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The Inhibitory Effect of Intolerance of Uncertainty on the Emotional Eating Response

Master Thesis

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Abstract

Emotional eating is a response which is so far hard to explain by literature. There is a need for more knowledge of the underlying mechanism. The present study is the first in addressing the role of intolerance of uncertainty in the emotional eating response. 81 women completed a taste perception test and questionnaires measuring intolerance of uncertainty and negative affect. Hypotheses were tested by conducting a moderation analysis, in which negative affect was entered as independent variable, IU as moderator, and calorie intake as dependent variable. Results showed that IU was significantly related to the emotional eating response. More specifically, individuals with a low or moderate IU consumed significantly more calories than individuals with a high intolerance of uncertainty. It seems that a high IU is related to more controlling and health approaching behavior in order to decrease uncertainty. The results indicate that a low IU is related to emotional eating and interventions could be focused on this risk group, in order to stimulate more healthy approach behavior.

Introduction

Nowadays, obesity and overweight are considered as a worldwide problem. The World Health Organization (WHO) reported that in 2016 nearly one-third of the world population was overweight or met the criteria of obesity. Also in the Netherlands overweight and obesity are considered two of the biggest health problems. In 2016, 49% of the adult Dutch population (18-years and older) were deemed overweight and 14% met the criteria of obesity. Environment, heredity, and individual factors, such as self-esteem and lifestyle, are the most important factors in the development of obesity (Van Binsbergen et al., 2010).

In a lot of cases, overweight or obese people can lose weight by following a healthy diet and by exercising. However, two types of eaters cannot be helped sufficiently by a healthy diet or exercise alone. External eaters and emotional eaters often do not benefit from a healthy diet, without tackling the problem underneath their eating behavior (van Strien, 2013). External eaters overeat when they are exposed to tempting food cues, such as the smell of food and the visual presence of food. This external eating can easily be explained as an evolutionary reaction; eating in periods when there is plenty of food, will lead to survival in famine periods. By contrast, eating when facing negative emotions or stress (i.e., emotional eating) is an atypical reaction from an evolutionary perspective. Van Strien (2013) explained that our ancestors needed to fight or flight to survive the presence of danger; eating would not save the lives of our ancestors when facing dangerous situations. Emotional eating is often a coping response to negative affect; a dimension of subjective distress and unpleasurable engagement (Watson & Clark, 1984). Negative affect also can be described as aversive mood states such as guilt, disgust, anger, sadness, and anxiety (Watson & Clark, 1984). In a negative affect state, eating can consciously or unconsciously be used as a coping mechanism by reducing the negative mood through eating palatable food (Masih, Dimmock, Epel, & Guelfi, 2017). Emotional eating is commonly observed in clinical populations; e.g., people with obesity, depression, anxiety, and eating disorders (Aldao & Dixon-Gordon, 2014; Kontinen, Männistö, Sarlio-Lähteenkorva, Silventoinen & Haukkala, 2010; Leehr et al., 2015;).

Eating in response to negative affect is also observed in general populations. Van Strien and colleagues (2013) found that participants under a negative mood induction had a significant higher food intake than participants under a positive mood induction. In a study among 1562 employees of a bank, Koenders and Van Strien (2011) found that emotional eating rather than restrained and external eating was associated with weight gain. High engagement in sports was the only factor that reduced the gain in emotional eating. Though sports may attenuate the overeating and weight gain in emotional eating, however, it does not solve the problem. Rather than solving the problem by dieting and sports, there is a need for a change in psychological factors to reduce the adverse effects

of emotional eating. Mannucci and colleagues (2010) found that psychosocial and psychopathological factors were associated with poor health related quality of life in obese patients and stated that psychological and psychiatric interventions are essential for the treatment of obesity; to improve treatment outcome and reduce the burden of disease.

