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Editorial Board
Appetite

Dear editorial board,

Please find attached our original, unpublished manuscript entitled: “Moving beyond the ‘eating addiction’ versus ‘food addiction’ debate: Comment on Schulte et al. (2017),” which we are submitting for exclusive consideration of publication as a brief commentary in *Appetite*. Our submission is 2,059 words long (3,035 words including references).

The concept of addictive-like eating has been hotly debated in recent years. An important aspect of the debate centres on whether this eating pattern is best conceptualized as a substance use disorder (“food addiction”) or behavioural addiction (“eating addiction”). Schulte et al.’s 2017 commentary, “A commentary on the “eating addiction” versus “food addiction” perspectives on addictive-like food consumption,” which was published in *Appetite*, argued for the former conceptualization. By contrast, we argue that the similarities drawn between substance use disorders and addictive-like eating also apply to other mental disorders, including eating disorders, and are not sufficient to support a substance-based food addiction framework.

The present commentary emphasizes the importance of investigating the validity and incremental clinical utility of addictive-like eating, and draws attention to other potentially valid ways of conceptualizing this construct. In light of potential implications of how addictive-like eating is conceptualized, such as for treatment, it is important not to lose sight of the considerations which our commentary highlights. Importantly, we discuss future directions for research that could help to clarify the addictive-like eating construct and ensure a valid and clinically useful conceptualization.

Thank you for your consideration of this commentary. We appreciate your time and look forward to your response.

Kind regards,

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Abstract

In a recent commentary, Schulte et al. (2017) argued that addictive-like eating should be conceptualized as a substance use disorder rather than a behavioural addiction, and noted that many parallels that Hebebrand et al. (2014) drew between addictive-like eating and behavioural addictions apply likewise to substance use disorders. However, we argue that many of the arguments advanced by Schulte et al. (2017) in support of a substance-based food addiction model, including the important role played by ingested substances, are nonspecific. That is, these arguments apply equally well to behavioural addictions and other mental disorders, notably eating disorders, which raises the question of whether the phenomenon of addictive-like eating is encompassed by existing eating disorder diagnoses. Similarities between addictive-like eating and substance use, no matter how compelling, do not ensure the validity or clinical utility of a substance-based food addiction model and should not drive the conceptualization of addictive-like eating. Framing the question of how best to conceptualize addictive-like eating as “eating addiction versus food addiction” presumes there is clinical utility in the resulting construct, and may overlook other potentially valid ways to conceptualize addictive-like eating, for example as a subtype of binge eating disorder or a spectrum of uncontrolled eating.

Keywords: addictive disorders, behavioral addictions, binge eating disorder, eating behavior, food addiction, substance use disorders

Moving beyond the “eating addiction” versus “food addiction” debate:

Comment on Schulte et al. (2017)

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Moving beyond the “eating addiction” versus “food addiction” debate:

Comment on Schulte et al. (2017)

A recent commentary (Schulte, Potenza, & Gearhardt, 2017) argued that a substance-based food addiction model is more appropriate to conceptualize addictive-like eating than the behavioural addiction model proposed by Hebebrand et al. (2014). The commentary raised important points, including that not all foods are equally associated with addictive-like eating, and that the assessment of both substance use disorders and behavioural addictions relies upon behavioural indicators. However, we disagree that studies would need to demonstrate *equal* addictive potential among all foods to justify the application of a behavioural addiction model.

The Role of Ingested Substances

In support of the substance-based food addiction model, Schulte et al. (2017) cite evidence for the key role played by ingestion of food in the development of addictive-like eating. Similarly, they note that a defining feature of substance use disorders is the ingestion or absorption of a specific rewarding substance, whereas behavioural addictions typically lack an ingested substance. The Yale Food Addiction Scale 2.0 (YFAS 2.0; Schulte & Gearhardt, 2017), a self-report questionnaire assessing food addiction, instructs the respondent to consider any foods or beverages similar to “sweets like ice cream, chocolate, doughnuts, cookies, cake, candy; starches like white bread, rolls, pasta, and rice; salty snacks like chips, pretzels, and crackers; fatty foods like steak, bacon, hamburgers, cheeseburgers, pizza, and French fries; sugary drinks like soda pop, lemonade, sports drinks, and energy drinks...or ANY OTHER foods you have had difficulty with in the past year (emphasis in the original).” Because the ingested substance could be any food (or beverage), the YFAS operationalization of ingested substances is much broader than the specific drugs of abuse defined in DSM substance use disorders criteria (American

