Masters Thesis

The effect of norm violation on the attribution of eating beahvior

A.C.P. Paulissen

Supervisor: J.C de Witt Huberts

Abstract English

In this study, we examined whether people attribute their overeating behavior to emotions. Hypothesized was that participants will misattribute their norm violating behavior by overestimating experienced emotions at the time of norm violation. 41 university college women were randomly allocated to two groups (control and norm violating group). Norm violation was manipulated by providing subjects with bogus feedback that they ate too much in a food assessment task, after which emotions and retrospective emotions were measured. The norm violation group (N= 22) retrospectively indicated that they felt more negative at the time of norm violation than the control group ($N = 19$), $p =< .05$. This effect was mediated by negative affect by the norm violation. This research shows that people misattribute their overeating behavior to emotions, by overestimating their negative emotions.

Abstract Nederlands

In deze studie werd onderzocht of mensen hun (over)eetgedrag toeschrijven aan emoties. De hypothese was dat participanten hun norm overschrijdende gedrag verkeerd zullen toeschrijven aan emoties, door hun emoties te overschatten ten tijde van de norm overschrijding. 41 vrouwelijke universiteits studenten zijn willekeurig verdeeld over 2 groepen (controle en norm overschrijdende groep). Normoverschrijding was gemanipuleerd door proefpersonen bogus feedback te geven dat ze teveel hadden gegeten in een voedsel inschattingstaak, waarna emoties en retrospectieve emoties gemeten werden. De norm overschrijdende groep (N= 22) gaf retrospectief aan dat ze zich negatiever voelden ten tijde van de norm overschrijding, dan de controle groep (N = 19), p =< .05. Dit effect werd gemedieerd door negatief affect, dat werd veroorzaakt door de norm overschrijding. Dit onderzoek toont aan dat mensen hun (over)eetgedrag verkeerd toeschrijven aan negatieve emoties.

Introduction

According to the World Health Organization, overweight is one of the largest public health problems in the 21st century. Prevalence numbers of overweight have tripled in some countries since 1980 and they are still increasing (van den Hurk, van Dommelen, van Buuren, Verkerk & HiraSing, 2007). Overweight is not only a threat to health, it is also a major cost to society (Branca, Nikogosian & Lobstein, 2007). Health organizations try a number of different solutions to the obesity problem. An example of one of these solutions is running prevention campaigns. To develop an effective campaign, information is needed about the determinants of excessive eating. A great amount of research (biological, physiological and psychological) has already been conducted in this topic and there are numeral different theories about excessive eating. A result from several studies, is that emotion seems to play an important role in the regulation of eating behavior (Macht, 2008). Especially, the relationship between negative emotion (fear, anger and sadness) and consumption, has been investigated extendedly (Canetti, Bachar & Berry, 2002). A normal physiological reaction to the experience of a negative emotion is to decrease food intake. Negative emotions cause a feeling of satiety, which reduces appetite (Spoor, Bekker, van Strien & van Heck, 2006). The psychological reaction to a negative emotion, where the feeling of satiety or hunger doesn't play a role, means that people keep eating when feeling down, whether they are satiated or not. This reaction could be a cause for overeating (Macht, 2008). Emotional eating is such a psychological reaction. This is the tendency to overeat in reaction to negative emotions (van Strien et al, 2007). Studies in normal weight women have indeed found positive relations between emotions and increasing food intake (Newman, O'Connor & Conner, 2007). However, there are also studies that found no relationship between emotional eating and food intake in response to negative emotions (Lluch, Herbeth, Mejean, & Siest, 2000). Overall, it is not entirely clear how emotions affect eating behavior.

A limitation of these studies is a methodological one. Often, when subjects are asked about their eating behavior, this is done retrospectively. From a study of Thomas and Diener (1990) and Ready, Weinberger en Jones (2007), it appears that retrospective judgments of emotional experiences are often not very accurate. This raises a question of whether or not, it is true that emotional eaters increase their food intake in response to negative emotions. Considering the fact that retrospective self-reports are not as accurate as was thought, it could be that emotional eater scales 'diagnose' people falsely as an emotional eater. The problem could

then be with participants who underreport or overreport their eating behavior (Ready, Weinberger & Jones, 2007).

In contrast with retrospective studies are the experimental studies done in the lab, where negative emotions are induced and later food intake is measured with Bogus taste tests. These taste tests are used to rule out the bias of self-reports and inaccurate retrospective judgments. In a study by Evers, de Ridder and Adriaanse (2009), who used this methodological set-up, the authors found no increase in food intake during negative affect in emotional eaters compared to control groups. Since the bias has been omitted from the study design and the results still leave an uncertainty about the relationship between emotions and eating, there remains the question of how can overeating behavior in people be explained in relation to emotions?

