When food becomes an obsession

Article

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When food becomes an obsession: Overweight is related to food-related obsessive-compulsive behavior

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Abstract

In this study, it was examined whether overweight is associated with food-related obsessions and compulsions. Participants with a healthy weight ($n = 27$) and participants who were overweight ($n = 33$) filled out the Yale-Brown-Cornell Eating Disorder Scale, the Eating Obsessive-Compulsive Scale, and the Emotional and Behavioral Reactions to Intrusions Questionnaire to assess frequency, distress, control, and reactance associated with food-related preoccupations and compulsions. Overweight participants showed increased food-related preoccupations, compulsive eating, and heightened emotional and behavioral reactance compared to participants with a healthy weight. Increased food-related obsessive-compulsiveness was also associated with unhealthy eating patterns.

Keywords

body mass index, cognitive processing, eating behavior, obesity, overweight

Introduction

In the last decades, the excess of high-caloric, palatable food has coincided with major changes in the average body composition of people in Western societies with a steady increase in the prevalence of overweight and obesity (Finucane et al., 2011; Wang and Beydoun, 2007). As a result of this so-called obesity epidemic, more and more people are at risk of developing cardiovascular diseases, diabetes, musculoskeletal disorders, and cancer (World Health Organization (WHO), 2009). Even though most people now realize the risks associated with excess body weight, only a small proportion of people who attempt to lose weight are able to maintain a healthy diet and reduce their body weight over an extended period of time (Jeffery et al., 2000). Thus, we are in dire need of more effective weight loss interventions, but to achieve that goal we first need to broaden our understanding of the factors that drive excessive eating.

One important factor that is thought to precede and mediate excessive eating and uncontrolled eating behavior, such as seen in obesity, is food craving (Gendall et al., 1998; Greeno

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et al., 2000; Lafay et al., 2001; Potenza and Grilo, 2014). In addition, craving for food makes it harder to stick to one's diet (Fedoroff et al., 2003; Meule et al., 2012) and is related to increased body weight (Chao et al., 2014; Franken and Muris, 2005; Schlundt et al., 1993), suggesting a prominent role of craving in excessive food intake and weight gain. Despite the importance of food cravings, however, there is considerable disagreement regarding the definition of food cravings: While food craving was traditionally defined as a strong desire to eat (Weingarten and Elston, 1990), the definition of food craving was later expanded to an intense desire to consume food that is difficult to resist (White et al., 2002). Defined in this way, craving resembles the concept of intrusions, which are defined as spontaneous and discrete thoughts, images, or impulses that are experienced as being difficult to control and that interfere with ongoing activity (Clark and Rhyno, 2005).

Some researchers have even suggested that intrusive thoughts mark the beginning of all craving episodes: According to this Elaborated Intrusion (EI) theory, craving can be described as a cycle of mental elaboration of an initial intrusive thought (Andrade et al., 2015; Kavanagh et al., 2005; May et al., 2012). Cognitive, emotional, contextual, and physiological associations to food can automatically trigger spontaneous intrusive thoughts. These thoughts will initially be pleasurable and rewarding, since they share properties of the desired target, and therefore motivate the individual to further enrich and elaborate them. This elaboration involves the retrieval of related information in long-term memory and formation of vivid and realistic mental images of the desired target, which will increase craving for the target (Andrade et al., 2015; Kavanagh et al., 2005; May et al., 2012). However, this elaboration can subsequently take over one's entire chain of thought, leading to compulsive eating or to distress when the desire cannot be met (May et al., 2012).

