in predicting intentions and for time 3 (six years later) a 20% variance. Findings suggested that perceived past behavior was predictive of intentions cross-sectionally; however the findings were not prospective. Another significant finding showed intention to predict prospective healthy eating behavior by explaining 9% of variance, opposed to perceived past behavior which had non-significant results.

Opposed to the previous examples of studies with significant finding for the Theory of Planned Behavior variables, a study on urban Native American Youth (Fila and Smith 2006) found no association between intention and healthy eating behavior. However, this study done on 139 respondents between the ages of 9-18 years of age, found significant results in healthy eating behavior independently. Their findings showed that healthy eating behavior was strongly predicted by barriers ($\beta=0,46$), attitude ($\beta=0,44$), perceived behavioral control ($\beta=0,35$) and subjective norms ($\beta=0,34$). According to their results the barriers most predictive towards healthy eating was availability and the taste of foods. For the girls eating behavior was most predicted by barriers, while for the boys it was most predicted by subjective norm.

At the University of Reading there was in 2007 a study published on predicting healthy eating behavior (Chambers et al. 2007). The study aimed at predicting adults' intention to eat according to official eating recommendations for the next year and for parents' intention to give their children the same guidelines. To investigate this topic they set up two Theory of Planned Behavior surveys and in addition to its regular variables, they included self-efficacy and self-identity. 250 adults took part in the survey and this resulted in a model with good predictive power. The adults' intention for following the official eating recommendations were positively associated with positive attitudes, high self-efficacy and self-identity. As for the parents intention to follow the same recommendations for their children, high self-efficacy and positive attitudes were associated with the intention, as well as child subjective norm. Parents' intentions were negatively linked to their partners' subjective norms.

The Theory of Planned Behavior was applied to Southern Appalachian teens (Wu et al. 2009), where the authors found that among the respondents 29,8% out of the 416 respondents definitely intended to eat healthy while 34,6% were "mostly yes" towards the idea of healthy eating. Here the perceived behavioral control and attitude were also positively linked to a stronger intention for healthy eating.

As previously mentioned, many of the studies done on predicting intentions for healthy eating involves fruit and vegetables. One of the studies (Pawlak, Malinauskas, and Rivera 2009) applied the Theory of Planned Behavior when predicting College Baseball Players' intention to eat a healthy diet. The male undergraduate college baseball players received a survey based on the variables of the Theory of Planned Behavior. The results showed that attitude, perceived behavioral control and subjective norms accounted for 72% of variance in behavioral intentions towards healthy eating behavior. As for previous findings above, also among these college baseball players the strongest predictor of intention was attitude ($\beta=0,383$, $p<0,001$) followed by subjective norms ($\beta=0,291$ $p<0,001$) and perceived behavioral control ($\beta=0,269$, $p<0,001$). The biggest impact on intention for healthy eating was their busy schedules and their perception of the impact that healthy eating would have on concentration and focus.

A study done in Hong Kong (Chan and Tsang 2011) examined adolescents intention for healthy eating using the Theory of Planned Behavior and a construct of advertising intervention. 570 secondary school students participated. Findings of the study showed that perceived behavioral control was the most important predictor on intention for healthy eating followed by attitude and subjective norms. Combined the three variables explained 45% of

variance in behavioral intention towards healthy eating. As for advertisement, the respondents' attitudes towards advertisement promoting healthy eating had high positive correlation with attitudes towards healthy eating.

Danish authors have also done a case study on adolescents using the Theory of Planned Behavior (Grønhøj et al. 2012). They found that perceived behavioral control followed by attitudes were the most important factors for predicting behavioral intention. Among the 410 students, females and adolescents of higher BMI also showed a stronger intention toward healthy eating.

Findings from a study done (Sharifirad et al. 2013) at an Iranian High School found that the Theory of Planned Behavior explained 25,7% of the variance in intentions when asking 521 students. The strongest predictor was attitudes ($\beta=0,31$, $p<0.001$) and weakest was subjective norms ($\beta=0,29$, $p<0.001$). Actual behavioral control and past behavior accounted for an additional 20,4% of variance in fast food consumption while intentions accounted for 6%.

[Self-Control and health-related behaviors including healthy eating](#)

Health-related behavior was examined in a study of 381 heart surgery patients in Germany (Schroder and Schwarzer 2005). The aim of the study was habitual self-control and other trait predictors, which were measured before and six months after the surgery. Before the surgery, social-cognitive predictors were assessed. Habitual self-control showed itself as a strong predictor of behavioral outcomes, and it further explained significant variance in dieting and physical exercise compared to behavior-specific predictors. A hierarchical linear regression revealed that habitual self-control strengthens the congruence of intention-behavior. When predicting future dieting six months after, an interaction between habitual self-control and dieting intentions revealed that self-control only supported dieting among those patients having moderate dieting intentions.

Wolfe and Higgins (2008) examined whether perceived behavioral control moderates the link that self-control has with alcohol consumption, or if the link was additive. The results of their analyses indicated that self-control had a significant negative link with drinking alcohol. They further found that perceived behavioral control had a significant link with drinking.

Few studies have focused on healthy eating and self-control. However, some have researched self-control in relation to other health-related behaviors. One of these studies (Crescioni et al.

2011) explored the intuitive connection between self-control and weight loss. This study included a final sample of 86 participants in a 12-week weight loss program consisting of diet, exercise and weight loss. Out of these, 66,3% were students. Regression analyses revealed that participant with higher levels of self-control engaged in more moderate exercise at baseline ($\beta=0,31$, $t(72)=2,30$, $p<0,05$) and had lower BMI ($\beta=-0,23$, $t(82)=-2,14$ $p<0.05$) than those with lower self-control. However, self-control did not predict participants' baseline caloric intake from fat. Participants' exercise behavior did also not statistically relate to their weight when an analysis controlling for trait self-control was done.

A meta-analysis study done by de Ridder et al. (2012) investigated 102 studies of the behavioral effects of self-control using different self-control scales. Only a small to medium positive effect of self-control on behavior was found using the three scales. The studies included in this review had as mentioned studies using three different scales for measuring self-control. The self-control scale was used in 50 studies, the Barratt Impulsiveness Scale rejected many of the studies which resulted in 31 studies, and the Low Self-Control Scale included the review of 21 studies. Most studies ranging across the scales had reported several outcomes.

Salmon et al. (2014) did an experiment with 119 men. They chose to use a 2x2x2 design, where they compared high vs. low self-control, social proof vs. no heuristic, and trade-off vs. control choice where the latter was the within-subject factor. They found that in line with previous research, low self-control resulted in fewer healthy food choices. This finding was however, reversed when the healthy food choice was associated with social proof heuristic, and the respondents made more healthy food choices when having low self-control.