An alternative explanation about why overeating can be attributed to a negative mood state despite prospective studies that indicate that people actually don't overeat when in a negative mood state, could be in the research of Oettingen, Grant, Smith, Skinner and Gollwitzer (2006) and Parks-Stamm, Oettingen and Gollwitzer (2010). They found that unconscious norm violating behavior leads to negative affect. In order to reduce this negative affect, people search for an explanation for this kind of behavior. This explanation is often a misattribution, because it is frequently unknown to people why they behave in a certain way. Earlier experienced emotions could serve as an explanation for their norm violating behavior. Overeating could be that kind of norm violating behavior for some men and women. More specifically, for men and women who are restrained eaters or dieters. This type of eaters pay a great amount of attention to what they eat and how much they eat (Herman & Mack, 1975). Their goal is to reduce or maintain weight, hence when they eat too much by accident, they will feel bad about themselves (negative affect) because their behavior (overeating) is not in line with their goal (reduce eating and weight). This could be personal norm violation.

In this study, we investigate whether women use negative emotions wrongly as an explanation (misattribution) for overeating (norm violating behavior). With this study, a new path will be paved in research to eating behavior.

Misattribution

According to self-perception theory (Bern, 1972), people make misattributions about their behavior when their internal status is weak, ambiguous or difficult to interpret. They conceive their attitudes and mood states, just as an outsider would conceive them; by observing their behavior and trying to explain why they do what they do. This will lead to misattributions.

Bar-Anan, Wilson en Hassin (2010) give two kinds of self-perception errors. In the first pattern, people are encouraged to behave in a way that is unnatural to them. Although the behavior is unnatural to them, they still misattribute that behavior to a prior attitude, characteristic or objective. In this error pattern, people fail to identify the extent to which their actions were triggered by the situation. In the second error pattern, people apply the wrong label to internal, physiological cues. For instance, when people become aroused (by physical exercise or drugs), they can sometimes misattribute their arousal to an emotional mood state (i.e. sexual attraction) (White, Fishbein & Rutstein, 1981).

The process of misattribution is motivated from the need to reduce cognitive dissonance. This cognitive dissonance arises, because sometimes there is inconsistency between the behavior of a person and the norms en values of that person. People want to understand why they perform certain behavior. An example with eating behavior, is that when someone tries to lose weight and therefore would not eat fat and sugar rich food, but yet does so. In this example, the norms and values of that person do not match with his behavior, which results in cognitive dissonance.

Norm-violation and emotion

A situation where people often misattribute their behavior, is when people are confronted with norm-violating behavior. The internal status of a person could be in this case weak, ambiguous or difficult to interpret, because they acted in a different way than their norms and values. When they are confronted with this cognitive dissonance, it will lead to negative feelings. This is because that person can't find a reason why he or she performed that behavior. Hence, they are in an 'explanatory vacuum' (Oettingen et al., 2006). Without an explanation for their behavior, people are exposed to the anger of others or to their own feelings of guilt and irritation. Since people want to protect themselves against negative feelings of guilt, they will make a misattribution to explain their norm-violating behavior. They do this by choosing a goal or internal status that was present in consciousness earlier, which could explain their norm-violating behavior. For instance, emotion could serve as an explanation for norm-violating behavior. This is a plausible clarification, since emotions aren't remembered very accurately.

From retrospective research (Thomas & Diener,1990; Ready, Weinberger & Jones, 2007) appears that respondents tended to underestimate or overestimate their negative emotions afterwards. With a diary, participants noted several times a day their emotions. Hereafter, subjects were asked afterwards about the days they noted down their emotions. Participants'

mood state and the intensity were examined. In the study of Thomas and Diener (1990), it appeared that respondents overestimated the intensity of their mood state and that they underestimated the frequency of their positive versus negative affect. In the study of Ready, Weinberger and Jones (2007), it seemed that elderly people (65+) had the tendency to overestimate their positive affect and that the youth (adolescents) had the tendency to overestimate their negative affect. This shows that emotions can only partially be recalled correct.

Another reason why people can choose emotion as a plausible explanation for their norm-violating behavior, is that it seems that behavior acted out during emotions, is judged by others as less negative and it is felt that the actor of the behavior is less responsible for his actions at the time of the emotions (Pizarro, Uhlmann & Salovey, 2003). This suggests that when emotions are in play, people judge others more subjective and more favorable than without emotions. Hence, emotions ensure that people judge others less hard, which gives people a save way to use emotions as an alternative explanation for their norm-violating behavior.

This experiment will positively contribute to research in overeating behavior. When people experience a negative emotion (after having received feedback about a task), it will be examined whether participants try to explain their health standard violating behavior in an alternative way, i.e. by overestimating their emotions. Until this far, there are no studies that have investigated the role of misattribution of emotions in correlation with overeating. This experiment is a first in this new research area. It is important, because it creates a new perspective into research about the influence of emotions on eating behavior.

In the current study, norm-violation is manipulated with participants. Our hypothesis is that participants attribute their norm-violating behavior to prior experienced emotions, because in this way, they have an explanation for their norm-violating behavior and hence reduces negative feelings.