Thus, food craving can take on obsessive-compulsive properties, especially when one is trying to fight the urge to consume the desired food. With respect to intrusive thoughts and obsessions, Clark and Rhyno (2005) described a severity continuum between clinical and nonclinical obsessions, with frequency, distress, and perceived control being the distinguishing factors. Indeed, for the majority of people, intrusions are an ordinary, everyday experience (Brewin et al., 1996). Intrusive thoughts, however, are also characteristic of several clinical disorders, like obsessive-compulsive disorder (Calkins et al., 2013; Purdon et al., 2005), generalized anxiety disorder (Langlois et al., 2000a, 2000b; Ruscio et al., 2011), post-traumatic stress disorder (Brewin, 2001; Michael et al., 2005), depression (Ruscio et al., 2011; Wenzlaff, 2005), and eating disorders (Blackburn et al., 2012; Perpina et al., 2011; Rawal et al., 2010), with contents related to the specific disorder. Similarly, craving for food has also been observed in the majority of the population with about 90–100 percent of women and 60–70 percent of men reporting food cravings (Pelchat, 1991; Weingarten and Elston, 1991), suggesting that this is an ordinary experience for most people. Although cravings for food are thus generally not pathological, they can be problematic for some people, by triggering excessive eating and subsequent weight gain as discussed above. Hence, food craving appears to be a continuum just like has been observed for normal versus clinical obsessions and intrusive thoughts.

From this, it follows that obesity can be characterized by obsessive thinking about how tempting and irresistible a food is. Such obsessive thinking then elicits the urge to eat or craving that triggers compulsive consumption of the food to reduce the cravings. The aim of this study was to investigate the assumption that obesity is associated with obsessive and compulsive traits. Given that the main difference between clinical and nonclinical intrusive thoughts is "one of degree, rather than kind" (Clark and Rhyno, 2005), we hypothesized that obesity would be characterized by more frequent as well as more distressing and distracting food-related intrusive thoughts that are perceived as uncontrollable. Moreover, such beliefs

determine one's appraisal of intrusive thoughts, which in turn determines cognitive and behavioral responses to those intrusions. It was therefore hypothesized that obese individuals would also show increased behavioral reactivity (i.e. compulsive behavior) toward unwanted intrusive thoughts about food.

Method

Participants

Participants were recruited through advertisements asking for Dutch-speaking volunteers in a study about food-related thoughts and eating behavior. A total of 60 participants (47 females) with a mean age of 40.35 years (standard deviation (SD) = 11.27) participated in the study. Based on their body mass index (BMI; kg/m^2), participants were classified as having a normal weight (BMI < 25) versus being overweight (BMI ⩾ 25). A total of 27 participants (22 females) had a healthy body weight (mean BMI = 21.96, SD = 1.57; range = 18.09–24.69), and 33 participants (25 females) were classified as overweight (mean BMI = 32.82, SD = 6.28; range = 25.00–54.33). There was no significant difference in age between the normal-weight group (M = 38.44, SD = 12.17) and the overweight group (M = 41.91, SD = 10.41), $F(1,58) = 1.41$, $p = .24$. The study protocol was approved by the Ethical Review Committee Psychology and Neuroscience (ERCPN).

Materials and measures

Food preoccupations and rituals. Preoccupations and rituals pertaining to food were measured with the self-report version (Bellace et al., 2012) of the Yale-Brown-Cornell Eating Disorder Scale (YBC-EDS; Mazure et al., 1994) to assess the nature and severity of preoccupations and rituals related to eating. The YBC-EDS consists of eight core items, with four items assessing preoccupations and four items measuring rituals. Because we were only interested in preoccupations and rituals with food in general, we did not include the symptom checklist and only used the eight core items of the YBC-EDS in relation to food. All eight items were phrased in terms of preoccupations and rituals with food.

For both subscales (preoccupations and rituals), the four items assess frequency (e.g. How much of your time, including meal times, is occupied by thoughts and images about food?), interference (e.g. How much do these preoccupations with food interfere with your social or work functioning? Is there anything that you don't do because of them?), distress (e.g. How much distress do your preoccupations with food cause you?), and degree of control over the preoccupations and rituals (e.g. How successful are you in stopping or diverting your preoccupations with food?). Participants rated each item on a 5-point Likert Scale from 0 (*none*) to 4 (*extreme*). Three scores were obtained from the YBC-EDS: Preoccupation ($\alpha = .79$), Ritual ($\alpha = .49$), and Total (the sum of the Preoccupation and Ritual scores; $\alpha = .80$). Higher summed scores indicate more severity and impairment.