A study by Adriaanse et al. (2014), examined the mediating role of habit in investigating the link between self-control and unhealthy snack consumption. 77 participants, 92% of the female, responded to a questionnaire and kept a snacking diary for seven days. The results of the research showed a negatively association between self-control and unhealthy snack consumption as well as with unhealthy snacking habits. The authors also found that the link between self-control and unhealthy snack consumption was mediated by habit strength. Furthermore, self-control was not associated with either fruit consumption, or fruit intake habits.

Habit and health-related behaviors including healthy eating

Danner et al. (2008) did a study on the role of intention in predicting future behavior by analyzing how past behavior frequency moderates the relationship of intention-behavior. Their focus was finding the extent to which context in which behavior was performed was stable. Two of their studies found that when habits were weak, intentions guided future behavior; however, it was not guided when habit strength was high. A third study showed that when or if habitual goal-directed behavior was activated directly by context, then mental accessibility of the behavior would moderate the relation between intention and behavior in a similar way.

Their first study showed a strong effect of past behavior frequency and a smaller effect of intention for snacking. Both variables showed predictive power on future behavior, however, they did not interact in predicting future behavior. Milk consumption showed that both frequency of past behavior and intention were related to future behavior, however, the interaction between the two was not significant. Frequency of past behavior and intention on alcohol consumptions were both predictive of future alcohol consumption respectively, but also here the two variables did not interact.

Study number two of this research aimed at replicating and extend their previous findings to travel behavior. Eighty students participated in the study. Findings showed that frequency of past behavior and intention to cycle both related to future behavior. Interaction between intention and habit strength was significant, and so was the effect of both habit and intention, separately, on future behavior. After further analysis on the interaction between habit strength and intention, intentions were non-indicative of future behavior when habit strength was high; indicating that future behavior was linked to intentions when cycling habit strength was low.

The Self-Reported Habit Index developed by Verplanken and Orbell in 2003 have previously been used in a number of studies for gaining insights into the relationship between prior and current behavior. Verplanken (2006) found, using this index, that habit mediated the effect of past snacking behavior on current snacking behavior, that habit in itself is a good explanation of the residual variance problem (cited in De Bruijn et al., 2006 p. 901).

De Bruijn (2010) aimed at understanding college students' fruit consumption by integrating strength of habit in the Theory of Planned Behavior using a sample of 538 students. The findings showed that the intention-fruit consumption relationship was twice as strong at low

levels of habit strength ($\beta=0,39$), than at high levels ($\beta=0,16$), based on a significant intention x habit interaction. These results indicate that stronger habits towards fruit consumption make fruit consumption less intentional and that messages intended to increase fruit consumptions should focus on situational beliefs rather than the health outcomes of the consumption.

The aim of a study done by Allom and Mullan (2012) was to examine the determinants of fruit and vegetable consumption by applying the Theory of Planned Behavior and additional variables of self-schema, habit and self-regulation. They handed out self-report questionnaires to 209 students at university, a survey that regarded fruit and vegetable consumption and two tests of self-regulation. A week later, the respondents completed the questionnaire in relation to their behavior. The findings of this study suggests that the theory of planned behavior significantly predicted intentions and future behavior. For the healthy eater schematics, those having high intention and self-regulatory ability were more likely to consume fruits and vegetables, while within the non-schematics category, those having low intention and high strength of habit had higher likelihood of consumption. However, self-schema did not moderate the intention-behavior relationship.

Gardner (2014) published a review and analysis of the use of habit when predicting, influencing and understanding health-related behaviors. His findings showed that the definitions of habit have varied and that they are not directly linked to any underlying theory. Further he proposed a definition whereby *“habit is a process by which stimulus generates an impulse to act as a result of a learned stimulus-response association. Habit-generated impulses may compete or combine with impulses and inhibitions arising from other source, including conscious decision-making, to influence responses and need not generate behavior”* (Gardner, 2014 p.2).

In a Dutch study (De Bruijn et al. 2007) the intention-behavior relationship of the Theory of Planned Behavior was examined using habit strength as a predictor. 521 Dutch adults, whereof 46,3% were male, were sent a questionnaire including the variables of the Theory of Planned Behavior, and habit strength. All variables were assessed at T1, while fruit consumption was measured five weeks later. The respondents were divided into three groups; low, medium and high habit strength. Confirmatory factor analyses and multi-group path analyses were used for analysis of the data. The latter showed findings that intention as a significant predictor of fruit consumption when there was low level of habit strength ($\beta=0,36$, $p<0.001$) and medium habit strength ($\beta=0,30$, $p<0.001$), however in the high habit group the findings were non-significant ($\beta=0,05$ $p=0,596$).

The present study's contribution to literature

After reviewing the Theory of Planned Behavior, one can see that the theoretical framework has strong empirical support for predicting and understanding healthy eating behavior across populations. However, as many of the previous findings have suggested, an extension of the framework could reduce the so-called intention-behavior gap. Applying the Theory of Planned Behavior to healthy eating has been done in a number of studies on a global scale, for a range of different respondent groups, however, in Norway there seems to be lacking research on the theoretical framework in general, and specifically lacking for the respondent group of this study as well as for the behavior in question.

Method

Participants

In this study, the participants were university college students at Aalesund University College in Norway. The participants were E-mailed the survey in order to more easily transfer the data into data collection and analysis software. At Aalesund University College there are 2300 and then some, students and they were all invited to participate. Out of the total population of students, 227 initially started the survey. After cleaning the data, removing those respondents who had not completed the questionnaire, removing those who had answered in outliers, the student sample was 118.

64 (54,2%) of the respondents were female, while 54 (45,8%) were male, suggesting that males were under-represented in the sample, however, not by much. The average age of the respondents was 26,27 years ($SD=4.862$). In terms of household income, 46 (39%) of the respondents reported income below 100 000 NOK, 40 (33,9%) between 100 000 NOK and 200 000 NOK, 6 (5,1%) between 200 000 NOK and 300 000 NOK, 5(4,2%) between 300 000 NOK and 400 000 NOK, 3(2,5%) between 400 000 NOK – 500 000 NOK, 5(4,2%) earned more than 500 000 NOK, while 13(11%) did not report/wished not to report an annual household income.

When constructing the demographic measures for the questionnaire, somehow only finishing secondary school found its way into the options for answers. Reporting these findings seems irrelevant seeing as one has to complete High School in order to apply for University College in Norway, unless one has been apprentice and has a certificate saying so. 18(15,3%) of the respondents answered that their highest completed level of education was high school, 37 (31,4%) had one year of higher education, 43 (36,4%) Bachelor or equivalent and 17(14,4%) had more than 5 years (master, PhD or similar) as their highest completed level of education.