Methods

Participants

Forty-six women have participated in this study with an average age of 21.07 years (SD = 2.43). Forty-two are studying at Utrecht University and the other four were either working or studying at Hogeschool Utrecht. Participants received a compensation of 8 Euros or 2 course credits. All participants signed an informed consent when entering the study. Participants were randomly allocated to the control group (N = 19) or the experimental group (N = 22). The data of five participants were deleted, these people were outliers (SD> 3 from the mean, T2: n= 3, T3: n= 2) at one of the measured emotional scales. These data could not be used for statistical analyses, the final sample consisted therefore of 41 participants. Table 1 shows the composition of the participants in the two groups.

Table 1. Mean and standard deviation of age and BMI of the control group and the experimental group and the whole sample.

	Control group		Experimental group		All participants	
	Age	BMI	Age	BMI	Age	BMI
Number	19		22		41	
Mean	21.26	21.53	20.90	22.15	21.07	21.86
SD	2.72	2.59	2.20	2.99	2.43	2.79

Procedure

When participants signed in to join the experiment, they received an information letter and an informed consent. The true purpose of the study would not be revealed to subjects, until the end of the experiment. Instead, they heard a cover story, where they were told that the experiment contained an assessment task to investigate how well they can judge the size of certain amounts of food.

The experiment consisted of 2 separate parts (for full text see appendix 1), both were executed on a laptop in the software program e-prime. Part 1 consisted of a baseline emotion (T0), in combination with a short questionnaire about the general health. Then, a neutral, ambiguous movie was shown, that lasted 5 minutes. Hereafter, a second emotion measurement took place (T1). Then, the judgment task was conducted. Participants were asked to estimate how large a portion of 20 grams was of a certain food type. They had to judge the amount of food by eating it.

Part two took place one day after the first part of the experiment. In this part, norm violation was manipulated; the feedback of the assessment task for the participants in the norm violation group. The feedback contained fake information about the amount of calories they had consumed with the assessment task. Participants in the control group got feedback that they rated the amount of food correctly. Participants in the experimental group got feedback that they had overrated the amount of food and that they had consumed too much calories. Hereafter, a third emotion measurement was administered. This happened right after participants received the feedback (T2). Then, they received a questionnaire where they were asked to retrospectively judge their emotions at the moment just before the assessment task (T3). Finally, participants filled in the Dutch Questionnaire for Eating Behavior (DEBQ, van Strien, 2005). Last, demographic variables such as age, weight, BMI and education level were also asked for. After the computer tasks, they received a debriefing form, with information about the real content of the experiment.

Instruments

The software program E-Prime (version 1.2, Psychology Software Tools) was used to develop and implement the computer tasks of the experiment. The tasks were conducted on a HP laptop with a 15.6 inch screen.

Emotion questionnaire

The positive affect negative affect schedule (PANAS; Watson, Clark & Tellegen, 1988) was selected to measure baseline emotions (T0), emotions after the movie (T1) and emotions after feedback (T2). This scale was adjusted for this study with the 4 basic emotions (anger, sad, fear, happiness) containing each 5 words that represented the basic emotion ranging from 1 (*not at all*) to 5 (*very much*) (see appendix 1). The positive emotion items were reversed and formed together with the negative emotion items, one negative items scale. The negative score of the participants is an average score of all the items taken together (Cronbachs alpha = .88).

Movie

To induce an ambiguous state of mind, a movie was used. As it should not directly induce a positive or negative mood state, a wildlife movie about sea turtles was selected from youtube.com. Otherwise participants could explain their eating behavior as a result of a very negative/positive mood state that was induced by the movie.

Manipulation

The manipulation was induced by giving participants false feedback about the assessment task, where they had to judge the amount (20 grams) of 4 types of food. Participants received feedback about each separate food type. Subjects in the control group were told that they ate the right amount (in grams) of food that was required. Subjects in the norm violating group were told that they ate too much of each food type. They received feedback about each separate type of food and finally, they were told that they ate in total 511 kilocalories too much. This number of 511 kilocalories in total was chosen in a pilot study. In this pilot study, 20 women were asked with how many calories, they would have a sense that they had eaten too much and felt guilty or would be ashamed. Participants indicated that 500 kilocalories would be too much, and hence be a norm violation for them.

Food Products

In this study, we used products of the following brands: M&M's (chocolate), marshmallows, biscuits (c1000), cut mini carrots. For alternative products, we used cherry tomatoes and naturel chips (spar). Participants were asked to rate the amount of M&M's, carrots, marshmallows and biscuits by eating the amounts of food they thought to be 20 grams. Participants received the food pieces on a neutral plastic plate, without any information about the product. The plates were filled to the top with the specific food type. When participants disliked a certain kind of food, they were offered an alternative; small tomatoes instead of carrots and chips instead of the other candy.