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Psychiatric Association, 2013). Although specific addictive agents, such as chemicals used in food processing, have not been identified thus far, Schulte et al. (2017) discussed preliminary evidence suggestive of differential addictive potential among different types of food. For example, high-fat, high-sugar foods may trigger addictive-like food consumption in rats (Avena, Rada, & Hoebel, 2008). Similarly, refined foods high in fat, carbohydrates, and sugar, more than other types of food, have been associated with addictive-like eating behaviour in humans (e.g., Schulte, Avena, & Gearhardt, 2015). The authors interpret preliminary evidence of differential addictive potential as supporting a substance-based, rather than behavioural, food addiction model. As an important next step to refine the food addiction construct, Schulte and colleagues (2017) proposed a program of research to identify specific food characteristics with elevated addictive potential.

More research on addictive potential of foods is needed, however, we argue that the identification of specific addictive properties of food would not validate a substance-based model of addictive-like eating, nor rule out a behavioural one. The authors contend that “to consider eating a true behavioural addiction like gambling, the nature of the ingested food should have no impact on the development of the addictive process” (p. 4). This position is problematic because it overlooks a key distinction: whether variable addictive potential is attributable to specific chemical substances or physical characteristics of food; to higher-order cognitive aspects of eating (i.e., the learned significance ascribed to specific foods, for example through emotional associations with important life events or people); to behavioural aspects of eating (i.e., patterns associated with certain food types and environments, for example the tendency to eat large quantities of popcorn at the cinema); or to a combination of these factors. For example, in the only recognized behavioural addiction, gambling disorder (American Psychiatric Association,

2013), the nature of the game impacts the development of the addictive process. Involvement with activities such as lotteries, raffles, and horse race betting rarely becomes pathological, whereas slots and video lottery terminals (VLTs) are strongly associated with gambling disorder (Holtgraves, 2009; MacLaren, 2016). Similar to how addictive-like eating behaviour may be influenced by food characteristics such as processing, fat content, and glycemic load (Schulte et al., 2015), the risk of abuse of VLTs can also be impacted by sensory manipulations such as speed, sound, and the presence of a counter displaying a running total of money won/lost (Dixon et al., 2014; Loba, Stewart, Klein, & Blackburn, 2001). However, the differential addictive potential of various games and game characteristics arises indirectly from complex cognitive processes, rather than directly from biochemical effects of ingested substances on the brain's reward processing system, as in substance use disorders. Although substance ingestion defines a substance use disorder, the ingestion of food--a specific type of substance--is a defining feature of another diagnostic category: eating disorders. Furthermore, all human beings eat (with exceedingly rare exceptions), whereas not all humans elect to ingest drugs. When substance use disorder criteria are directly applied to a substance that humans must consume regularly for survival (i.e., food), there is no sharp line distinguishing addictive-like eating from non-addictive eating. Thus, to consider food addiction a true substance use disorder, it would be necessary to demonstrate that the elevated addictive potential of specific food substances is due substantially to their biochemical properties, in addition to cognitive or behavioural processes.

Importance of Behaviour Across Mental Disorders

In support of the behavioural addictions model of eating addiction, Hebebrand et al. (2014) cited the reliance on behavioural features in the diagnosis of addictive-like eating. In their commentary, Schulte et al. (2017) aptly countered that behavioural features play an important

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171 role in the development, assessment, maintenance, and treatment of *all* addictive disorders.

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173 Behaviour consistently plays a key role *in all mental disorders*, not just addictive disorders.