Procedure

Habit strength was measured using Verplanken and Orbell's Self Reported Habit Index (SRHI) developed in 2003. TPB variables were measured using the constructs suggested by Icek Ajzen himself (<http://people.umass.edu>), and self-control was measured using a 10-item Self-Scoring Self-Control Scale developed by Tangney et al. in 2004. The behavior of interest should be defined in terms of action, context and time as well as target, and all constructs

should be defined using the same elements when it comes to constructing the Theory of Planned Behavior questionnaire.

Action: Increase intention of healthy eating

Context: Among students at Aalesund University College, thereby a college environment

Time: For the next three months

Target: Eating a healthy diet, here defined “ healthy dietary patterns as eating five fruits and vegetables a day, two days a week eating fish, a diet including wholegrain, low-fat alternatives of dairy and meat, and in general a limited intake of red and processed meat, sugar, salt and alcohol per week.”

Usually when using the measures of a TPB questionnaire a later assessment is used to assess behavior, however, because this thesis focuses on intention, this was not done. A copy of the SRHI items as well as the Self-Scoring Self-Control Scale items have been added to the appendix. It included a 12-item measure that suggests four dimensions of habit; lack of awareness, difficulty to control, mental efficiency, and repetition. These 12 items were included in the questionnaire sent to the students at the University College. (cited in De Bruijn et al. 2006 p. 901)

The questionnaire approved by the supervisor for the current study before recruiting participants and data collection. Afterwards, the survey was sent to all students at Aalesund University College via E-mail. The E-mail explained the focus of the survey, how long expected time for completion was. It further explained that the survey was completely anonymous and that the data was collected only for the purpose of the current study. One week after the initial invitation a reminder was sent out to all students. One week later the questionnaire was closed and the data collected pending cleaning and analysis.

Measures

Because this paper is written using a lot of psychology, there are many differing opinions as to what defines a healthy eating behavior. Using some guidelines from the Norwegian Institute of Public Health, as well as some reoccurring suggestions of dietary guidelines in previous articles, a definition of healthy eating behavior was introduced in this survey. As mentioned, healthy dietary patterns as eating five fruits and vegetables a day, two days a week eating fish, a diet including wholegrain, low-fat alternatives of dairy and meat, and in general

a limited intake of red and processed meat, sugar, salt and alcohol per week. For further research there was also included a time aspect of three months.

Intention was measured on a scale from 1-7 where 1 indicated “Not closely at all” and 7 indicated “Very closely”. The respondents were asked how closely they intended to keep to the defined recommendations of a healthy diet for the next three months. Because only one item was added to the questionnaire, no Cronbach’s Alpha was found, which in retrospect suggests bad planning.

Attitudes were measured on a 7-point scale ranging from “Very unlikely” to “Very likely”. Included in the survey were eight items all measuring beliefs of the outcome of healthy eating for the next three months. “Eating healthy for the next three months will...:”

- Reduce my risk of health related diseases
- Keep me in good shape
- Help me reduce my weight
- Help me maintain my weight
- Make me look good
- Increase my energy level
- Make me feel better about myself
- Make me enjoy food

Cronbach’s Alpha for attitudes was 0.826, suggesting high internal consistency among the questions asked.

Subjective, or social norms was measured by two items; “to what extent will people who are close to you approve or disapprove of you eating a healthy diet during the next three months” and “I want to do what those who are important to me think I should do”. The first item was measured on a scale of 7 points ranging from “Strongly disapprove” to “Strongly approve”, while the latter was measured on a scale of 7 points ranging from “Strongly disagree” to “Strongly agree”. In retrospect, one or more items should have been added because the reliability analysis showed a Cronbach’s Alpha of 0.506, indicating poor internal consistency.

Perceived behavioral control was measured using six items of potential difficulty of maintaining a healthy diet for the next three months. The six items were measured on a scale of 7 from “Never” to “Very frequently”, and these six were:

- I do not have time for eating a healthy diet

- Eating a healthy diet is too expensive
- Eating a healthy diet is inconvenient (too time-consuming etc.)
- I do not always have enough knowledge about foods necessary for a healthy diet
- Away from home, eating a healthy diet is difficult
- Eating a healthy diet means that I have to cook

Cronbach's Alpha indicated high internal consistency by 0.805.

Habit strength was measured, as mentioned, using Verplanken & Orbell's (2003) Self-Report Habit Index which is included in the Appendix. The behavior X is something ... as stated in the Index form, became "Eating healthy is something..." The respondents then answered on a 7 point scale from "Strongly disagree" to "Strongly agree". The 12 items measured showed a very high internal consistency of Cronbach's Alpha 0.943.

As also previously mentioned, self-control was measured using Tangney et al. (2004)s' 10-Item Self-Scoring Self-Control Scale, a list of items is also included in the Appendix. The developers of the self-control scale has noted that the items should be measured on a scale from 1-5 where 1="Not at all like me" and 5="Very much like me" 5 would also indicate that the respondent is extremely self-controlled, while 1 would indicate not at all self-controlled. However, because all other variables have been measured on a scale from 1-7 points, asking the respondents to check the box that best represent him or her. Cronbach's Alpha revealed an unacceptable internal inconsistency =0.476. My belief is that this is not necessarily the case, as the authors has suggested summing all points of the respondents and dividing by the number of items.

Using SPSS a new variable was therefore computed adding all respondents' scores and dividing them by 10 for future analyses. By running a new descriptive statistics analysis mean value of respondents self-control scores were found to be 3,8628 (SD=0,69376). If we were to use the maximum representing extremely self-controlled and minimum to be not at all self-controlled, the average respondent would be somewhere in the middle, a bit closer to the higher end of the scale than the lower. New variables were also computed for attitude, social norms, perceived behavioral control and habits in order to run regression analyses for testing the hypothesis previously stated. An interaction term was also created in order to test the hypothesis of the interaction between self-control and habit on intention.

Analysis

The data was analyzed using the IBM SPSS Statistics version 20, a Windows software package. Initially some descriptive statistics along with a bivariate correlations analysis between the relevant variables of the study was run. In order to test my hypothesis, three separate regression analyses were ran. The first included intention as the dependent variable, and attitude, social norms and perceived behavioral control as dependent ones. This tested my initial three hypotheses that 1) attitude positively influences intention for healthy eating behavior, 2) social norms positively influences healthy eating behavior and 3) perceived behavioral control positively influences healthy eating behavior. The second linear regression analyses included intention as the dependent variable, and self-control and habit as the independent ones. This was done for testing my fourth and fifth hypotheses that self-control influences intention for healthy eating in a positive manner, and that habit also positively influences healthy eating through intention.

As mentioned previously, a moderator effect, or an interaction term if you will was computed in order to test my final hypothesis 6) the interaction between self-control and habit positively influences intention for healthy eating behavior. The interaction effect was added by computing a new variable (habit x self-control).