Dieting, emotional eating.

The Dutch Questionnaire for Eating Behavior (DEBQ; van Strien, 2005) was conducted to control for the degree of dieting, emotional eating and external eating. These aspects could have an influence on the research results. This questionnaire consists of 33 questions that are divided into three subscales: restraint eating, emotional eating and external eating. With these subscales answers are on a 5 point scale ranging from 1 ('Never') to 5 ('Very Often').

Cronbach's alpha's of the three scales are: .93 for the scale of restraint eating, .91 for the scale of emotional eating and .80 for the scale of external eating.

Statistical Analyses

First, a randomization check was conducted to see whether the two groups did not differ on the DEBQ and on demographic variables such as age, BMI and education level.

Second, a manipulation check was conducted with a repeated measures ANOVA to investigate whether the ambiguous movie had any effect on emotion (T0-T1). A second manipulation check was conducted with an ANOVA to see whether the two groups differed in negative emotion after they received feedback about the assessment task (T2)

The main analyses contained a repeated measures ANOVA to check whether the two groups differed on negative emotion between T1 and T3.

Results

Randomization check

With a MANOVA, a randomization check was conducted on the variables of age, weight, BMI and the three scales of the DEBQ (emotional eating, external eating, restraint eating) of the two groups. The control group and the experimental group did not differ significantly ($F(1,40) = .52$; $p = .79$) on each of these variables, hence the randomization was successful.

Manipulation check

To investigate whether the movie had an influence on the measured emotions of the subjects, a repeated measures ANOVA was conducted to measure the difference between T0 and T1. There was a marginal significant effect for time between T0 ($M= 1.58$; $SD=.38$) and T1 ($M= 1.66$; $SD= .36$), $F(1,40) = 3.94$; $p = .054$. All participants were slightly more negative after the movie. However, no interaction or condition effect was found ($p >.05$), thus the groups did not differ in their emotion experience before and after the movie.

To check whether the manipulation of negative feedback on the estimation of the eating task had any effect on the emotion of subjects, an ANOVA was conducted to measure the difference between the two groups at T2. A significant main effect was found between the control group ($M= 1.41$; $SD= .19$) and the norm-violating group ($M= 1.63$; $SD= .34$) on T2, $F(1,39) = 6.06$; $p = .02$ (see table 2). Hence, the manipulation has induced more negative feelings in the norm-violating group than in the control group.

Table 2. Difference in mean scores and standard deviations of negative emotions between control group and norm-violating group at T2 (after feedback).

T2	Control group (n=19)	Norm-violating group (n= 22)
Mean	1.41	1.62
SD	.19	.34

Main Analyses

With an ANOVA, the difference at T3 between the two conditions on emotion score was found to be significant, $F(1,39) = 4.76$; $p =.03$. The norm-violating group ($M= 1.79$; $SD= .44$) felt more negative than the control group ($M= 1.55$; $SD= .22$). The effect size of the

significant difference at T3 is .10. When controlling for the difference in negative affect at T2, this significant difference disappears with an ANCOVA analysis, $F(1,38) = .71$; $p = .40$.

The covariate, T2, appeared to be significant, $F(1,38) = 19.52$; $p = .00$. This suggests that there is a mediation effect of T2. With a Sobel test, it appeared that T2 had a significant mediating effect, $p = .01$ (one-tailed). Thus, the difference between the two conditions at T3 is influenced by T2 (negative affect).