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175 Thus, evidence demonstrating an important role of behaviour, or conversely, of food, in the
176 development of the addictive process, would be consistent with both the substance-based food
177 addiction model, and with the behavioural eating addiction model, and would be insufficient to
178 validate either model.
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183 **Gaps in Evidence for Addictive-Like Eating**

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185 Arguments supporting food addiction have focused heavily on neurobiological
186 similarities between eating and drug taking (Avena et al., 2008; Tang, Fellows, Small, & Dagher,
187 2012). For example, Schulte et al. (2017) stated binge eating of high-sugar, high-fat foods
188 impacts the reward system similarly to other addictive disorders, for example leading to
189 downregulation of dopamine receptors. However, these similarities are not as robust as has often
190 been implied, given qualitative and quantitative differences in the neurobiological effects of food
191 versus drugs of abuse. Drugs of abuse have substantially more potent neurobiological effects
192 than foods (Chen et al., 2008; Lu, Grimm, Hope, & Shaham, 2004; Rogers, 2017). Although
193 sugar acts on the dopamine system, there is limited evidence to suggest changes in
194 neuroplasticity due to sugar ingestion that are comparable to those induced by drugs of abuse
195 (De Jong, Vanderschuren, & Adan, 2016). Furthermore, a meta-analytic synthesis of
196 genealogical studies among people with obesity failed to show differences in polymorphisms that
197 regulate the density of dopamine receptors (Benton & Young, 2016), a potential risk factor for
198 addiction that has been observed among people with substance use disorders (Deng et al., 2015;
199 Munafo, Matheson, & Flint, 2007; Ohmoto et al., 2013). Given the limitations concerning
200 evidence for similarities between substance use disorders and addictive-like eating, the statement
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227 that “current data support a food addiction model that highlights an important role for specific
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229 foods” (Schulte et al., 2017, p. 11) may be an overstatement. Furthermore, similarities between
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231 addictive-like eating and substance use, no matter how compelling, are insufficient to decide the
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233 question of how best to conceptualize addictive-like eating. So, what should decide this
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237 question?

238 **Beyond the “Eating Addiction” Versus “Food Addiction” Debate**

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240 To move toward a valid conceptualization of addictive-like eating, we must generate
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242 predictions - ideally falsifiable - to test the theories of eating addiction and food addiction
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244 models. Specifically, research is needed to determine whether differential addictive potential
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246 among various foods in humans is due to their chemical properties, to cognitive and behavioural
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248 processes, or to both. This question could be approached from several directions. For example, as
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250 a first step, qualitative research could explore individuals’ experiences with addictive-like eating,
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252 to examine the extent to which people attribute their addictive-like eating to specific foods or
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254 food characteristics, or whether their descriptions focus more heavily on cognitive, emotional,
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256 and behavioural processes surrounding their eating patterns. Experimental research, for example
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258 using ecological momentary assessment or laboratory-based paradigms, could examine whether
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260 addictive-like eating can occur in response to foods lacking proposed “addictive properties” such
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262 as processing, high fat content, or high glycemic load. Cross-cultural research could examine the
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264 degree of similarity in addictive-like eating processes across cultures. A high degree of
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266 consistency in specific addictive properties of food across cultures would suggest that at least
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268 some variability in addictive potential is attributable to chemical characteristics of food, rather
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270 than solely to higher-order cognitive and behavioural associations, consistent with the substance-
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272 based food addiction model.
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Narrowly framing the question of how best to conceptualize addictive-like eating by contrasting substance-based versus behavioural addiction models may overlook other potentially valid ways to conceptualize addictive-like eating. For example, Davis (2013) proposed that food addiction could be conceptualized as a severe form of binge eating disorder (BED). The overlap between binge eating and food addiction is supported by evidence of their high rates of co-occurrence (estimates ranging from 41.5% to 92.4%; Imperatori et al., 2016), similar symptoms (Davis et al., 2011; Gearhardt et al., 2012), and biological bases (Smith & Robbins, 2013). Preliminary research has demonstrated greater impairment, symptom severity, impulsivity, depressive symptoms, and attention-deficit/hyperactivity disorder symptoms among individuals who meet food addiction criteria, versus those who only meet criteria for BED (Davis et al., 2011), which is also consistent with the conceptualization of food addiction as a more severe form of BED. Though many individuals with food addiction also meet criteria for BED, there is a need for research examining individuals with food addiction who do not meet criteria for a recognized eating disorder. Vainik et al. (2015) extended Davis et al.'s conceptualization to propose a transdiagnostic construct of "uncontrolled eating," whereby a continuum of severity would extend from occasional nonpathological overeating to food addiction. Such a transdiagnostic spectrum model would be compatible with the substantial overlap of food addiction with not only BED, but also other eating disorders: 35% to 60% of individuals with anorexia nervosa (Granero et al., 2014; Speranza et al., 2012) and 81% to 100% of individuals with bulimia nervosa (Granero et al., 2014; Meule, Rezori, & Blechert, 2014) have met food addiction criteria, based on self-report data. More research is needed to determine whether individuals with anorexia nervosa and bulimia nervosa who perceive themselves as addicted to food also objectively experience addictive-like eating.