Results

This section presents the results of the different analyses conducted in order to address and assess the hypotheses previously stated for the purpose of this study. First, reliability analyses for the constructed variables for the questionnaire has already been elaborated in the prior section. Next is the descriptive statistics that presents the means, standard deviations and ranges for each variable examined in this study. Table 1 (see Appendix) provides the descriptive statistics for all relevant variables. Pearson correlation analysis or bivariate correlation analysis was conducted to examine the degree of correlation between the variables relevant for the study. Finally, the results of the regression analyses that were executed will be presented. The first one tests the three first hypothesis, those of the original construct of the Theory of Planned Behavior, then the fourth and fifth hypotheses are presented in a new linear regression including the additional variables; habit and self-control. And finally one last regression is presented, showing the results of the interaction effect added to the linear regression.

Descriptive statistics and Pearson correlations

Table 1 and 2 (see Appendix), provides descriptives for and bivariate correlations between the relevant variables in this study. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. In this case we can see that there are six statistically significant relationships between our variables ($p < 0.001$). The strongest relationship is the one between intention and habit (0.546), indicating that changes in habit will positively change intention.

There is also a significantly positive relationship between intention and social norms (0.434), and between intention and attitude (0.399), as well as between attitude and habit (0.337). Some of the variables do also have a negative association with each other, indicating that a change in one variable will trigger a negative change in the other. This is the case for the relationship between perceived behavioral control and intention (-0.345), and between perceived behavioral control and habit (-0.434). It is worth noting that the level of statistical significance for bivariate correlations is not indicating how strongly the two variables are associated, but instead how much confidence we should have in the obtained results.

Some descriptive statistics shows intention to have a mean value of 4.25 (SD=0.1680). This indicates that the respondents on average has an above mid-scale intention for healthy eating

behavior. The same goes for attitude ($M=5,2007$, $SD=1,06334$), social norms ($M=4,7393$, $SD=1,29422$), and perceived behavioral control ($M=4,1695$, $SD=1,30740$). As for habit and self-control, the respondents on average answered somewhat below mid-scale, ($M=3.8836$, $SD=1,28480$) and ($M=3,8626$, $SD=0.69376$) respectively.

Results of the TPB variables in regression analysis

The dependent variable for the first regression analysis was intention seeing as this was stated in the hypotheses. In order to test the three first hypotheses 1) Attitude positively influences intention among students for healthy eating behavior, 2) Social norms positively influences intention among students for healthy eating behavior, and 3) Perceived behavioral control positively influences intention among students for healthy eating behavior, attitude, social norms and perceived behavioral control were added as independent variables.

Tolerance and VIF values are indicating multiple correlation or multicollinearity with other variables as low. (Tolerance value more 0.10, ranging from 0.799-0.984), and VIF levels far below 10 (1,017-1,251) as you can see (table 5 in Appendix). The assumption of multicollinearity is therefore not violated. As for normality (see plot 1 in Appendix), the points lie in a reasonably straight line going from the bottom left to top right, indicating no major deviations in normality. Same goes for the scatter plot (see plot 2 in the Appendix), where the residuals are distributed in a rectangular manner. Assumptions of linearity, homoscedasticity and normality are therefore not violated.

Adjusted R Square ($=0.265$) (see table 3 in Appendix) shows the amount of variance in intention can be explained by the three independent variables. In this case 0.265, or 26,5% of variance in intention can be explained by attitude, social norms and perceived behavioral control. Standard error of estimate $=1,441$, measuring how much R is predicted to vary from one sample to the next.

According to the Analysis of Variance (see table 4 in the Appendix), there were significant differences between the independent variables of the model $F(3,109) = 14,456$ $p < 0.005$. Looking at the coefficient table again (see table 5 in Appendix) the standardized coefficients compares the contribution of each independent variable. Beta shows that the largest contribution is 0.411, which is for attitude. Attitude therefore makes the strongest contribution in predicting intention when variance explained by all other variables is controlled for. Significance level statistically significant ($p < 0.05$). Social norms is not statistically significant

($p > 0,909$) with $\beta = -0,010$ indicating a rather small and not significant contribution for predicting intention. Perceived behavioral control is also making a statistical significant contribution $\beta = -0,353$.

This means that out of the three firstly tested hypotheses, both attitude positively influencing intention and perceived behavioral control positively influences intention are true, therefore we can reject the null hypothesis for both. As for the social norms, as previously mentioned I should in retrospect have included one or more items to the variable because the two showed low internal consistency. This could in part explain why social norms are not contributing statistically significant to predicting intention for healthy eating behavior among students. Social norms positively influencing intention for healthy eating behavior among students should therefore be rejected.

Regression analysis for the two new variables: Self-Control and Habit

For the second regression analysis intention was also the dependent variable, as stated in the hypothesis 4 and 5; Habit positively influences the intention among students for healthy eating behavior and Self-control positively influences the intention among students for healthy eating behavior. Habit and self-control are therefore the two independent variables.

Tolerance and VIF values (see table 6 in Appendix) indicate low multicollinearity with other variables. Tolerance value > 0.10 (both 0.999) and VIF values both below 10 (both 1.001). The assumption of multicollinearity is therefore not violated. As for normality (see plot 3 in Appendix) the points lie in a reasonably straight line going from the bottom left to top right, indicating no major deviations in normality, same as for the previous regression. The same can be said for the scatter plot (see plot 4 in the Appendix), where the residuals are distributed in a rectangular manner. Assumptions of linearity, homoscedasticity and normality are therefore not violated.

Adjusted R Square ($=0,304$) (see table 7 in Appendix) shows that variance in intention can be explained by habit and self-control. In this case 0.304, or 30,4% of the variance in prediction of intention for healthy eating behavior can be explained by the two independent variables. Standard error of estimate $=1,402$, measuring how much R is predicted to vary from one sample to the next.

According to ANOVA (see table 8 in Appendix), there were significant differences between the independent variables of the model $F(2,110) = 25,469$ $p < 0.005$. Looking again to the coefficient table (see table 6 in Appendix) the standardized coefficient Beta shows that the largest contribution is 0.551, for habit. Habit therefore makes the strongest contribution in predicting intention when variance explained by all other variables is controlled for. Significance level is statistically significant ($p < 0.05$). The other independent variable, self-control is not making a statistically significant contribution for predicting intention ($\beta = -0,134$, $p > 0.05$).

Out of the two hypothesis, only one can be accepted. Habit positively influences the intention for healthy eating behavior. As previously mentioned, the reliability analysis done on the items for self-control showed low internal consistency. This might have something to do with the fact that the authors (Baumeister and Boone, 2004) suggested summarizing the score of all items and dividing by the number of items. This would only give us one variable to measure, which does not qualify for reliability analysis. Self-control positively influencing intention to healthy eating behavior among students should therefore be rejected.