Finally, a repeated measures ANOVA was conducted to measure the difference between T1 and T3 and between the two conditions on emotional score. There was a difference between the two conditions and the different measurements in time. However, this main effect is not significant, $F(1,39) = .56$; $p = .46$. The control group felt less negative at T3 ($M=1.55$; $SD= .22$), than at T1 ($M= 1.56$; $SD= .19$). The norm-violating group felt that they were more negative at T3 ($M= 1.79$; $SD= .44$) than at T1 ($M= 1.75$; $SD= .44$). Although, this difference is not significant, the two groups did change in the hypothesized direction.
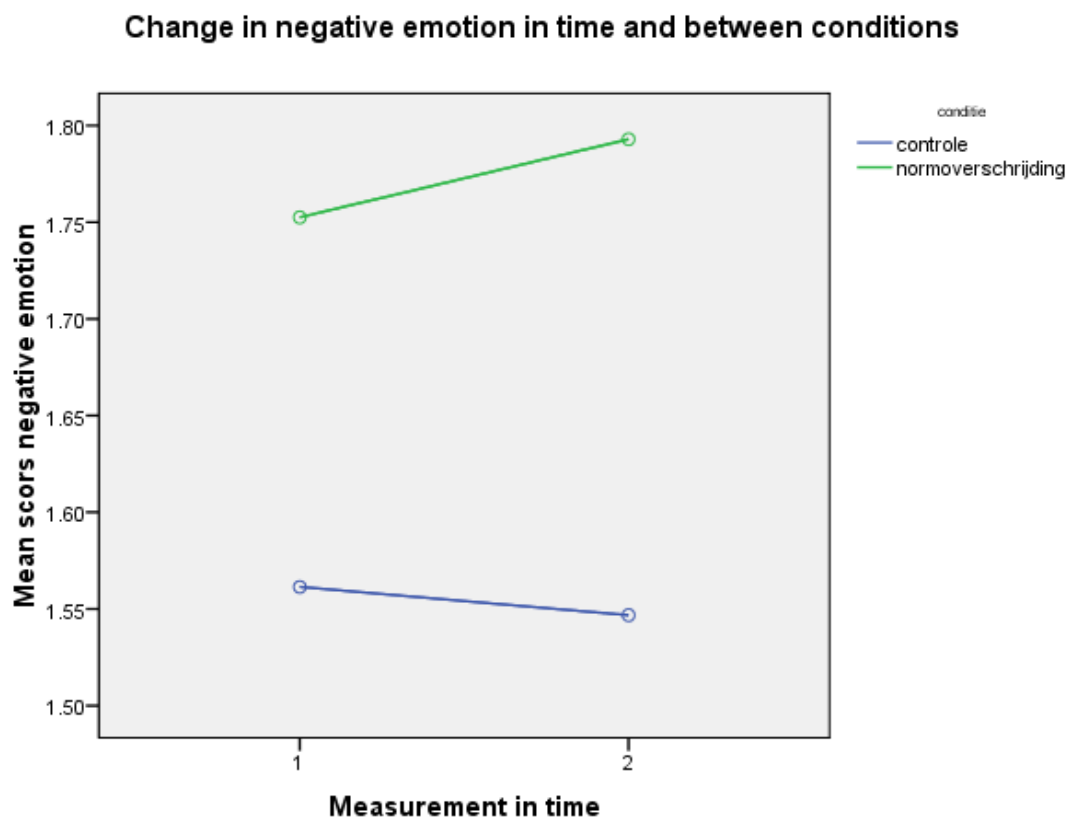

Figure 1. Difference in mean scores of negative emotion between T1 and T3 of the control group and the norm-violating group.

Discussion

In this study, the main question that was investigated is: how will people attribute their norm violating behavior to emotions? We hypothesized that people will attribute their norm violating behavior to earlier experienced emotions by overestimating them, because in this way, they have an explanation for their behavior. This hypothesis was confirmed in the present research.

From the main analyses it appeared that the norm violation group retrospectively indicated to have felt more negative prior to the norm violation than the control group. Hence, they overestimated their earlier experienced emotions after the norm violation, whereas the control group did not. This effect was mediated by negative affect after the norm violation (T2).

These results are in line with research of Oettingen et al. (2006) and Parks-Stamm et al. (2010). They state that when people are confronted with their norm violating behavior (receiving feedback in the experiment), this will lead to negative feelings. This causes people to often misattribute their behavior. Hence, the norm violation effect that is mediated by negative affect fits theories about norm violation with other tasks (social tasks) from previous research Oettingen et al. (2006) and Parks-Stamm et al. (2010). A new aspect in this research, is that it examines norm violation in eating behavior, which has not been investigated before. Also, in the research of Oettingen et al. (2006) and Parks-Stamm et al. (2010), norm violation is examined when participants can't find an explanation for their unconscious behavior, in our experiment, participants were conscious about their behavior.

This experiment raised an interesting new question for future research: what caused the misattribution? If norm violation would be the cause for the misattribution, this would mean that the theory of Oettingen et al. (2006) and Parks-Stamm et al. (2010) is validated in this experiment. If norm violation isn't necessary, and inducing negative affect alone is enough to cause the misattribution, this theory should be rejected and more research would be needed to investigate how negative affect actually works on people's attributing behavior. An alternative explanation could be found in the article of Robinson and Clore (2002). They state that an emotional experience can't be stored nor retrieved from memory. People remember the context details wherein emotions were experienced. With the passage of time, accurate recall of emotional experiences declines and biases occur when trying to retrieve the experience from memory. This is where a shift is made from episodic memory (specific to a particular event in the past) to semantic memory (consists of generalizations, beliefs). After a

while, people will experience more difficulty in retrieving passage-specific episodes. They compensate this, by also retrieving additional related information from semantic memory. There are two types of semantic emotion knowledge: situation-specific (how particular situations will influence their emotions) and identity related (beliefs about their emotions in general). From which type of memory a participant is retrieving information, depends on the type of ratings researchers use in their experiments. Because of the passage of time (retrospective reports) or the lack of availability (prospective reports), episodic memory may be inaccessible. People will then access the next type of information source; semantic memory (situation specific beliefs and identity related beliefs). These beliefs often have nothing to do with the actual experienced emotion of, for instance, five days ago, but the situation was the same. Hence, people will then think that they probably felt very negative, because in that situation, you usually feel negative. Regarding our research, when participants have to retrieve emotional information one day ago (the day they overate), it could be that, with a retrospective report, people retrieve information from semantic memory and hence the information about their emotions yesterday isn't as accurate as it would be when retrieving from episodic memory. This could cause for a bias and because people can't recall the exact emotions, they will over- or underestimate their emotions, which possibly causes the misattribution. This could be investigated in future research about this topic.

