Appetite 150 (2020) 104679

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

The influence of attractiveness and convenience cues on food appeal in adults with and without ADHD

Shirley Hershko[c,*], Samuele Cortese[a,b], Eyal Ert[c], Anna Aronis[c], Adina Maeir[c], Yehuda Pollak[c]

[a] Center for Innovation in Mental Health, Academic Unit of Psychology and Clinical and Experimental Sciences (CNS and Psychiatry), Faculty of Medicine, University of Southampton, Southampton, UK
[b] Solent NHS Trust, Southampton, UK
[c] The Hebrew University of Jerusalem, Israel

A B S T R A C T

Objective: Previous research on adults with ADHD revealed high rates of overweight and obesity, as well as unhealthy diet habits. Other studies demonstrated that social-affective contexts can influence food choice. This study examines the sensitivity of adults with ADHD to cues of food attractiveness and convenience, for healthy and unhealthy foods.
Method: One hundred and seventy-two university students with (n = 59) and without (n = 113) ADHD, aged 19–40, participated in the study. Participants rated the level of appeal of 32 pictures of healthy and unhealthy foods, which varied in the degree of attractiveness and convenience.
Results: The findings reveal a higher level of appeal of attractive food items compared to non-attractive ones ($p < .001$), as well as of convenient compared to non-convenient food items ($p = .005$). Type of diagnostic group did not have an effect on the level of appeal.
Conclusion: Increasing the attractiveness and convenience of food items increased the level of appeal for both students with and without ADHD. These findings emphasize the importance of environmental health intervention to potentially reduce abnormal eating pattern in the ADHD adult population, which may contribute in preventing the reported higher risk of obesity in this population.

1. Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a highly prevalent neurodevelopmental condition, characterized by a persistent pattern of inattentive, and/or hyperactive-impulsive behavior, leading to functional impairment (American Psychiatric Association, 2013; Faraone et al., 2015). The disorder affects approximately 5% of children and adolescents (Polanczyk, Willcutt, Salum, Kieling, & Rohde, 2014) and 2.5% of adults (Michielsen et al., 2012) worldwide.

Decades of research have consistently reported strong links between ADHD and adverse life outcomes (Faraone et al., 2015; Thapar & Cooper, 2016) (Asherson, Buitelaar, Faraone, & Rohde, 2016). Whereas ADHD-related impairments in academic, occupational and social domains have already been well established, only in recent years attention was devoted to health impairments, as sleep difficulties, physical injuries, hypertension, and obesity (Nigg, 2013; Spencer, Faraone, Tarko, McDermott, & Biederman, 2014), as well as unhealthy eating patterns.

Studies have found that Australian adolescents with ADHD consumed foods with less nutrient density and more total fat (Howard et al., 2011); Iranian children with ADHD adhered more often to the sweet- and fast-food diet (Azadbakht & Esmaillzadeh, 2012); and Korean children with higher odds of having ADHD endorsed the traditional Western pattern (Woo, Shin, & Kim, 2014). A large-sample study revealed significant associations between ADHD and both the number of overeating episodes and unhealthy food consumption in children (Kim et al., 2014). Another research (Ríos-Hernández, Alda, Farran-Codina, Ferreira-García, & Izquierdo-Pulido, 2017) revealed that children and adolescents with ADHD demonstrated reduced intake of vegetables and fruits and increased intake of sugar, candies, soft drinks, and fast food. A more recent work (Chou et al., 2018) revealed that children with ADHD consumed a lower proportion of calcium and vitamin B-2 compared with non ADHD controls. Hershko and colleagues have recently found that university students with ADHD reported eating a similar number of calories and food servings to controls, yet the composition of these calories included more unhealthy foods for ADHD ones (Hershko, Aronis, Maeir, & Pollak, 2018). These unhealthy eating patterns have the potential to increase the risk of obesity and other related diseases, urging the development of health interventions.