Regression analysis for the interaction of habit and self-control

The third regression analysis has intention as the dependent variable, and the interaction effect, computed as habit x self-control as the independent variable. This is done in order to test the final hypothesis; habit and self-control positively and significantly interact to predict student intention for healthy eating.

Tolerance and VIF values (see table 9 in Appendix) indicate low multi correlation with other variables because there is only one independent variable. This results in both Tolerance and VIF value =1. There cannot be any multicollinearity when there is only one independent and one dependent variable, which means that the assumption of multicollinearity is not violated.

Normality in the Normal Probability Plot (see plot 5 in Appendix) shows a somewhat straight line from the bottom left to top right. This indicates that there are no large deviations in normality. The scatter plot (see plot 6 in Appendix) shows that the residuals are roughly distributed rectangularly. Assumptions of linearity, homoscedasticity and normality are therefore not violated.

Adjusted R Square (=0.155) (see table 10 in Appendix) shows that variance in intention can be explained by the interaction of habit and self-control. Here the value of Adjusted R Square=0.155, meaning that 15,5% of the variance in prediction of intention for healthy eating behavior can be explained by this interaction between self-control and habit. Standard error of estimate = 1,545, measuring how much R is predicted to vary from one sample to the next.

According to ANOVA (see table 11 in Appendix), $F(1,111) = 21,529$, $p < 0.005$. Looking to the coefficient table again (see table 9 in Appendix), Beta shows a large, statistically significant contribution from the interaction term $\beta = 0.403$ $p < 0.000$. Interaction between habit and self-control is thereby positively and significantly interacting with intention to predict healthy eating behavior among students. The final hypothesis can therefore be accepted.

Discussion

The purpose of this section is to interpret the results of this study and summarize them, and also identify some limitations in relation to design of research, suggest directions for future research.

Summarizing the results

The three first hypotheses examined the main purpose of this study; the applicability of the Theory of Planned Behavior for predicting intentions towards healthy eating behavior among students, more specifically students at Aalesund University College.

These hypotheses thereby stated that attitudes, subjective norms and perceived behavioral control would positively influence intention to engage in a healthy eating behavior over a three-month period, this is consistent with the theoretical framework of the model. The overall model indicated that 26,5% of variance in predicted intention of healthy eating behavior could be explained by attitudes, social norms and perceived behavioral control. Attitude showed the largest contribution for variance explained in intention prediction by $\beta=0.411$.

This confirms previous findings stating that the most significant predictor of intention is attitude (Øygard and Rise 1996, Pawlak, Malinauskas, and Rivera 2009, Sharifirad et al. 2013). Social norms showed non-significant results which also is confirmed in prior research (Chan and Tsang 2011). This is not surprising considering that findings of social norms often indicate a weaker prediction of intention than the other TPB variables (Øygard and Rise 1996, Armitage and Conner 2001, Wu et al. 2009).

Perceived behavioral control had a statistically significant contribution to prediction of intention, which corresponds well with some prior findings (Wu et al. 2009), however, most previous research show perceived behavioral control as positively associated with intention (Øygard and Rise 1996, Armitage and Conner 2001, Grønhøj et al. 2012), while this is not the case in current study.

Attitude, subjective norms and perceived behavioral control accounted for 26,5% of variance in behavioral intention to eat a healthy diet. This is somewhat lower than the findings of other studies discussed in this paper ((Grønhøj et al. 2012, Pawlak, Malinauskas, and Rivera 2009, Armitage and Conner 2001, Øygard and Rise 1996, Chan and Tsang 2011), yet higher than others (Sharifirad et al. 2013)

The fourth and fifth hypothesis stated that habit and self-control both positively influences intention among students for healthy eating behavior. 30,4% of variance in perceived behavioral intention can be explained by habit and self-control. Only habit had a significant and unique contribution to the dependent variable. Previous research supports habit as a predictor of intention when habit strength was low intention was indicated to be higher than if habit strength was high, indicating no need for planning (Danner, Aarts, and de Vries 2008, De Bruijn et al. 2007).

Self-control was as mentioned not statistically significant, which contradicts the findings of the one study discussed in this study stating that habitual self-control strengthens the intention-behavior congruence (Schroder and Schwarzer 2005). It is however, worth noting, that those findings were related to management of health-related behavior opposed to the current health eating behavior. No research has previously, to my knowledge focused on the relationship between habit and self-control as independent variables for predicting intentions, and discussions on model fit when running regression where the two variables combined explain variance in behavior intentions would be pure speculations.

As for the final hypothesis, the interaction between habit and self-control being positively significant towards predicting students intention for healthy eating behavior, findings showed $\beta=0.403$ $p<0.000$ meaning that the results were significant, and that it therefore is a unique contributor to behavioral intention. To my knowledge there are no current or previous findings that support or contradicts these findings, however, there have been some errors in the regression analysis part that will be discussed as limitations below.

Limitations of the present study

There are a number of limitations to the current study, and some have already been discussed. Firstly, when developing the questionnaire for the participants there should have been included a few more items. One or more items should have been included for the intention variable, because it is believed that a reliability analysis should have been performed on all variables before continuing the analysis. As for social norms, one or more items should also have been included, this because the reliability analysis showed poor internal consistency, and because there were only two items, removing one was not an option. This could also explain why the second hypothesis was rejected, even though previous findings as discussed above have also found social norms to have weaker prediction power than the other constructs.

Secondly, some more preparation should have gone into the research of self-control and how to analyze this in a data analysis software program. I suspect that the results in this study are affected by the lack of distinction between high and low level of self-control. It is also suspected that another limitation lies within the construct of habit. That the analyses of both new variables should have been grouped, meaning that habit strengths should have been divided in order to compare between low, high and medium habit strength.

Another limitation is the small sample of participants. Out of more than 2300 students the sample was only close to 10% of the students before cleaning of the data. This could limit the significance of the study. That the survey was a self-report questionnaire opposed to an observed survey could also be a limitation to the study. Previous findings suggested that when behavior was measured through self-reporting, the TPB accounted for 11% more of variance in behavior than when the behavior measures were observed (Armitage and Conner 2001).

A last and feared limitation to the current study is the regression analyses performed. It is believed that hierarchical linear regression would have been better suited for predicting intention. In order to do such an analysis there should also have been included as previously mentioned, a distinction between high and low self-control as well as low, medium and high strength of habit.

Implications for further research

It is my belief that in order to reduce the intention-behavior gap in the area of health-related behaviors' an extension might be necessary of the Theory of Planned Behavior. This has been suggested by many researchers through self-efficacy, self-identity, past behavior and moral beliefs. (Conner and Armitage 1998, Danner, Aarts, and de Vries 2008, Sommer 2011).