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It is essential that conceptualizations of addictive-like eating are not only valid but also clinically useful. The possibility should be considered that the construct of addictive-like eating does not yield incremental utility in explaining problematic patterns of overeating beyond existing eating disorder diagnoses. After all, for decades the substance abuse field resisted using the term “addiction” due to difficulties in attaining consensus on a definition and questions about the utility of doing so (Kelly, Saitz, & Wakeman, 2016; Reinarman & Granfield, 2015). DSM-5 has taken the step of creating a diagnostic category of substance-related and addictive disorders that encompasses gambling disorder (American Psychiatric Association, 2013). However, caution is warranted to avoid pathologizing normative overeating through a downward extension of the concept of addiction (Finlayson, 2017; Haslam, 2016). To determine whether conceptualizing overeating as an addiction provides incremental clinical utility, it is important to determine whether this construct identifies individuals who do not meet criteria for an eating disorder yet experience significant distress and functional impairment due to overeating.

367 **Conclusions**

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The main arguments advanced by Schulte et al. (2017) in support of a substance-based food addiction model—i.e., the important roles played by behaviour and ingested substances—are nonspecific. That is, these arguments apply equally well to behavioural addictions and other mental disorders, including eating disorders. The existing evidence of differential addictive potential of foods is preliminary and insufficient to validate the food addiction model. To support such a model, research would not only need to identify specific addictive agents, but also demonstrate that their differential addictive potential is at least partly attributable to chemical, rather than cognitive or behavioural, processes. Furthermore, it is not clear so far what clinical utility may come from conceptualizing addictive-like eating as an addiction. To attain a valid and

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395 useful conceptualization of addictive-like eating, research must move beyond the “food
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397 addiction” versus “eating addiction” debate and actively investigate alternative
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References

- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Avena, N. M., Rada, P., & Hoebel, B. G. (2008). Evidence for sugar addiction: Behavioral and neurochemical effects of intermittent, excessive sugar intake. *Neuroscience and Biobehavioral Reviews*, *32*, 20-39. doi: 10.1016/j.neubiorev.2007.04.019
- Benton, D., & Young, H. (2016). A meta-analysis of the relationship between brain dopamine receptors and obesity: a matter of changes in behavior rather than food addiction? *International Journal of Obesity (2005)*, *40*(Suppl 1), S12. doi:10.1038/ijo.2016.9
- Chen, B. T., Bowers, M. S., Martin, M., Hopf, F. W., Guillory, A. M., Carelli, R. M., . . . Bonci, A. (2008). Cocaine but not natural reward self-administration nor passive cocaine infusion produces persistent LTP in the VTA. *Neuron*, *59*(2), 288-297. doi: 10.1016/j.neuron.2008.05.024
- Davis, C. (2013). Compulsive overeating as an addictive behavior: Overlap between food addiction and binge eating disorder. *Current Obesity Reports*, *2*, 171-178. doi: 10.1007/s13679-013-0049-8
- Davis, C., Curtis, C., Levitan, R. D., Carter, J. C., Kaplan, A. S., & Kennedy, J. L. (2011). Evidence that 'food addiction' is a valid phenotype of obesity. *Appetite*, *57*, 711-717. doi: 10.1016/j.appet.2011.08.017
- De Jong, J. W., Vanderschuren, L. J., & Adan, R. A. (2016). The mesolimbic system and eating addiction: What sugar does and does not do. *Current Opinion in Behavioral Sciences*, *9*, 118-125. doi: 10.1016/j.cobeha.2016.03.004