People are continuously exposed to food thereby making multiple food choices on a daily basis; choices that play an essential role in the regulation of food intake and consequently in weight management (Charbonnier, van der Laan, Viergever, & Smeets, 2015). Therefore, obtaining a deeper insight into the mechanisms underlying people's food choices is imperative. It has been found that visual cues can

* Corresponding author. The Hebrew Universithy of Jerusalem, Israel.
E-mail address: shirleyhershko@gmail.com (S. Hershko).

https://doi.org/10.1016/j.appet.2020.104679
Received 4 May 2019; Received in revised form 23 February 2020; Accepted 19 March 2020
Available online 22 March 2020
0195-6663/ © 2020 Elsevier Ltd. All rights reserved.

influence food choices (Wansink, Cheney, & Chan, 2003), eliciting a wide range of responses: physiological (such as a release of insulin and changes in heart rate (Drobes et al., 2001)), emotional (as the desire to eat (Ouwehand & Papies, 2010) or pleasure (Berthoud & Morrison, 2008)), and cognitive processes (memory retrieval and hedonic evaluation (Berthoud & Morrison, 2008)). Several functional MRI studies, which examined the brain responses to visual food cues found that they are primarily guided by the visual system (Linné, Barkeling, Rössner, & Rooth, 2002). For instance, they showed that viewing pictures of high calorie foods are more rewarding than low calorie ones (Charbonnier et al., 2015).

An effective intervention for altering food choices consists in making healthy choices not only more convenient (to be seen, picked up and consumed) but also more attractive (a nicely designed packaging, a catchy brand name, or a reasonable price) (Wansink, 2015). For instance, children ate 70% more apples when they were served in slices than when they were served as a whole (Wansink, Just, Hanks, & Smith, 2013), and placing apples near the cash register increased their sales by 35% (van Kleef, Otten, & van Trijp, 2012). It has also been shown that people responded, both consciously and unconsciously, to differences in these features while making food choices (Wilson, Buckley, Buckley, & Bogomolova, 2016); putting fruit in a nice bowl enticed children to take more of it, and adding a garnish to a sandwich made people rate the sandwich as tastier even though the garnish was not consumed (Hanks, Just, Smith, & Wansink, 2012). These examples demonstrate that the levels of attractiveness and convenience of food items have a significant impact on food choices and appeal.

To our knowledge, the effect of contextual cues, such as attractiveness and convenience, have not been examined in people with ADHD; therefore, the extent to which their food choices may be affected by contextual cues is still unclear. On the one hand, individuals with ADHD may be more sensitive to reward (Luman, Tripp, & Scheres, 2010; Tripp & Wickens, 2009). The mesocortical dopamine system, which has been implicated in ADHD, plays an important role in reward-related processes, and it contains circuits that function to motivate and reinforce food seeking and eating behaviors (Ikemoto & Panksepp, 1999). It has been proposed that the mesolimbic reward system increases responsiveness to visual food cues. Individuals with ADHD are also more reluctant to engage in a mental effort (Barkley, 2003), reflecting difficulties in effort allocation (Sergeant, 2005). On the other hand, they are inattentive, so they may pay less attention to the contextual details (American Psychiatric Association, 2013; Faraone et al., 2015). Taken together, these features may make them more or less prone to attractiveness and convenience cues. Therefore, the aim of the current study was to examine the extent to which adults with ADHD are inclined to convenience and attractiveness food cues.

2. Material and methods

2.1. Participants and protocol

The study was approved by the institutional review board of the Hebrew University. (0410I2016). The dataset is publicly available at https://osf.io/s9wx8. All participants filled out a consent form for participating in the study before completing the questionnaires. One hundred and seventy-two university undergraduate students (83 males and 89 females) were recruited through student's social media, aged 19–40, in the Faculty of Agriculture, Food and Environment, of the Hebrew University of Jerusalem. University students were chosen because their lifestyle includes making independent food choices (Marquis, 2005). Exclusion criteria were specific dietary patterns (e.g., vegetarian, vegan), as well as chronic diseases influencing food choice patterns, such as diabetes, or any other health condition reported by participants.