Findings discussed in this study suggests that the limitation of self-control leads to ego-depletion. This could reduce impulse-control and I believe that moral justification, licensing and moral licensing would be interesting for further research. Especially in the area of healthy eating behavior.

Conclusion

The focus of this study was to explore the constructs of the Theory of Planned Behavior in order to see if these constructs were predictors of intention among Norwegian students, (students at Aalesund University College) towards healthy eating behavior. Results of the study suggests that the Theory of Planned Behavior appears to be a helpful theoretical framework for understanding and predicting Norwegian students intention to engage in healthy eating behavior.

The present study also aimed at providing evidence for adding an interaction computed by habit and self-control to the intention aspect of the Theory of Planned Behavior. By investigating the predictive power of self-control and habit on the construct of behavioral intention the current study aimed to reduce the current gap between intention and behavior.

For future researchers it is suggested to continue to test and develop the framework of the Theory of Planned Behavior. As for the healthy eating behavior, future research is recommended to focus on habits, impulse-control and our constant moral justification for making unhealthy food choices. Extending the Theory of Planed behavior would increase its predicting power and this is in general needed, but especially important for healthy eating behaviors, seeing as obesity rates only keep increasing.

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Appendix

10-Item Self-Scoring Self-Control Scale

Adapted from
Tangney, J.P., Baumeister, R.F., Boone, A.L. (2004). High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success. *Journal of Personality*, 271-324.

First, please read the following 10 statements and for each, check the box that best represents you.

	Not at all like me	A little like me	Some what like me	Mostly Like Me	Very much like me
I have a hard time breaking bad habits.	5	4	3	2	1
I get distracted easily.	5	4	3	2	1
I say inappropriate things.	5	4	3	2	1
I refuse things that are bad for me, even if they are fun.	1	2	3	4	5
I'm good at resisting temptation.	1	2	3	4	5
People would say that I have very strong self-discipline.	1	2	3	4	5
Pleasure and fun sometimes keep me from getting work done.	5	4	3	2	1
I do things that feel good in the moment but regret later on.	5	4	3	2	1
Sometimes I can't stop myself from doing something, even if I know it is wrong.	5	4	3	2	1
I often act without thinking through all the alternatives.	5	4	3	2	1

Next, add up all the points for the checked boxes and divide by 10. The maximum score on this scale is 5 (extremely self-controlled), and the lowest scale on this scale is 1 (not at all self-controlled).

The Self-Report Habit Index
(Verplanken & Orbell, 2003, p. 1329)

Behavior X is something . . .

1. I do frequently.
2. I do automatically.
3. I do without having to consciously remember.
4. that makes me feel weird if I do not do it.
5. I do without thinking.
6. that would require effort not to do it.
7. that belongs to my (daily, weekly, monthly) routine.
8. I start doing before I realize I'm doing it.
9. I would find hard not to do.
10. I have no need to think about doing.
11. that's typically "me."
12. I have been doing for a long time.

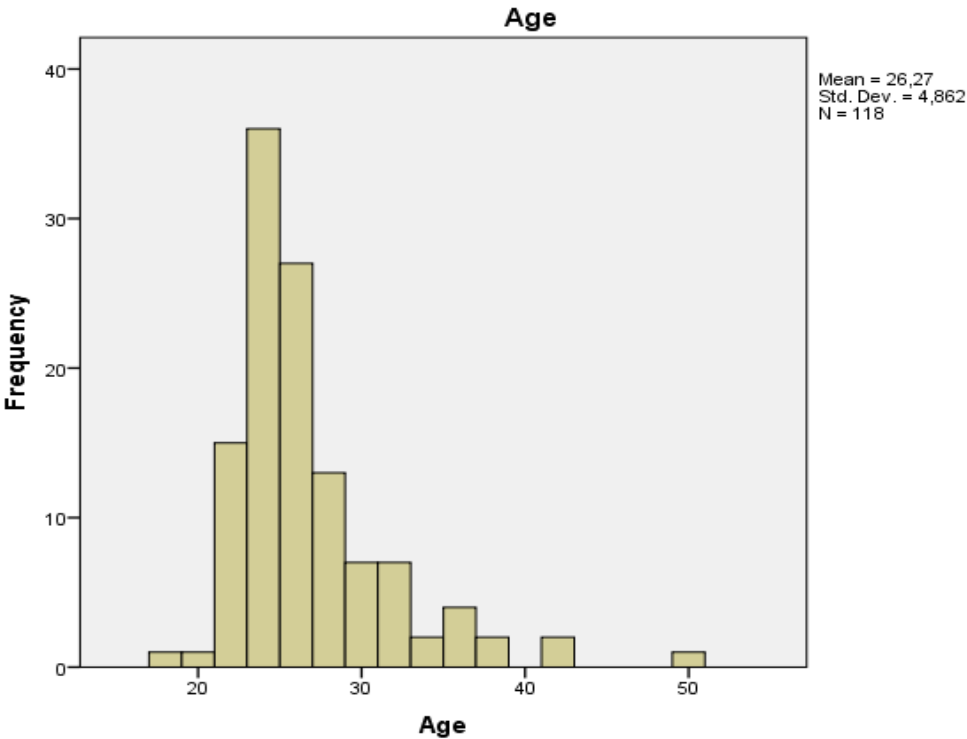
Note: The items are accompanied by response scales anchored by agree / disagree and preferably should contain five or more response categories. In the present studies, 7-point (Studies 1 and 2) and 11-point response scales (Studies 3 and 4) were used. Some items may have to be reworded in line with the behavior under study.

Other measures related to habit include those used in laboratory experimental research settings. Consistent with an assumption of automaticity, a fast-response measure (Jaccard & Blanton, 2005) has been used to measure habit by measuring cognitive accessibility. For example, travel mode habits were measured by asking respondents to choose as quickly as possible their preference (car, bus, bicycle, train, or walking) in response to 10 travel destinations and purposes (e.g., movie theater, summer excursion) (Verplanken, et al., 1998).