Obsessive-compulsive eating. The Eating Obsessive Compulsive Questionnaire (EOC; Mount et al., 1990) was used to measure the level of obsessive-compulsive eating tendencies. The questionnaire consisted of 20 statements that assess ruminations about food, compulsive eating, eating rituals, anxiety, or guilt when confronted with food, resistance, and interference (Mount et al., 1990). Example items include "Thoughts of food unnecessarily distract me and interfere with my work and other activities," "food seems to 'call me' from the refrigerator, cabinets, deli's, etc, and I feel powerless to resist it," and "When I try to leave food on my plate or in the serving dish, it 'eats' at me until I eat it." Participants rated each statement on a 5-point Likert-type scale, from 0 (*never*) to 4 (*always*). A total score was calculated by summing all items ($\alpha = .92$).

Emotional and behavioral reactions to intrusions. Emotional and behavioral reactions to intrusive thoughts were measured with the Emotional and Behavioral Reactions to Intrusions Questionnaire (EBRIQ; Berry et al., 2010). For

the purpose of this study, the questionnaire referred to intrusive thoughts about food rather than intrusive thoughts in general. At the beginning of the questionnaire, intrusive thoughts were defined as spontaneously occurring thoughts that "pop" into your head without effort or origin and capture your attention. The questionnaire consisted of seven statements. For each statement, participants rated how often it applies to them when they experience an intrusive thought about food. Example items include "It makes me anxious" and "I act on the thought by seeking out my most-craved substance." Each statement was rated on a 5-point Likert-type scale, from 0 (*never*) to 4 (*every time*). The EBRIQ has a two-factor structure: the emotional subscale measures the emotional response to intrusions (e.g. distress, anxiety; $\alpha = .80$) and the behavioral subscale assesses behavioral reactions to intrusions (e.g. distraction, compulsion to consume; $\alpha = .89$). We calculated a mean score for both subscales separately, as well as a total mean score ($\alpha = .90$), with higher scores indicating stronger reactivity toward intrusions.

Eating behavior. To measure participants' eating behavior, we used a questionnaire developed by Kuijer and Boyce (2012). Participants recalled their eating behavior over the past 2 weeks with five items that asked on how many days participants (a) ate healthy amounts of food (not too much or too little), (b) ate in a balanced way with a lot of fruit and vegetables, (c) ate junk food (potato chips, desserts, candy, …), (d) overate, and (e) ate breakfast. All items were scored on a 5-point scale (1 = *less than once a week*, 5 = *every day*). The questionnaire contains two subscales: one for healthy eating (items a, b, and e) and one for unhealthy eating (items c and d). Items were scored separately for the healthy and unhealthy subscale in such a way that a higher score on the summed scale indicates, respectively, healthier or unhealthier eating behaviors.

Procedure

The study was performed online. All participants first provided informed consent to participate in this study. Next they filled out the modified YBC-EDS, the EOC, and the EBRIQ, in this order. Finally, participants filled out the eating behavior questionnaire and they reported their weight and height. As reward for their participation, participants were entered in a raffle to win a gift certificate.

Results

Table 1 presents the correlations between the YBC-EDS scores, EBRIQ scores, and the EOC score as well as BMI and eating behavior. The YBC-EDS scores, EBRIQ scores, and the EOC score were all highly correlated, indicating that they tap into similar underlying constructs. More importantly, BMI was significantly correlated with all scores related to obsessive-compulsive food-related behavior indicating that a higher BMI was associated with increased food-related preoccupation, compulsive eating behavior, and heightened emotional and behavioral reactance. In addition, a similar pattern of results was found for eating behavior, showing that unhealthy eating is also related to increased preoccupation with food, more food-related compulsive behavior, and stronger reactivity toward food-related intrusive thoughts. Specifically, unhealthy eating was significantly related to preoccupations with food (as well as the total YBC-EDS score), to EOC scores, and to behavioral reactance toward intrusions. Importantly, healthy eating did not correlate with any of the obsessive-compulsive dependent measures.