- 505
506
507 Deng, X.-D., Jiang, H., Ma, Y., Gao, Q., Zhang, B., Mu, B., . . . Xie, Y. (2015). Association
508
509 between DRD2/ANKK1 TaqIA polymorphism and common illicit drug dependence:
510
511 evidence from a meta-analysis. *Human Immunology*, *76*(1), 42-51.
512
513
514 Dixon, M. J., Harrigan, K. A., Santesso, D. L., Graydon, C., Fugelsang, J. A., & Collins, K.
515
516 (2014). The impact of sound in modern multiline video slot machine play. *Journal of*
517
518 *Gambling Studies*, *30*(4), 913-929. doi:10.1007/s10899-013-9391-8
519
520 Finlayson, G. (2017). Food addiction and obesity: unnecessary medicalization of hedonic
521
522 overeating. *Nature Reviews: Endocrinology*, advance online publication.
523
524 10.1038/nrendo.2017.61
525
526 Gearhardt, A. N., White, M. A., Masheb, R. M., Morgan, P. T., Crosby, R. D., & Grilo, C. M.
527
528 (2012). An examination of the food addiction construct in obese patients with binge
529
530 eating disorder. *International Journal of Eating Disorders*, *45*(5), 657-663. doi:
531
532 10.1002/eat.20957 22684991
533
534
535 Granero, R., Hilker, I., Aguera, Z., Jimenez-Murcia, S., Sauchelli, S., Islam, M. A., . . .
536
537 Fernandez-Aranda, F. (2014). Food addiction in a Spanish sample of eating disorders:
538
539 DSM-5 diagnostic subtype differentiation and validation data. *European Eating*
540
541 *Disorders Review*, *22*(6), 389-396. doi: 10.1002/erv.2311 25139680
542
543 Haslam, N. (2016). Concept creep: Psychology's expanding concepts of harm and pathology.
544
545 *Psychological Inquiry*, *27*(1), 1-17. doi: 10.1080/1047840X.2016.1082418
546
547
548 Hebebrand, J., Albayrak, O., Adan, R., Antel, J., Dieguez, C., de Jong, J., . . . Dickson, S. L.
549
550 (2014). "Eating addiction", rather than "food addiction", better captures addictive-like
551
552 eating behavior. *Neuroscience and Biobehavioral Reviews*, 295-306. doi:
553
554 10.1016/j.neubiorev.2014.08.016 25205078
555
556
557
558
559
560

Holtgraves, T. (2009). Gambling, gambling activities, and problem gambling. *Psychology of Addictive Behaviors*, 23(2), 295. doi: 10.1037/a0014181

Imperatorì, C., Fabbriatore, M., Vumbaca, V., Innamorati, M., Contardi, A., & Farina, B. (2016). Food Addiction: definition, measurement and prevalence in healthy subjects and in patients with eating disorders. *Rivista di Psichiatria*, 51(2), 60-65.

Kelly, J. F., Saitz, R., & Wakeman, S. (2016). Language, substance use disorders, and policy: The need to reach consensus on an “addiction-ary”. *Alcoholism Treatment Quarterly*, 34(1), 116-123.

Loba, P., Stewart, S. H., Klein, R. M., & Blackburn, J. R. (2001). Manipulations of the features of standard video lottery terminal (VLT) games: Effects in pathological and non-pathological gamblers. *Journal of Gambling Studies*, 17(4), 297-320.