Descriptive statistics

1=male 2 = female

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	54	45,8	45,8	45,8
	2	64	54,2	54,2	100,0
	Total	118	100,0	100,0	



1=sec school, 2=high school, 3= 1 year higher education, 4=bachelor or equivalent 5= PhD, master etc

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	2,5	2,5	2,5
	2	18	15,3	15,3	17,8
	3	37	31,4	31,4	49,2
	4	43	36,4	36,4	85,6
	5	17	14,4	14,4	100,0
	Total	118	100,0	100,0	

1= >100 000, 2= 100 000 -200 000 3= 200 000 - 300 000, 4 = 300 000 - 400 000, 5 = 400 000 - 500 000 6= more than 500 000 6= do not wish to answer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	46	39,0	39,0	39,0
	2	40	33,9	33,9	72,9
	3	6	5,1	5,1	78,0
	4	5	4,2	4,2	82,2
	5	3	2,5	2,5	84,7
	6	5	4,2	4,2	89,0
	7	13	11,0	11,0	100,0
	Total	118	100,0	100,0	

Reliability analyses

Attitudes

Reliability Statistics

Cronbach's Alpha	N of Items
,826	8

Social norms

Reliability Statistics

Cronbach's Alpha	N of Items
,506	2

Perceived behavioral control (PBC)

Reliability Statistics

Cronbach's Alpha	N of Items
,805	6

Habit

Reliability Statistics

Cronbach's Alpha	N of Items
,943	12

Self-control

Reliability Statistics

Cronbach's Alpha	N of Items
,476	10

Bivariate correlations and descriptive statistics

Table 1

Correlations

		Intention	Attitude	SocialNorms	PBC	Habit	Selfcontrol
Intention	Pearson Correlation	1					
Attitude	Pearson Correlation	,399	1				
	Sig. (2-tailed)	,000					
SocialNorms	Pearson Correlation	,124	,434	1			
	Sig. (2-tailed)	,182	,000				
PBC	Pearson Correlation	-,345	,023	,124	1		
	Sig. (2-tailed)	,000	,806	,185			
Habit	Pearson Correlation	,546	,337	,058	-,434	1	
	Sig. (2-tailed)	,000	,000	,537	,000		
Selfcontrol	Pearson Correlation	-,114	-,058	,201	,145	,036	1
	Sig. (2-tailed)	,226	,540	,032	,124	,702	

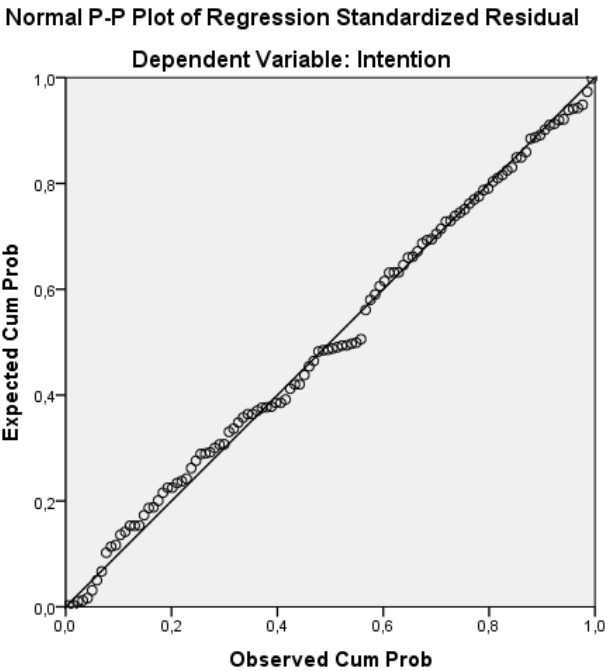
Table 2

Descriptive Statistics

	Mean	Std. Deviation
Intention	4,25	1,680
Attitude	5,2007	1,06334
SocialNorms	4,7393	1,29422
PBC	4,1695	1,30740
Habit	3,8836	1,28480
Selfcontrol	3,8626	,69376

Regression analyses

'Plot 1



Plot 2

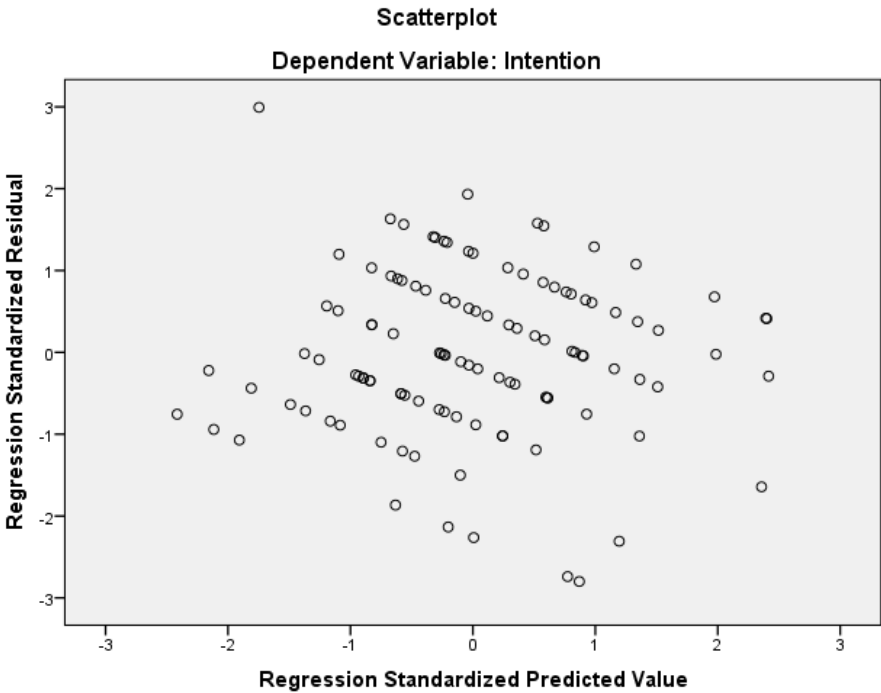


Table 3

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,533 ^a	,285	,265	1,441

a. Predictors: (Constant), PBC, Attitude, SocialNorms

b. Dependent Variable: Intention

Table 4

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	90,012	3	30,004	14,456	,000 ^b
	Residual	226,242	109	2,076		
	Total	316,254	112			

a. Dependent Variable: Intention

b. Predictors: (Constant), PBC, Attitude, SocialNorms

Table 5

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2,832	,818		3,460	,001		
	Attitude	,650	,142	,411	4,573	,000	,811	1,233
	SocialNorms	-,014	,118	-,010	-,115	,909	,799	1,251
	PBC	-,454	,105	-,353	-4,326	,000	,984	1,017

a. Dependent Variable: Intention

Table 6

Coefficients^a

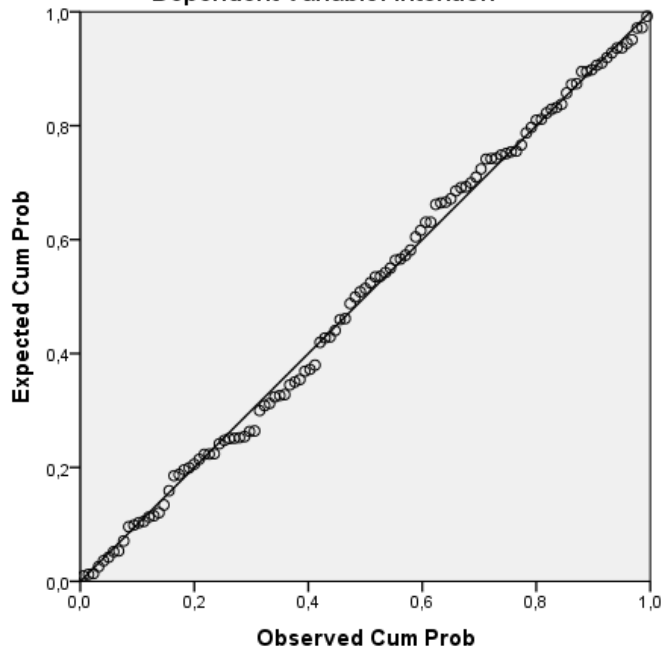
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2,706	,837		3,232	,002		
	Habit	,721	,103	,551	6,990	,000	,999	1,001
	Selfcontrol	-,324	,191	-,134	-1,697	,093	,999	1,001