This pattern of results was also conformed using multivariate analysis of variance (MANOVA) with BMI entered as a categorical factor (normal-weight vs overweight) and the YBC-EDS preoccupation scale, the YBC-EDS rituals subscale, the EOC questionnaire, the EBRIQ emotional reactions subscale, and the EBRIQ behavioral reactions subscale as dependent variables, $F(5, 54) = 2.59$, $p = .04$, $\eta_p^2 = .19$. Follow-up univariate analyses of variance (ANOVAs) were performed for each dependent measure separately. To adjust for multiple testing, we applied Bonferroni correction ($\alpha = .05/5$). As shown in Table 2, results showed significantly

Table 1. Correlations between the YBC-EDS scores, EBRIQ scores, EOC score, BMI, and eating behavior.

	1	2	3	4	5	6	7	8	9
1. YBC-EDS preoccupation	–								
2. YBC-EDS ritual	.66**	–							
3. YBC-EDS total	.94**	.87**	–						
4. EOC	.77**	.65**	.79**	–					
5. EBRIQ emotion	.60**	.58**	.65**	.75**	–				
6. EBRIQ behavior	.71*	.61**	.73**	.76**	.81**	–			
7. EBRIQ total	.69**	.62**	.72**	.80**	.96**	.94**	–		
8. BMI	.31*	.38**	.37**	.33*	.34**	.39**	.38**	–	
9. Healthy eating behavior	–.11	–.08	–.11	–.17	–.17	–.24#	–.21	–.10	–
10. Unhealthy eating behavior	.29*	.23#	.29*	.36**	.21	.27*	.25#	.16	–.44**

YBC-EDS: Yale-Brown-Cornell Eating Disorder Scale; EOC: Eating Obsessive Compulsive Questionnaire; EBRIQ: Emotional and Behavioral Reactions to Intrusions Questionnaire; BMI: body mass index.
**$p < .01$, *$p < .05$, #$p < .10$.

Table 2. Characteristics of participants in the normal-weight and overweight groups.

	M (*SD*)		*F*-tests
	Normal-weight	Overweight	
YBC-EDS preoccupation	3.11 (1.89)	4.97 (2.91)	$F(1,58) = 8.18$, $p < .01$, $\eta_p^2 = .12$
YBC-EDS ritual	3.19 (1.44)	4.52 (1.87)	$F(1,58) = 9.16$, $p < .01$, $\eta_p^2 = .14$
EOC	11.78 (7.96)	20.03 (11.80)	$F(1,58) = 9.61$, $p < .01$, $\eta_p^2 = .14$
EBRIQ emotion	0.32 (0.41)	0.73 (0.60)	$F(1,58) = 9.23$, $p < .01$, $\eta_p^2 = .14$
EBRIQ behavior	0.26 (0.41)	0.80 (0.74)	$F(1,58) = 11.56$, $p < .01$, $\eta_p^2 = .17$

YBC-EDS: Yale-Brown-Cornell Eating Disorder Scale; EOC: Eating Obsessive Compulsive Questionnaire; EBRIQ: Emotional and Behavioral Reactions to Intrusions Questionnaire; BMI: body mass index.
Means (*M*) and standard deviations (*SD*) are shown together with significance tests for the difference between the two groups.

higher scores for overweight participants on all dependent measures relative to normal-weight participants. Hence, these findings demonstrate that overweight participants not only experience more severe food-related preoccupations but also report more food-related compulsive behavior and stronger emotional and behavioral reactivity toward food-related intrusions compared to participants with a healthy weight.

Discussion

This study examined whether obese individuals can be distinguished from people with a normal weight based on their obsessions and compulsivity with respect to food. As expected, overweight participants scored higher on measures of both obsessive food-related thoughts and compulsive behavior related to food compared to participants with a healthy weight. Specifically, participants who were overweight reported to experience more frequent preoccupations (i.e. obsessions) and compulsive behavior with respect to food, which were seen as more distracting, more anxiety-provoking and less controllable compared to participants with a normal body weight. Moreover, a similar pattern of results was obtained for eating behavior, with increased obsessive-compulsiveness toward food being related to more unhealthy eating patterns (i.e. eating junk food and overeating).