Lu, L., Grimm, J. W., Hope, B. T., & Shaham, Y. (2004). Incubation of cocaine craving after withdrawal: A review of preclinical data. *Neuropharmacology*, 47, 214-226. doi: 10.1016/j.neuropharm.2004.06.027

MacLaren, V. V. (2016). Video lottery is the most harmful form of gambling in Canada. *Journal of Gambling Studies*, 32(2), 459-485. doi: 10.1007/s10899-015-9560-z

Meule, A., Rezori, V., & Blechert, J. (2014). Food addiction and bulimia nervosa. *European Eating Disorders Review*, 22(5), 331-337. doi: 10.1002/erv.2306

Munafò, M., Matheson, I., & Flint, J. (2007). Association of the DRD2 gene Taq1A polymorphism and alcoholism: A meta-analysis of case-control studies and evidence of publication bias. *Molecular Psychiatry*, 12(5), 454-461.

Ohmoto, M., Sakaishi, K., Hama, A., Morita, A., Nomura, M., & Mitsumoto, Y. (2013). Association between dopamine receptor 2 Taq1A polymorphisms and smoking behavior

- 617
618
619 with an influence of ethnicity: A systematic review and meta-analysis update. *Nicotine &*
620 *Tobacco Research*, 15(3), 633-642. 10.1093/ntr/nts196
621
622
623 Reinarman, C., & Granfield, R. (2015). Addiction is not just a brain disease. In R. Granfield &
624 C. Reinarman (Eds.), *Expanding addiction: critical essays* (pp. 4-5).
625
626
627 Rogers, P. J. (2017). Food and drug addictions: Similarities and differences. *Pharmacology*
628 *Biochemistry and Behavior*, 153, 182-190. doi: 10.1016/j.pbb.2017.01.001
629
630
631 Schulte, E. M., Avena, N. M., & Gearhardt, A. N. (2015). Which foods may be addictive? The
632 roles of processing, fat content, and glycemic load. *PloS One*, 10(2), e0117959.
633
634
635 Schulte, E. M., & Gearhardt, A. N. (2017). Development of the Modified Yale Food Addiction
636 Scale Version 2.0. *European Eating Disorders Review*, 25(4), 302-308. doi:
637
638 10.1002/erv.2515
639
640
641
642 Schulte, E. M., Potenza, M. N., & Gearhardt, A. N. (2017). A commentary on the “eating
643 addiction” versus “food addiction” perspectives on addictive-like food consumption.
644
645 *Appetite*, 115, 9-15. <https://doi.org/10.1016/j.appet.2016.10.033>
646
647
648
649 Smith, D. G., & Robbins, T. W. (2013). The neurobiological underpinnings of obesity and binge
650 eating: A rationale for adopting the food addiction model. *Biological Psychiatry*, 73, 804-
651 810. doi: 10.1016/j.biopsych.2012.08.026
652
653
654
655 Speranza, M., Revah-Levy, A., Giquel, L., Loas, G., Venisse, J. L., Jeammet, P., & Corcos, M.
656 (2012). An investigation of Goodman's addictive disorder criteria in eating disorders.
657 *European Eating Disorders Review*, 20(3), 182-189. doi: 10.1002/erv.1140
658
659
660
661
662 Tang, D. W., Fellows, L. K., Small, D. M., & Dagher, A. (2012). Food and drug cues activate
663 similar brain regions: A meta-analysis of functional MRI studies. *Physiology & Behavior*,
664 106, 317-324. doi: 10.1016/j.physbeh.2012.03.009
665
666
667
668
669
670
671
672

Vainik, U., Neseliler, S., Konstabel, K., Fellows, L. K., & Dagher, A. (2015). Eating traits questionnaires as a continuum of a single concept. *Uncontrolled eating. Appetite, 90*, 229-239. doi: 10.1016/j.appet.2015.03.004

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Moving beyond the “eating addiction” versus “food addiction” debate: Comment on Schulte et al. (2017)

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