Over the past years, the research area of eating disorders and other clinical disorders has focused on a new psychological construct known as 'Intolerance of Uncertainty' (IU). IU can be defined as the tendency to react negatively on a cognitive, emotional, and behavioral level to uncertain situations (Dugas, Buhr, & Lacouceur, 2004). An individual with a heightened level of intolerance of uncertainty will find uncertain situations to be upsetting and will interpret them as negative; situations that should be avoided. McEvoy and Mahoney (2011) found support for a two-factor model of IU, whereby each factor is related to different clinical disorders. The first factor is associated with desire for predictability (prospective IU); excessive approach behaviors in order to decrease uncertainty. This factor seems to be related to symptoms of generalized anxiety disorder, obsessive compulsive disorder and eating disorders (ED's) (McEvoy & Mahoney, 2011; Kesby, Maguire, Brownlow & Grisham, 2017). The second factor is associated with an uncertainty paralysis (inhibition IU), which means cognitive avoidance or inaction in response to uncertainty and seems related to symptoms of social anxiety, panic, depression, and agoraphobia (McEvoy & Mahoney, 2011). Rosen, Knaüper, and Sammut (2007) found that individuals with a higher IU score were more likely to show health related approach behaviors than individuals with a lower IU score (Rosen, Knaüper & Sammut, 2007). In the study of Rosen and colleagues (2007) individuals with a higher IU score were more likely to search for health improving information than individuals with a lower IU score.

The experimental study of Sternheim, Startup, and Schmidt (2011) found that individuals with an eating disorder reported significant higher IU-scores than healthy controls. In patients with anorexia nervosa uncertain situations led to anxious feelings and resulted in a strong need for control, leading to extreme planning and controlling (Sternheim, Konstantellou, Startup & Schmidt, 2011). These findings by Sternheim and colleagues (2011) support the excessive approach behavior (controlling and planning) described by McEvoy and Mahoney (2011). Renjan, McEvoya, Handleya, and Fursland (2016) found a direct effect of IU on restraint behaviors. They hypothesized that the functional relationship between IU and controlling behaviors (such as purging and dietary restraint) is missing by bingeing; by definition bingeing is characterized by the absence of control. In order to achieve predictability and control, IU motivates the formation of weight and shape beliefs and rigid eating (Renjan et al., 2016). So far the research area only focused on the role of IU in eating disorders and other clinical populations and not on eating behaviors in a non-clinical population. Emotional eating is a response which is so far hard to explain by literature. There is a

need for more knowledge of the underlying psychological factors that play a part in overeating. This is important for selecting the appropriate targets for intervention in the context of emotional eating and associated overweight. Assumed is that a high IU is related to health improving approach behavior. In this case, it is assumed that a high IU will lead to more control on the emotional eating response.

The aim of the current study is to determine if IU is associated with the emotional eating response. Taken the results of prior research of IU and eating disorders into account (e.g. Sternheim et al., 2011; Renjan et al., 2016), it is expected that when experienced negative affect, people with a low intolerance of uncertainty level would be expected to consume more calories than people with a high intolerance of uncertainty level.

Method

Participants

Women were recruited for this study through flyers and social media. Students of the University of Utrecht were also invited by the Faculty Social Science website for current research studies.

Inclusion criteria for participation were being female, being between 18 and 35 years old and the absence of a food allergy. Participants that were students of the University of Utrecht could earn one research-hour for course credit. The other participants received 6 euro's after participation in this study. At recruitment, participants were asked to refrain from eating 2 hours before participation in the study. In this study 81 women participated, with a mean age of 22.08 years ($SD= 2.44$). 96.1 % ($n = 77$) of the participants had the Dutch nationality. After gathering the data, one woman participant was excluded from the data analysis; she was 37 years old at the date of participation and did not fit the inclusion criteria age of 35.

Measures

Calorie Intake

Following a study by Guerrieri, Nederkoorn, Schrooten, Martijn, and Jansen (2009) a Bogus Taste Test is used in order to measure food intake of the participants in an unobtrusive way. Participants are left alone for 15 minutes to taste and rate three sorts of palatable foods (M&M's, wine gums, and crisps) that are placed in front of them. Participants rate odour, general palatability and, depending on the sort of food, sweetness, creaminess, saltiness, and crunchiness. Without the participants knowledge the bowls of food are weighed before and after the taste test in order to establish food intake. The amounts eaten of each food are measured by calculating the consumed weight of every food to their specific caloric value.