These results support the idea of a continuum from normal food desires to abnormal food-related intrusive thoughts that is related to BMI in such a way that overweight and obesity are characterized by more frequent intrusions about food. Moreover, the escalation from normal to pathological intrusive thoughts appears to rely on the emotional and behavioral effects that are elicited by these food-related intrusive thoughts, rather than on their presence alone. Indeed, overweight individuals reported more distress, anxiety, and behavioral reactance/compulsivity in response to intrusive food-related thoughts. This idea is similar to cognitive models of obsessive-compulsive disorder (Clark and Rhyno, 2005) and also to the EI theory (Andrade et al., 2015; Kavanagh et al., 2005; May et al., 2012) postulating that food craving results from elaboration on intrusive thoughts. Importantly, the EI theory also entails the possibility that people can differ with respect to both processes that are deemed necessary for a craving episode, namely, intrusive thoughts and elaboration. Specifically, some individuals may be more prone to experiencing intrusive thoughts due to stronger associative links with the desired object in memory. In addition, once a food-related intrusive thought emerges, some but not all can become caught in cycles of elaboration, increased craving, and increased frustration when the desired object cannot or should not be acquired (e.g. when trying to diet). During such attempts at control, guilt and anxiety about the intrusive thought or elaboration may ensue.

The present findings indeed show that for people with excessive body weight, preoccupation with food is more frequent and these thoughts also elicit stronger emotional (e.g. anxiety, guilt, distress, frustration) as well as behavioral responses (e.g. distraction, need to acquire the target). Importantly, such negative emotional reactions may subsequently trigger overconsumption (Marks, 2015), leading to a downward spiral of increased obsessions and compulsivity with food. It should be noted, however, that the sample size in this study was relatively small. Even though effect sizes were mostly medium to large, it would be good to replicate these findings in future research using a more extensive sample of participants. Furthermore, due to the use of an online survey, it is possible that height and weight were under- or overestimated and future research should use more objective measures of body weight when replicating these findings. Finally, eating disorder pathology was not measured or controlled for, so it is unclear to what extent eating disorder pathology may have contributed to the present findings.

The implication of the present findings is that this increased obsession and compulsiveness with food in people with overweight is something that should be considered during treatment. Current cognitive behavioral treatment (CBT) models stress that compulsive actions to reduce feelings associated with obsessions are critical in maintaining obsessions. CBT therefore aims to reduce these feelings by handling the obsessions differently. A way to change obsessive preoccupations with food is to restructure the cognitions by challenging the thoughts in a Socratic way. Cognitive challenges are supposed to change the way an obsession is perceived, which would prevent the occurrence of compulsive behavior. There are some indications that cognitive restructuring is helpful in preventing relapse after weight loss in obese people (Stahre et al., 2007; Werrij et al., 2009). Another way of intervening is exposure with response prevention, during which one is exposed to the disturbing thoughts and feelings while preventing the compulsion to occur. It is learned that the compulsive act is not necessary to reduce thoughts and feelings. Although there are some studies suggesting that cue exposure with response prevention is effective in the reduction of food cravings (Carter and Jansen, 2012; Jansen et al., 2011; Schyns et al., 2016), the focus in these studies was on cue-elicited craving and not on intrusions and obsessions. It would be of interest to study whether exposure to food intrusions and obsessions while preventing the compulsive action is helpful in changing the obese eating habits and body weight. Future studies into

the obsessive-compulsive model of obese eating and related interventions might be helpful for a better understanding and treatment of obesity.

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References

Andrade J, May J, van Dillen L, et al. (2015) Elaborated intrusion theory: Explaining the cognitive and motivational basis of desire. In: Hofmann W and Nordgren L (eds) *The Psychology of Desire*. New York: Guilford Press, pp. 17–35.