Non-ADHD control participants included 113 students with no history of ADHD diagnosis. In addition, they did not meet the screening criterion of the Adult ADHD Self-Report Scale. The experimental group of ADHD participants included 59 students who were recruited through the social media of the diagnostic center of the Hebrew University. Each of these participants was diagnosed before the study at the MATAL diagnostic center of the Hebrew University. MATAL (Learning function system) is a system of standard tests and questionnaires developed for the purpose of diagnosing learning disabilities - dyslexia, dyscalculia, and dysgraphia - and assessing the likelihood of ADHD in adults. MATAL was developed at the Israeli National Center for Testing and Evaluation with the assistance of learning disability experts and is based on up-to-date theoretical knowledge. MATAL includes a background interview and systematic information gathering, two questionnaires and 20 tests which examine cognitive functions in the following areas: language (reading and writing), mathematical abilities, attention, memory, perception and general processing speed. The diagnosis of ADHD is determined by the interview, the documentation, the questionnaires and the tests. The effectiveness of these diagnostic tools was analyzed in a large-scale study of students with various learning disabilities, and national performance norms were collected for all tools (Ben-Simon & Inbar-Weiss, 2012). In addition, a final diagnosis was confirmed either by a neurologist or by a psychiatrist.

Regarding the ADHD medication status, 36 out of 59 participants reported not using medication at all, 15 participants reported using medication occasionally, and eight reported using it daily; 13 participants reported using medication during the 24 h prior to the study.

2.2. Measures

Picture task: The stimuli used in this study were 32 pictures of healthy (apple, tomato, eggs, and water) and unhealthy (biscuits, cookies, snacks, and juice) food items. Each food item had four alternative pictures: (1) attractive and convenient; (2) attractive and inconvenient; (3) unattractive and convenient; (4) unattractive and inconvenient. The level of attractiveness was manipulated by (1) colorfulness of the background (trees compared to a wall), the color of the plate (orange compared to white) and the appearance of the table (with or without a red map); (2) brand (well-known vs. less-known product); (3) packaging (colorful compared to colorless). These manipulations pertaining to attractiveness were implemented simultaneously[1] in the same picture (the branded food item was presented with colorful packaging, in front of a colorful background, on a colorful plate next to a red map (Fig. 1). The level of convenience was manipulated by (1) distance (close compared to far away); (2) availability to choose and pick up (the food was on a plate or inside the package/box, the apple and the tomato were sliced or not, the drinks were in the glass or in the bottle). These convenience manipulations were also implemented simultaneously (Fig. 1). On-screen instructions informed participants that they would see a series of pictures depicting various food items, and that their task was to rate the appeal of each item, using a 5-point scale (1 *not appealing at all* to 5 *very appealing*). The order of the pictures' presentation was randomized and counter-balanced across participants. Prior to the experiment, we ran a manipulation check whereby 39 students assessed the attractiveness and convenience of the food items in each of the four conditions on a 5-point scale. The results confirmed that the manipulation was successful, as participants rated the items in the attractive condition as more attractive than in the unattractive condition (3.8 and 2.4 respectively) and rated the items in the convenient condition as more convenient than in the inconvenient

[1] The three attractiveness factors (and the two convenience factors) were implemented simultaneously since a separate implementation would imply a considerable increase of the number of items, and a potential weariness especially in the ADHD group. Moreover, the purpose of the study is testing whether attractiveness and/or convenience affect people with/out ADHD rather than exploring the factors that make items more attractive or convenient.

Fig. 1. Attractiveness and convenience cues for cookies in the picture task.

condition (3.7 vs. 2.4).

The following demographic variables were measured: age, sex, religion and family status (single/not single). To control for comorbid psychopathology, which is typically significantly more frequent among people with ADHD compared to those without ADHD (Faraone et al., 2015), the General Health Questionnaire (GHQ) was administered to all participants. Additionally, we asked about the use of medications for ADHD (i.e., "Are you taking medications for ADHD?" (yes/no); "How often do you take medications?" (daily/occasionally); "When was the last time you took medications?"), as the most common side effect of taking medications for ADHD is appetite suppression (Flaskerud, 2010). In addition, participants were asked how hungry they were at the time of the study) i.e., "How hungry are you right now?", 1 *not hungry at all* to 4 *very hungry*). We controlled for hunger since previous studies suggested that it might increase the rated pleasantness of foods (van der Laan, de Ridder, Viergever, & Smeets, 2011).