a. Dependent Variable: Intention

Plot 3

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Intention



Plot 4

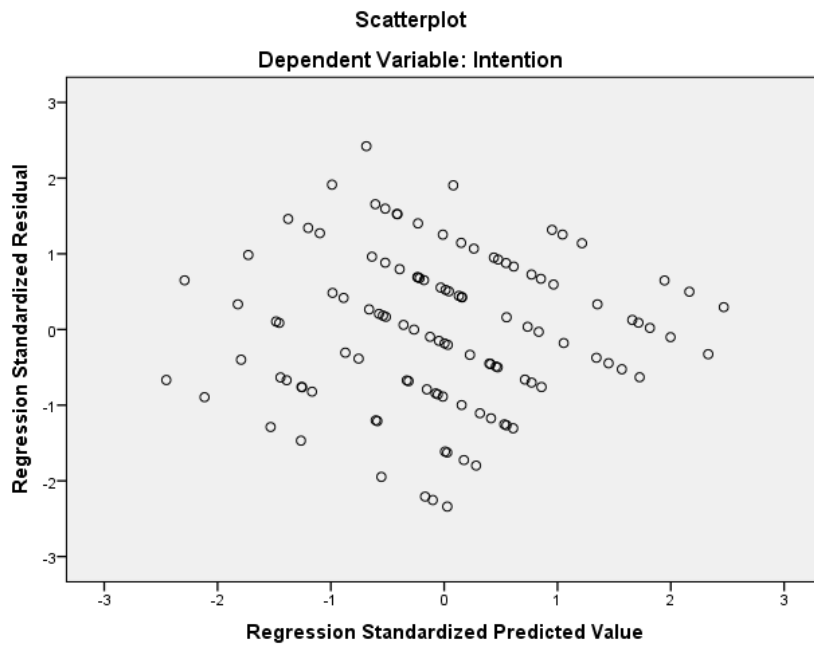


Table 7

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,563 ^a	,317	,304	1,402

a. Predictors: (Constant), Selfcontrol, Habit

b. Dependent Variable: Intention

Table 8

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	100,097	2	50,049	25,469	,000 ^b
	Residual	216,157	110	1,965		
	Total	316,254	112			

a. Dependent Variable: Intention

b. Predictors: (Constant), Selfcontrol, Habit

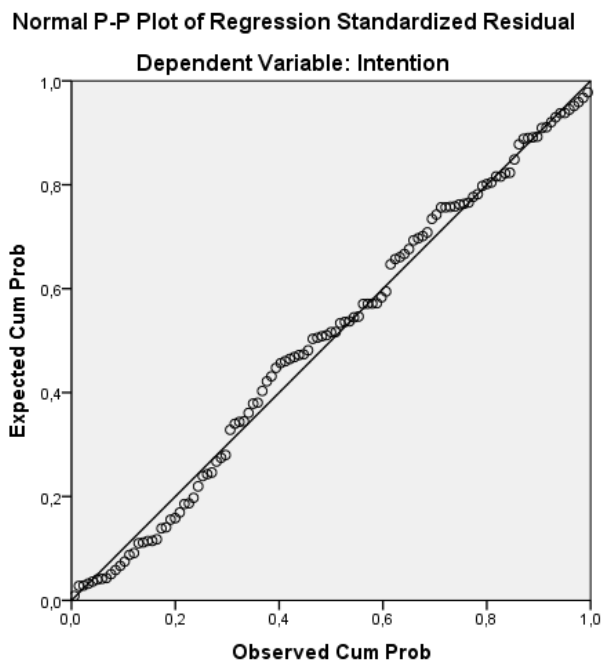
Table 9

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2,579	,389		6,627	,000	1,000	1,000
	Interaction	,112	,024	,403	4,640	,000		

a. Dependent Variable: Intention

Plot 5



Plot 6

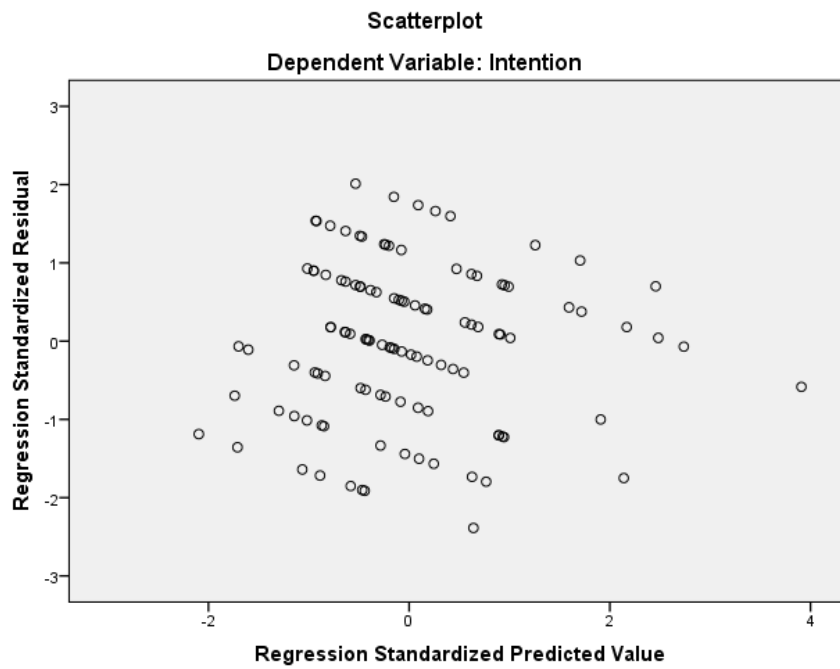


Table 10

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,403 ^a	,162	,155	1,545

a. Predictors: (Constant), Interaction

b. Dependent Variable: Intention

Table 11

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	51,375	1	51,375	21,529	,000 ^b
	Residual	264,880	111	2,386		
	Total	316,254	112			

a. Dependent Variable: Intention

b. Predictors: (Constant), Interaction