For now, this research shows that people misattribute their overeating behavior to emotions by overestimating them. This means that these results are in line with prior research in this topic (Lluch, Herbeth, Mejean, & Siest, 2000; Evers, de Ridder and Adriaanse, 2009); people actually don't feel negative when they think they ate too much. They only report having felt negative. When people actually are feeling negative, they don't overeat. Probably because negative feelings normally cause people to decrease food intake, as was discussed in the introduction (Spoor, Bekker, van Strien & van Heck, 2006). This means that in the future, researchers will have to develop new or other questionnaires to measure emotional eating behavior. The questionnaires that are used today, are often made up of retrospective information and self-reports. From this experiment, it becomes clear that these measures are not reliable (Robinson and Clore, 2002). Questionnaires should contain more objective measurements, such as bogus taste tests and diaries that have to be filled in twice or three times a day. In this way, more reliable measurements about eating behavior and the emotional state of mind can be used and the gap between retrospective and experimental research should become smaller.

A further suggestion for future research is to make separate groups with restraint eaters and emotional eaters. These different groups could cause a different effect when they are separated from the 'normal' eaters and are examined apart from each other. In this experiment we took al the groups together and with a randomization check it appeared that there was no difference between the groups. However, to gain deeper insight into the different types of eaters and whether they might cause different effects on eating behavior, there could be groups with restraint eaters and emotional eaters in future research about this topic. Restraint eaters would possibly experience a stronger effect than a 'normal' group, perhaps because they would feel norm violation earlier and stronger when they overeat (for more information on restraint eaters, see Herman & Mack, 1975). Emotional eaters could also show a stronger effect than a 'normal' group, when they have an explanation (negative emotions) for their overeating behavior. This effect is also shown in this research, however, since emotional eaters are specifically directed to negative emotions (more than a 'normal' eating group), the norm violation effect could be stronger in emotional eaters.

A third suggestion is to separate the two parts of the study less than 1 day. In this experiment, the two parts of the experiment were separated by one day (sometimes two). This time frame is not (yet) supported by literature. Hence, a time frame of two or more days, or less than one day would also be possible. A guess is that the effect/feeling of norm violation would set in within one day. More than two days seems less plausible, since experienced emotions at the time of the overeating could be biased by the time they have to be retrieved from memory (shift from episodic to semantic memory). Hence, the chance of over- or underestimating emotions would increase, because when a memory of an emotional experience shifts to semantic memory, several retrospective biases become active (belief-consistent) and self-reports of that emotional experience (emotions including) become less accurate with the passage of time, than when they are retrieved from episodic memory (time-dependent) within a time limit of about one day (Robinson & Clore, 2002).

With other suggestions for future research, it also becomes clear that there are a small number of limitations to our study. First, we did an experiment in a lab setting. This kind of setting is somewhat different than an experiment in a real life setting. It is possible that participants didn't show the behavior, they normally would display in real life. Also, we manipulated norm violation. It could be that with real norm violation (where people actually eat too much), they wouldn't behave in a similar way, and that results are slightly different than from what we found in this study.

Last, we only used female college students in our experiment. Hence, no further conclusions can be drawn towards other populations. More experiments with several other groups of women (lower SES or different age groups) should be conducted in the future. Different types of behavior (smoking, shopping, drinking) where emotions also play a role, should also be further investigated for more general conclusions.

Finally, we can conclude that we have found an explanation for the contradiction that people often don't overeat when experiencing negative emotions, but that they do see themselves as emotional eaters. This is a very important and valuable first step for practice and theory of eating behavior!

Literature

Bar-Anan, Y., Wilson, T.D. & Hassin, R.R. (2010). Inaccurate self-knowledge formation as a result of automatic behavior. *Journal of experimental social psychology,* doi:10.1016/j.jesp.2010.07.007

Bekker, M. H. J., Van de Meerendonk, C., & Mollerus, J. (2004). Effects of negative mood induction and impulsivity on self-perceived emotional eating. *International Journal of Eating Disorders, 36,* 461–469.

Branca, F., Nikogosian, H., & Lobstein, T. (2007). The challenge of obesity in the WHO European Region and the strategies for response. Copenhagen, Denmark (e-book).

Bern, D.J. (1972). Self-perception theory. In Bar-Anan, Y., Wilson, T.D. & Hassin, R.R. (2010). Inaccurate self-knowledge formation as a result of automatic behavior. *Journal of experimental social psychology,* doi:10.1016/j.jesp.2010.07.007

Canetti, L., Bachar, E., Berry, E. M. (2002). Food and emotion. *Behavioural Processes,* 60, 157-164.