2.2.1. Standard diagnostic scales were used to assess participants' characteristics

The Hebrew version of the ASRS-V1.1 (Kessler et al., 2005) was filled out for a continuous scaling of ADHD symptoms. The scale contains 18 items corresponding to the DSM diagnostic criteria of ADHD, of which frequency is rated from 1 (never) to 5 (very often). The questionnaire has high internal consistency (Cα = 0.88) assessing ADHD in adults. Its sensitivity is 68.4% and specificity 99.6% (Adler et al., 2006).

The brief version of the General Health Questionnaire (GHQ-12) identifies 12 minor psychiatric symptoms in the general population. It assesses the respondent's current state and asks if it differs from his or her usual state. The self-administered questionnaire focuses on two major areas: the inability to carry out normal functions and the appearance of new and distressing phenomena (Piccinelli, Bisoffi, Bon, Cunico, & Tansella, 1993). Reliability analysis of the test and the convergent validity with global quality of life scores showed satisfactory results (Montazeri et al., 2003). The principal component analysis of the test with oblique rotation solution showed that the GHQ-12 is a measure of psychological morbidity with a two-factor structure that jointly accounts for 51% of the variance (Montazeri et al., 2003).

Body Mass Index (BMI) was calculated using self-reported weight and height.

2.3. Statistical analysis

We confirmed the normality of the distribution of the attractive-convenient, attractive-inconvenient, unattractive-convenient and unattractive-inconvenient scales using skewness and kurtosis parameters, for the control and the ADHD groups separately. SPSS V.22.0, and PROCESS model 6 were used for the analysis.

A mixed between-within design was employed. The variables that were treated as within-subjects were attractiveness and convenience, and the between-subject variable was the diagnostic group. We tested the main effects of diagnostic groups, attractiveness, and convenience, using ANOVA with repeated measures. We used general psychopathology and hunger level as covariates. Finally, we checked whether the results were affected by the inclusion of use of medication as a covariate.

3. Results

3.1. Demographic and clinical characteristics of the ADHD and the control groups

The comparison between the characteristics between the ADHD and the control groups showed no differences in age, sex, family status, BMI, obesity rate, and hunger. The analysis also confirmed that the means of the ASRS and the general psychopathology (GHQ) scores were both significantly higher among people with ADHD than among controls (Table 1).

3.2. Effects of attractiveness and convenience cues on the perceived appeal of food items (hypothesis testing)

Fig. 2 shows the level of food appeal by attractiveness, convenience, and diagnostic group. Table 2 reports an ANOVA test, which revealed the following results: attractive items elicited a higher level of appeal compared to non-attractive items. Convenient items elicited a higher level of appeal compared with non-convenient items. Hunger level had also a significant effect on the level of appeal. In contrast, neither the general psychopathology score nor the diagnostic group showed an effect on the level of food appeal. The interactions between ADHD and attractiveness, as well as between ADHD and convenience were also insignificant. Adding the use of medication as a covariate, did not

Table 1
Demographic and clinical characteristics by diagnostic group.

	Controls (n = 113)	ADHD (n = 59)	Group comparison
Age *M (SD)*	27.78 (3.92)	28.50 (4.36)	t (168) = 1.10 (p = .27)
Sex	46.9% males	50.8% males	χ^2 (1) = 0.24 (p = .62)
Family status	45.1% single	45.8% single	χ^2 (1) = 0.01 (p = .94)
BMI *M (SD)*	22.90 (3.39)	23.41 (3.44)	t (168) = 0.93 (p = .35)
	3.5% obese	5.1% obese	χ^2 (1) = 0.24 (p = .69)
Hunger *M (SD)*	1.86 (.68)	1.90 (.80)	t (170) = 0.34 (p = .73)
GHQ *M (SD)*	2.12 (.51)	2.36 (.51)	t (170) = 2.86 (p = .005)
ASRS *M (SD)*	2.34 (.36)	3.26 (.49)	t (170) = 13.94 (p < .001)

Note: BMI (Body Mass Index); ASRS (Adult ADHD Self-Report Scale); GHQ (General Health Questionnaire).