Negative Affect

Current negative affect of the participants was measured using the 10 negative affect items of the Dutch translation of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). This 5 point Likert scale consists of 20 items, ranging from 1 = very slightly or not at all applicable, to 5 = very much applicable. Participants were asked to rate the extent to which they had experienced particular negative emotions over the past week. An example of an item is “guilty”. Mean scores of the PANAS were used, whereby a higher mean score indicate a higher level of negative affect than lower scores. Internal consistency for the negative affect scale in the current study was good ($\alpha = .87$).

Intolerance of uncertainty

Intolerance of uncertainty was measured using the Dutch translated version of the shortened 12-item Intolerance of Uncertainty Scale (IUS-12; Carleton, Norton, & Asmundson, 2007; de Bruin, Rassin, van der Heiden & Muris, 2006). Participants’ answers were rated on a 5-point Likert-scale ranging from 1 (not at all characteristic of me) to 5 (entirely characteristic of me). An example of an item is: “Unforeseen events upset me greatly”. After reversing the items, a mean IU score was calculated. A higher mean score on the IUS-12 indicates a higher intolerance of uncertainty than lower mean scores on the scale. Carleton et al. (2007) demonstrated a high internal consistency ($\alpha = .91$), factorial stability and convergent validity of the IUS-12. Cronbach’s alpha in the current study was good ($\alpha = .79$).

Procedure

The study was approved by the Faculty’s Ethics Committee at the Faculty of Social Sciences of Utrecht University. The study was conducted in a controlled laboratory environment, with the subjects being individually tested in a quiet room. At arrival, participants were seated in a chair in front of a computer monitor. Then, the experimenter started the program Qualtrics, left the laboratory, and went into an adjoining room.

The participants started by reading of the instructions of the study and the informed consent form in which voluntary and anonymity were highlighted. After the participants agreed to the informed consent, they had to fill out the questionnaires. First, the demographic questions about age and nationality, were asked. Subsequently, they had to fill out the PANAS with respect to the emotions experienced in the past week and the IUS-12. On average, it took 10 minutes to complete the questionnaires. After finishing the questionnaires, the screen displayed a text with the instruction to call the experimenter using a bell which was available on the desk. At this point, the

experimenter entered the laboratory room with three types of palatable foods (chocolate, crisps, and cookies) which were presented on the desk in front of the participant. Instructions for the Bogus taste task were displayed on the screen. Participants were left alone for 15 min to taste and rate three sorts of food that were placed in front of them in half-filled medium sized bowls: M&M's, chocolate cookies, and crisps. Participants had to rate odour, general palatability and, depending on the sort of food, sweetness, creaminess, saltiness, and crunchiness. Without the participants' knowledge the bowls of food were weighed before and after the taste test in order to establish food intake. After 15 minutes the experimenter returned to collect the food and restart the program Qualtrics in order to continue the experiment, after which she left the room. Finally, the screen displayed the debriefing of the study in which participants were offered to be informed about the true intentions of this study by contacting the experimenters.

Statistical analysis

The statistical analysis was performed with IBM SPSS Statistics Version 24. The SPSS macro PROCESS developed by Hayes, (2013) was used to conduct a moderation analysis, in which negative affect was entered as independent variable, IU as moderator, and calorie intake as dependent variable. In order to avoid multicollinearity, variables were centered first (Field, 2009). The moderation analysis estimated the direct effects of negative affect and IU, as well as the interaction negative affect x IU on calorie intake. Simple slopes were incorporated to test direct and indirect effects of the moderator IU.

Results

No outliers were found in the data. Means, SDs, and minimum and maximum scores for each of the measures are shown in Table 1.