Evers, C., de Ridder, D.T.D., & Adriaanse, M.A. (2009). Assessing yourself as an emotional eater: mission impossible? *Health Psychology, 28, 6,* 717-725.

Herman, C.P. & Mack, D. (1975). Restraint and unrestraint eating. In Macht, M. (2008). How emotions affect eating: A five-way model. *Appetite*, *50,* 1-11.

van den Hurk, K., van Dommelen, P., van Buuren, S., Verkerk, P.H., & HiraSing, R.H. (2007). Prevalence of overweight and obesity in the Netherlands in 2003 compared to 1980 and 1997. *Archives Dis Child, 92*, 992-995.

Lluch, A., Herbeth, B., Me´jean, L., & Siest, G. (2000). Dietary intakes, eating style and overweight in the Stanislas Family Study. *International Journal of Obesity, 24,* 1493–1499.

Macht, M. (2008). How emotions affect eating: A five-way model. *Appetite,* 50, 1-11.

Newman, E., O'Connor, D.B., & Conner, M. (2007). Daily hassles and eating behaviour: The role of cortisol reactivity status. *Psychoneuroendocrinology, 32*, 125–132.

Oettingen, G., Grant, H., Smith, P.K., Skinner, M. & Gollwitzer, P.M. (2006). Nonconscious goal pursuit: Acting in an explanatory vacuum. *Journal of Experimental Social Psychology,* *42,* 668-675.

Parks-Stamm, E.J., Oettingen, G. & Gollwitzer, P.M. (2010). Making sense of one's actions

in an explanatory vacuum: The interpretation of nonconscious goal striving. *Journal of Experimental Social Psychology, 46*, 531-542.

Pizarro, D., Uhlmann, E., & Salovey, P. (2003). Asymmetry in judgments of moral blame and praise: The role of perceived metadesires. *Psychological Science, 14, 3,* 267-272.

Ready, R.E., Weinberger M.I. & Jones, K.M. (2007). How happy have you felt lately? Two diary studies of emotion recall in older and younger adults. *Cognition & Emotion, 21*, 728-757.

Robinson, M.D. & Clore, G.L. (2002). Belief and feeling: Evidence for an accessibility model of emotional self-report. *Psychological Bulletin, 128*, 6, 934-960.

Spoor, S.T.P., Bekker, M.H.J., Van Strien, T., van Heck, G.L. (2007). Relations between negative affect, coping, and emotional eating. *Appetite,* 48, 368-376.

van Strien, T. (2005). *Handleiding Nederlandse Vragenlijst voor Eetgedrag [Manual Dutch Eating Behavior Questionnaire]*. Amsterdam: Boom Test Publishers.

van Strien, T., van de Laar, F.A., van Leeuwe, J.F.J., Lucassen, P.L.B.J., van den Hoogen, H.J.M., Rutten, G.E.H.M., et al. (2007). The dieting dilemma in patients with newly diagnosed type 2 diabetes: Does dietary restraint predict weight gain 4 years after diagnosis? *Health Psychology, 26*, 105–112.

Thomas D.L. & Diener, E. (1990). Memory accuracy in the recall of emotions. *Journal of Personality and Social Psychology, 59*, 291-297.

Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54, 6,* 1063-1070.

White, G., Fishbein, S., & Rutstein, J. (1981). Passionate love and the misattribution of arousal. In Bar-Anan, Y., Wilson, T.D. & Hassin, R.R. (2010). Inaccurate self-knowledge formation as a result of automatic behavior. *Journal of experimental social psychology,* doi:10.1016/j.jesp.2010.07.007

Appendix 1

E-prime text part 1

Welcome to this experiment

You will fill in some questionnaires, see a movie and perform an assessment task

Press 'space' to start the experiment

Here is a questionnaire about your mood and overall well-being at this time.

The first part contains a number of words that describe emotions and feelings.

Read each word and indicate the extent to which you experience this feeling at the moment. You can use the numbers to indicate how you feel. For instance, if you feel very happy this moment, you choose the number 5. If you hardly feel happy or not at all, you can choose the number 1.

Press 'space' to start the questionnaire.

PANAS questionnaire (T0):

20 questions: To what extent do you feel like:

1. washed-out
2. happy
3. sad
4. gloomy
5. agressive
6. irritable
7. scared
8. 'ongerust'
9. cheerful
10. frustrated
11. proud
12. low
13. guilty

14. enthousiastic

15. tense

16. anxious

17. energetic

18. angry

19. 'bedroefd'

20. nervous

Indicate at a scale of 1 to 5, with:

1 = hardly or not at all

2 = a little

3 = moderate

4 = very

5 = very much, a lot.

The second part contains a number of words that describe your wellbeing.