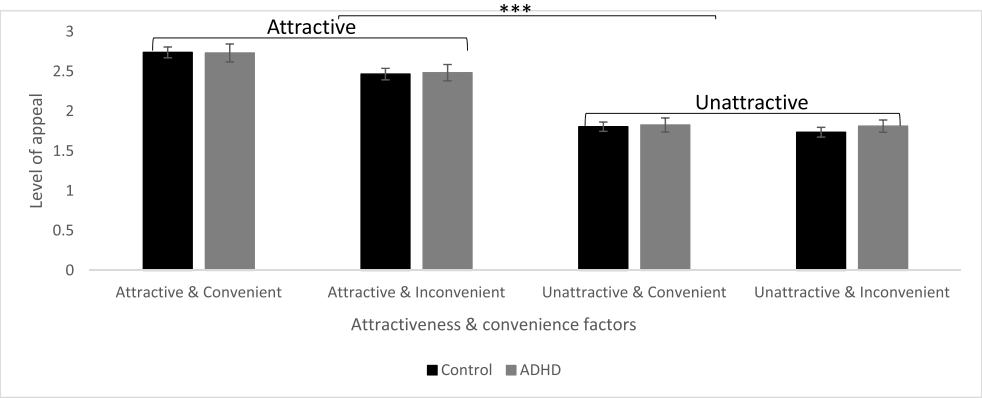

Fig. 2. Level of food appeal by attractiveness, convenience, and diagnostic group.

Table 2
ANOVA results of the level of appeal using group, attractiveness, convenience, hunger, and general psychopathology.

Predictors	df	Mean Square	F	p-value
Group	1	.02	.02	.83
Attractiveness	1	101.71	637.46	< .001
Convenience	1	3.56	36.65	< .001
Attractiveness * Group	1	.07	.47	.50
Convenience * Group	1	.06	.64	.43
Hunger	1	1.80	10.85	.001
GHQ	1	.24	.24	.62

Note: GHQ (General Health Questionnaire).

change the results of the analyses. Finally, replacing the categorical variable of the ADHD with a continuous one, which is based on the total score of the ASRS, did not change the results.

4. Discussion

The current research examined whether the attractiveness and convenience of food items influenced their appeal for people with and without ADHD. The findings confirmed that attractiveness and convenience cues affect the appeal of foods. All participants (both controls and people with ADHD) rated attractive and convenient foods as more appealing than unattractive and inconvenient foods. These results are in accordance with field studies demonstrating that manipulating the attractiveness or convenience of healthy food items has increased their consumption in cafeterias or supermarkets (e.g., Wansink et al., 2003, 2015).

The present study did not find any significant differences between individuals with and without ADHD on the level of food appeal. Interestingly, this similarity between groups in their response to food cues remained even when the use of medication was controlled for. One could think of at least two potential interpretations of this finding. First, it may be natural to assume that the observed similarity in responding to food cues may reflect similar processes of food choices among people with and without ADHD. Alternatively, this finding may also reflect the net effect of two opposing drivers. On the one hand, people with ADHD are known to be more sensitive to rewards than controls (Luman et al., 2010; Tripp & Wickens, 2009), a characteristic that should enhance their reaction to attractiveness and convenience cues. On the other hand, individuals with ADHD are also less attentive to details than controls (American Psychiatric Association, 2013; Faraone et al., 2015), a tendency that should decrease their reaction to these environmental cues. Hence, the apparent similarity in the reactions to food cues might not result from similar processes, but actually reflect opposing tendencies that happened to cancel each other out in the current context. Future studies should further address these questions to better understand the nature of this apparent similarity between ADHD and controls in their reaction to food cues. It seems also worthwhile to emphasize that the current study employed on-screen food pictures, rather than physical food items. While such environments are becoming increasingly relevant (e.g., online food shopping and deliveries), it is plausible to assume that food choice in these contexts might differ from choice in places where people face physical food (e.g., food stores, cafeterias). Therefore, we cannot rule out the possibility that people with and without ADHD might react differently to food cues when facing actual food. A potential difference between the two contexts could be driven by visceral cues (e.g., smell) in physical environments of food purchase and consumption, which might facilitate impulsive decisions (Wansink, 2015).