Table 1. Means, SDs, and minimum and maximum scores for the study measures (N= 80)

Variables	<i>M</i>	<i>SD</i>	Min	Max
<i>Negative Affect</i>	1.78	0.62	1.00	4.10
<i>Intolerance of Uncertainty</i>	2.59	0.50	1.50	4.00
<i>Calorie Intake</i>	301.80	159.80	15.00	638.25

*** Note: Variable negative affect was measured by the mean score on the PANAS negative subscale. Variable Intolerance of uncertainty was measured by the mean score on the IU-12 scale and the variable Calorie intake is the total intake on the Taste Perception Test.*

The explained variance in the model was significant; $R^2 = .33$, $F(3, 67) = 3,55$, $p = .018$.

Results of regression analysis showed no significant relationship between the IU score and calorie intake; $b = 22,97$, $p = .592$. A significant relationship was found between negative affect and

calorie intake, $b = 92,59$, $p = .021$. In line with the hypothesis, the interaction-effect IUx negative affect was significant $b = -104,92$, $t = -1,11$, $p = .034$. The simple slopes are shown in table 2 and figure 1. Results showed that only low or moderate IU scores had a significant relationship with a higher calorie intake. This effect of IU on calorie intake was not found by a high IU score.

Table 2. Simple slopes for a low (-1 SD), mean ($M= 2.59$) and high IU score(+1 SD) on calorie intake.

IU score	<i>B</i>	<i>T</i>	<i>P</i>
Low	144.80	2.78	.007
Moderate	92.59	2.60	.011
High	40.37	1.28	.204

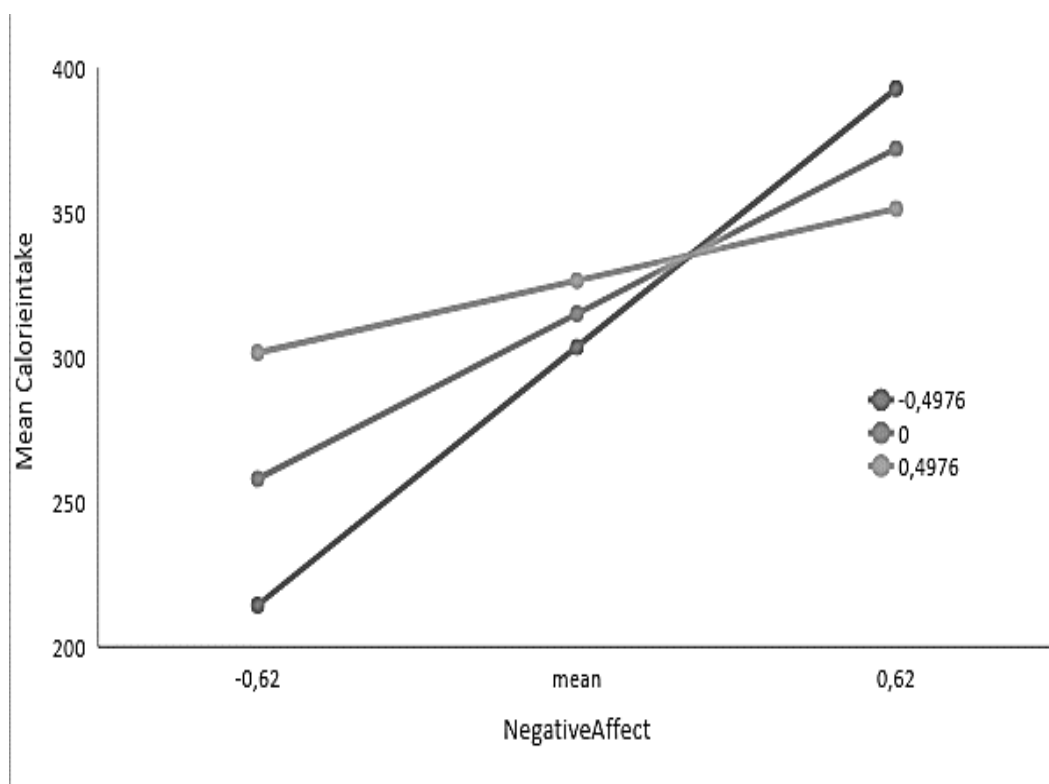


Figure 1. Simple slopes for a low (-1 SD), mean ($M= 2.59$) and high IU score(+1 SD) on calorie intake.