Bellace DL, Tesser R, Berthod S, et al. (2012) The Yale-Brown-Cornell Eating Disorders Scale self-report questionnaire: A new, efficient tool for clinicians and researchers. *International Journal of Eating Disorders* 45: 856–860.

Berry LM, May J, Andrade J, et al. (2010) Emotional and behavioral reaction to intrusive thoughts. *Assessment* 17: 126–137.

Blackburn JF, Thomson A and May J (2012) Feeling good about being hungry: Food-related thoughts in eating disorder. *Journal of Experimental Psychopathology* 3: 243–257.

Brewin CR (2001) A cognitive neuroscience account of posttraumatic stress disorder and its treatment. *Behaviour Research and Therapy* 39: 373–393.

Brewin CR, Christodoulides J and Hutchinson G (1996) Intrusive thoughts and intrusive memories in a nonclinical sample. *Cognition & Emotion* 10: 107–112.

Calkins AW, Berman NC and Wilhelm S (2013) Recent advances in research on cognition and emotion in OCD: A review. *Current Psychiatry Reports* 15: 1–7.

Carter FC and Jansen A (2012) Improving psychological treatment for obesity. Which eating behaviours should we target? *Appetite* 58: 1063–1069.

Chao A, Grilo CM, White MA, et al. (2014) Food cravings, food intake, and weight status in a community-based sample. *Eating Behaviors* 15: 478–482.

Clark DA and Rhyno S (2005) Unwanted intrusive thoughts in nonclinical individuals. In: Clark DA (ed.) *Intrusive Thoughts in Clinical Disorders: Theory, Research, and Treatment*. New York: Guilford Press, pp. 1–29.

Fedoroff I, Polivy J and Herman PC (2003) The specificity of restrained versus unrestrained eaters' responses to food cues: General desire to eat, or craving for the cued food? *Appetite* 41: 7–13.

Finucane MM, Stevens GA, Cowan MJ, et al. (2011) National, regional, and global trends in body-mass index since 1980: Systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9 1 million participants. *The Lancet* 377: 557–567.

Franken IH and Muris P (2005) Individual differences in reward sensitivity are related to food craving and relative body weight in healthy women. *Appetite* 45: 198–201.

Gendall KA, Joyce PR, Sullivan PF, et al. (1998) Food cravers: Characteristics of those who binge. *International Journal of Eating Disorders* 23: 353–360.

Greeno CG, Wing RR and Shiffman S (2000) Binge antecedents in obese women with and without binge eating disorder. *Journal of Consulting and Clinical Psychology* 68: 95–102.

Jansen A, Havermans R and Nederkoorn C (2011) Cued overeating. In: Preedy VR, Watson RR and Martin CR (eds) *The International Handbook of Behavior, Diet and Nutrition*. New York: Springer, pp. 1431–1443.

Jeffery RW, Epstein LH, Wilson GT, et al. (2000) Long-term maintenance of weight loss: Current status. *Health Psychology* 19: 5–16.

Kavanagh DJ, Andrade J and May J (2005) Imaginary relish and exquisite torture: The elaborated intrusion theory of desire. *Psychological Review* 112: 446–467.

Kuijer RG and Boyce JA (2012) Emotional eating and its effect on eating behaviour after a natural disaster. *Appetite* 58: 936–939.

Lafay L, Thomas F, Mennen L, et al. (2001) Gender differences in the relation between food cravings and mood in an adult community: Results from the fleurbaix laventie ville sante study. *International Journal of Eating Disorders* 29: 195–204.

Langlois F, Freeston MH and Ladouceur R (2000a) Differences and similarities between obsessive

intrusive thoughts and worry in a non-clinical population: Study 1. *Behaviour Research and Therapy* 38: 157–173.

Langlois F, Freeston MH and Ladouceur R (2000b) Differences and similarities between obsessive intrusive thoughts and worry in a non-clinical population: Study 2. *Behaviour Research and Therapy* 38: 175–189.