The current finding of similar reactions to food cues among people with and without ADHD is especially interesting in light of the previous studies that documented differences in eating patterns between individuals with and without ADHD, namely that people with ADHD eat less healthy foods (e.g., Hershko et al., 2018). The current finding that the level of food appeal is similar among people with and without ADHD and that both are similarly affected by attractiveness and convenience cues, suggests that other factors should also be explored to better understand the association between ADHD and unhealthy food choices, such as differences in emotional eating (Davis, Levitan, Smith, Tweed, & Curtis, 2006).

Another important motivational factor of human eating behavior is a person's feeling of hunger (Frank et al., 2010). Our findings confirmed that the level of hunger affects the appeal of the foods. These results are in line with results showing foods seem more palatable when hungry (Charbonnier et al., 2015). They are also consistent with research showing that hunger increases the rated pleasantness of foods, and that brain regions involved in reward processing are more strongly activated when people are viewing pictures of foods in a hungry state (van der Laan et al., 2011).

Previous work on the influence of the attractiveness and convenience of the food, has been conducted on the general population (e.g., Wansink, 2015), while the current study has focused on the ADHD population. Currently, dietary patterns continue to evolve, and obesity rises both among children and adults, causing morbidity and mortality as well as significant economic and social costs (Drichoutis, Lazaridis, Nayga, Kapsokefalou, & Chryssochoidis, 2008; Wansink, Westgren, & Cheney, 2005; Winterman, Sharp, McNamara, Hughes, & Brown, 2014). That is why the awareness of disorders with strong associations with obesity (ADHD), is crucial to allow early diagnosis and treatment of these conditions (Pi-Sunyer, 2009). In addition, previous studies tested attractiveness and convenience as one variable (e.g., (Wansink et al., 2003) (Hanks et al., 2012), while we separated them, and accordingly found that attractiveness had more impact than convenience on the level of appeal. These findings suggest that healthy food should be designed and served in a more appealing way.

This study should be considered in the light of a number of limitations. As noted, participants were recruited from one university faculty, which enhances control over many demographic variables, but at the same time weakens the ability to generalize the conclusions to other populations. Accordingly, the groups were similar in terms of age, sex, academic level, BMI, rates of obesity and family status, which imply that the ADHD group consisted of high functioning participants that may not represent the whole ADHD population. Additionally, the fact that the study was conducted in the Faculty of Agriculture, Food and Environment may have affected the knowledge and the awareness of the participants in regard to healthy/unhealthy eating (even though students from the Department of Nutrition did not participate in this study). Another limitation may relate to the employment of a new task that has never been tested before. Future studies are encouraged to replicate the study procedure by using this task. Finally, the attractiveness and convenience stimuli were each composed of several variables in accordance with the experiments of Wansink et al. For example, the attractiveness of food was manipulated according to the colorfulness of the background, the plate, the table, and the packaging, so as the brand variable. Therefore, we do not know which of these variables, or their combination, affected participants' preferences. Further research should examine these factors separately.

In conclusion, we found that individuals with ADHD, just like those without ADHD, were affected by the attractiveness and the convenience cues of food. This could eventually lead to developing interventions aimed at treating obesity in ADHD. We recommend that in addition to raising the awareness of people with ADHD about consequences of unhealthy diets, these interventions should accentuate environmental adaptation, by including convenient and attractive healthy food items.

Declaration of competing interest

Cortese, S., Honoraria for talks on ADHD from: Association form Child and Adolescent Mental Health (CADDRA), British Association of Psychopharmacology (BAP), Canadian ADHD Alliance Resource (CADDRA), and Healthcare Convention.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.appet.2020.104679.