Discussion

The goal of this study was to determine if IU is associated with the emotional eating response. In line with previous research on emotional eating in the general population (e.g. Van Strien et al., 2011), results showed the emotional eating response; higher scores of negative affect were related to a higher calorie intake. No relation was found between IU and calorie intake alone, as mentioned before IU is related to negative experiences (Dugas, Buhr, & Lacoureur, 2004). The results revealed as expected, that participants with a low IU score, when experience negative affect,

consumed more calories than participants with a high IU score.

The results of the study contribute to more insight in the underlying psychological factors of the emotional eating response. It seems that IU is not only related to eating disorders, but also plays a part in the eating behavior in a non-clinical population. More specifically, low and moderate IU seem to be related to an increase in calorie intake. The relation between negative affect and a higher calorie intake is not found with high IU. It seems that high IU is associated with an inhibitory response on emotional eating. These findings are in line with the research of IU and ED; it confirms the notion of Renjan and colleagues (2016) that IU has a potential effect on restraining behaviors. Sternheim and colleagues (2011) found that anorexia nervosa patients had a high IU level and hypothesized that in order to decrease feelings of uncertainty, patients are looking for a feeling of certainty by restraining behavior and controlling. This seemingly inhibitory response of IU in order to decrease uncertainty fits the hypothesized two-factor of McEvoy and Mahoney (2011) whereby the restraint response can be seen as a direct approach behavior which fits the described factor of desire for predictability (prospective IU) .

The study of Hong and Lee (2015) was the first study that examined the relation between IU and behavioral inhibition and activation system (BIS/BAS). They found that the prospective component of IU was associated with both BIS and BAS, whereas the inhibition variance was only associated with BIS. BAS is associated with organization behavior towards incentives or non-punishment and may correlate with the prospective IU's focus on active approach to reduce uncertainty. It seems possible that the prospective component of IU is related to healthy behavior; approach behavior in order to feel in control.

The results of this study has potential implications for clinical practice. IU could be used as a screening variable by health professionals. By determining IU, health professionals can have an indication if a person is at risk of engaging in emotional eating. Health professionals could be more specific in targeting risk groups for emotional eating behavior with interventions. Also, in the treatment of emotional eating, professionals could focus more on the stimulation of an active BAS in order to achieve more controlling and health approach behavior in individuals with a low IU.

Limitations

There are a few limitations to this study that need to be addressed in further research. In this study, most of the participants were recruited at the University of Utrecht. Education level seems to be related to overweight; people with higher education tend to have more knowledge and resources to healthy eating behaviors (Galobardes, Morabia & Bernstein, 2000; Snoek, Van Strien, Janssens, & Engels, 2007). Taken the high education level in the sample of this study into account, results may not be representative for the general population of women between 18 and 35 years old. Another

limitation of the study was the absence of a control question about possible food intake prior to the research. At recruitment, participants were asked to refrain from eating 2 hours before participation. It is unclear if the participants actually did that. The risk exists that participations failed to refrain from eating before participation; this could have led to distorted results of the taste perception test. Future research should avoid this risk by including a control question about refraining from eating prior to the research. No control variable for eating disorders was included in this study. Future research should control for the possibility of high scores on a eating disorder measurement; the presence of ED could also have distorted the results of the current study. Lastly, the study was conducted in a laboratory environment. Stroebele and De Castro (2004) found various external factors in social and physical environments can affect food intake. They noted that the presence of other people, the time, sounds and other distractions can affect food intake. The experimental setting, due to its specific environmental factors such as the presence of the experimenter, could have produced eating behavior that does not reflect the usual eating behavior of people.

Conclusion

This was the first study addressing the role of IU in the emotional eating response. Despite the limitations, this study contributes to the literature by extending the research of IU to a non-clinical population. The current study suggests that individuals with a low IU are more at risk of emotional eating than individuals with a high IU. It seems that a high IU is related to more controlling and health approaching behavior in order to decrease uncertainty. The results indicate that a low IU is related to emotional eating and interventions could be focused on this risk group, in order to stimulate more healthy approach behavior.

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