Read each word and indicate the extent to which you are experiencing this complaint. You can by use the numbers to indicate how you experience this complaint.

Press 'space' to start the questionnaire.

To which extent do you experience at this moment:

1. headache
2. dizziness
3. chest pain
4. lethargy
5. nausea or abdominal upset
6. palpitations
7. myalgia
8. stuffy
9. lump in throat
10. difficulty concentrating

11. having heavy arms or legs

12. the feeling there's something wrong

Indicate at a scale of 1 to 5, with:

1 = hardly or not at all

2 = a little

3 = moderate

4 = very

5 = very much, a lot.

Now you will see a movie.

Ask the experimenter to start the movie.

Movie showing

Again, here is a questionnaire about your mood at the moment.

The questionnaire contains a number of words that describe emotions and feelings.

Read each word and indicate the extent to which you experience this feeling at the moment.

You can use the numbers to indicate how you feel.

Press 'space' to start the questionnaire.

PANAS questionnaire (T1)

Here is the assessment task.

Ask the experimenter to start the assessment task.

For this assessment task you are asked to estimate how much 20 grams is. This is done by eating 20g of each product from the plate.

It is important that you make the most accurate possible estimate of what 20 grams of each product is. Do not think too long about it, go for your first impulse.

Press 'space' to start the task.

You see a plate of M & M's in front of you. Try to estimate how much 20 grams is by eating it.

Press 'space' to go to the next product.

You see a plate of marshmallows in front of you. Try to estimate how much 20 grams is by eating it.

Press 'space' to go to the next product.

You see a plate of biscuits in front of you. Try to estimate how much 20 grams is by eating it.

Press 'space' to go to the next product.

You see a plate of carrots in front of you. Try to estimate how much 20 grams is by eating it.

Press 'space' to go to the next product.

This is the end of the assessment task and thus the end of Part 1 of this study. We will see you tomorrow for the second part of this research.

Thank you very much!

E-prime text part 2

Welcome to the second part of this experiment.

First, you will receive feedback on the assessment task you did yesterday. Then, you will fill in several questionnaires.

Press 'space' to continue

Yesterday, you participated in our study, where we investigated how well you could indicate a quantity of food.

In reality, this experiment did not assess your judging qualities. We investigated whether people will overeat when exposed with unhealthy food and hence, will violate their norms.

Press 'space' to go to your personal results.

Press your participant number to see your results.

>>>One moment please<<<

Results

Control Group: You ate about 20 grams of M&M's. You dit not eat too much.

Experimental Group: You ate 193 kilocalories of M&M's. This is more than the 20 grams you had to eat.

Press 'space' to continu

Results

Control Group: You ate 18 grams of marsmallows. You did not eat too much.

Experimental Group: You ate 106 kilocalories of marshmallows. This was about the same as the 20 grams you should ate.

Press 'space' to continue

Results

Control Group: You ate 19 grams of biscuits. You dit not eat too much.

Experimental Group: You ate 199 kilocalories of biscuits. This is more than the 20 grams you should ate.
Press 'space' to continue

Results

Control Group: You ate about 20 grams of carrots. You did not eat too much..

Experimental Group: You ate 13 kilocalories of carrots. This was about the same quantity as the 20 grams you should ate.

Press 'space' to continue

Results

Control Group: You ate in total about 80 grams. This is about the same quantity as the other participants ate in this experiment.

Experimental Group: You ate in total 511. This is much more than what the other participants ate in this experiment.

Press 'space' to go to the questionnaires.

Here is a questionnaire about your mood and feelings at this time.

The questionnaire contains a number of words that describe emotions and feelings.
Read each word and indicate the extent to which you experience this feeling at the moment. You can use the numbers to indicate how you feel. For instance, if you feel very happy this moment, you choose the number 5. If you hardly feel happy or not at all, you can choose the number 1.

Press 'space' to go to the questionnaire.

PANAS questionnaire (T2)

Here is a questionnaire about your mood and feelings YESTERDAY, after watching the movie, just before the assessment task.

The questionnaire contains a number of words that describe emotions and feelings.
Read each word and indicate the extent to which you experienced this feeling YESTERDAY, after the movie, before the assessment task. You can use the numbers to indicate how you feel

Press 'space' to go to the questionnaire.

How emotional did you feel after watching the movie?

Indicate at a scale of 1 to 5, with:
1 = hardly or not at all
2 = a little
3 = moderate
4 = very
5 = very much, a lot.

Finally, we want to ask some questions about your eating habits and the extent to which you are working on your weight.

There are no right or wrong answers, it's just your opinion. Try to answer the questions as honestly as possible.

Press 'space' to go to the questionnaire.

DEBQ Questionnaire (Van Strien, 2005).

Last, we want to ask you some general questions.

All the results will be processed anonymously.

Press 'space' to start

Questions about:
1. age
2. height
3. weight
4. goal weight

You are finished with this experiment.

Thank you very much for participating!