Marks DF (2015) Homeostatic theory of obesity. *Health Psychology Open* 2: 1–30.

May J, Andrade J, Kavanagh DJ, et al. (2012) Elaborated intrusion theory: A cognitive-emotional theory of food craving. *Current Obesity Reports* 1: 114–121.

Mazure CM, Halmi KA, Sunday SR, et al. (1994) The Yale-Brown-Cornell Eating Disorder Scale: Development, use, reliability and validity. *Journal of Psychiatric Research* 28: 425–445.

Meule A, Lutz A, Vögele C, et al. (2012) Food cravings discriminate differentially between successful and unsuccessful dieters and non-dieters. Validation of the Food Cravings Questionnaires in German. *Appetite* 58: 88–97.

Michael T, Ehlers A, Halligan SL, et al. (2005) Unwanted memories of assault: What intrusion characteristics are associated with PTSD? *Behaviour Research and Therapy* 43: 613–628.

Mount R, Neziroglu F and Taylor CJ (1990) An obsessive compulsive view of obesity and its treatment. *Journal of Clinical Psychology* 46: 68–77.

Pelchat ML (1991) Food cravings in young and elderly adults. *Appetite* 28: 103–113.

Perpina C, Roncero M, Belloch A, et al. (2011) Eating-related intrusive thoughts inventory: Exploring the dimensionality of eating disorder symptoms. *Psychological Reports* 109: 108–126.

Potenza MN and Grilo CM (2014) How relevant is food craving to obesity and its treatment? *Frontiers in Psychiatry* 5: 164.

Purdon C, Rowa K and Antony MM (2005) Thought suppression and its effects on thought frequency, appraisal and mood state in individuals with obsessive-compulsive disorder. *Behaviour Research and Therapy* 43: 93–108.

Rawal A, Park RJ and Williams JMG (2010) Rumination, experiential avoidance, and dysfunctional thinking in eating disorders. *Behaviour Research and Therapy* 48: 851–859.

Ruscio AM, Seitchik AE, Gentes EL, et al. (2011) Perseverative thought: A robust predictor of response to emotional challenge in generalized anxiety disorder and major depressive disorder. *Behaviour Research and Therapy* 49: 867–874.

Schlundt DG, Virts KL, Sbrocco T, et al. (1993) A sequential behavioral analysis of craving sweets in obese women. *Addictive Behaviors* 18: 67–80.

Schyns G, Roefs A, Mulkens S, et al. (2016) Expectancy violation, reduction of food cue reactivity and less eating in the absence of hunger after one food cue exposure session for overweight and obese women. *Behaviour Research and Therapy* 76: 57–64.

Stahre L, Tärnell B, Håkanson CE, et al. (2007) A randomized controlled trial of two weight-reducing short-term group treatment programs for obesity with an 18-month follow-up. *International Journal of Behavioral Medicine* 14: 48–55.

Wang Y and Beydoun MA (2007) The obesity epidemic in the United States—Gender, age, socioeconomic, racial/ethnic, and geographic characteristics: A systematic review and meta-regression analysis. *Epidemiologic Reviews* 29: 6–28.

Weingarten HP and Elston D (1990) The phenomenology of food cravings. *Appetite* 15: 231–246.

Weingarten HP and Elston D (1991) Food cravings in a college population. *Appetite* 17: 167–175.

Wenzlaff R (2005) Seeking solace but finding despair: The persistence of intrusive thoughts in depression. In: Clark DA (ed.) *Intrusive Thoughts in Clinical Disorders: Theory, Research, and Treatment*. New York: Guilford Press, pp. 54–85.

Werrij MQ, Jansen A, Mulkens S, et al. (2009) Adding cognitive therapy to dietetic treatment is associated with less relapse in obesity. *Journal of Psychosomatic Research* 67: 315–324.

White MA, Whisenhunt BL, Williamson DA, et al. (2002) Development and validation of the food-craving inventory. *Obesity Research* 10: 107–114.

World Health Organization (WHO) (2009) *Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks*. Geneva: WHO.