References

Adler, L. A., Spencer, T., Faraone, S. V., Kessler, R. C., Howes, M. J., Biederman, J., et al. (2006). Validity of pilot adult ADHD self- report scale (ASRS) to rate adult ADHD symptoms. *Annals of Clinical Psychiatry, 18*(3), 145–148. https://doi.org/10.1080/10401230600801077.

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC.

Asherson, P., Buitelaar, J., Faraone, S. V., & Rohde, L. A. (2016). Adult attention-deficit hyperactivity disorder: Key conceptual issues. *Lancet Psychiatry, 3*(6), 568–578. https://doi.org/10.1016/S2215-0366(16)30032-3.

Azadbakht, L., & Esmaillzadeh, A. (2012). Dietary patterns and attention deficit hyperactivity disorder among Iranian children. *Nutrition, 28*(3), 242–249. https://doi.org/10.1016/j.nut.2011.05.018.

Barkley, R. A. (2003). Issues in the diagnosis of attention-deficit/hyperactivity disorder in children. *Brain & Development, 25*(2), 77–83. https://doi.org/10.1016/s0387-7604(02)00152-3.

Berthoud, H. R., & Morrison, C. (2008). The brain, appetite, and obesity. *Annual Review of Psychology, 59*, 55–92. https://doi.org/10.1146/annurev.psych.59.103006.093551.

Charbonnier, L., van der Laan, L. N., Viergever, M. A., & Smeets, P. A. (2015). Functional MRI of challenging food choices: Forced choice between equally liked high- and low-calorie foods in the absence of hunger. *PloS One, 10*(7), e0131727. https://doi.org/10.1371/journal.pone.0131727.

Chou, W. J., Lee, M. F., Hou, M. L., Hsiao, L. S., Lee, M. J., Chou, M. C., et al. (2018). Dietary and nutrient status of children with attention-deficit/hyperactivity disorder: A case-control study. *Asia Pacific Journal of Clinical Nutrition, 27*(6), 1325–1331. https://doi.org/10.6133/apjcn.201811_27(6).0020.

Davis, C., Levitan, R. D., Smith, M., Tweed, S., & Curtis, C. (2006). Associations among overeating, overweight, and attention deficit/hyperactivity disorder: A structural equation modelling approach. *Eating Behaviors, 7*(3), 266–274. https://doi.org/10.1016/j.eatbeh.2005.09.006.

Drichoutis, A. C., Lazaridis, P., Nayga, R. M., Kapsokefalou, M., & Chryssochoidis, G. (2008). A theoretical and empirical investigation of nutritional label use. *The European Journal of Health Economics, 9*(3), 293–304. https://doi.org/10.1007/s10198-007-0077-y.

Drobes, D. J., Miller, E. J., Hillman, C. H., Bradley, M. M., Cuthbert, B. N., & Lang, P. J. (2001). Food deprivation and emotional reactions to food cues: Implications for eating disorders. *Biological Psychology, 57*(1–3), 153–177. https://doi.org/10.1016/s0301-0511(01)00093-x.

Faraone, S. V., Asherson, P., Banaschewski, T., Biederman, J., Buitelaar, J. K., Ramos-Quiroga, J. A., et al. (2015). Attention-deficit/hyperactivity disorder. *Nature Reviews Disease Primers, 1*, 15020. https://doi.org/10.1038/nrdp.2015.20.

Flaskerud, J. H. (2010). American culture and neuro-cognitive enhancing drugs. *Issues in Mental Health Nursing, 31*(1), 62–63. https://doi.org/10.3109/01612840903075395.

Frank, S., Laharnar, N., Kullmann, S., Veit, R., Canova, C., Hegner, Y. L., ... Preissl, H. (2010). Processing of food pictures: Influence of hunger, gender and calorie content. *Brain Research, 1350*, 159–166. https://doi.org/10.1016/j.brainres.2010.04.030.

Hanks, A. S., Just, D. R., Smith, L. E., & Wansink, B. (2012). Healthy convenience: Nudging students toward healthier choices in the lunchroom. *Journal of Public Health, 34*(3), 370–376. https://doi.org/10.1093/pubmed/fds003.

Hershko, S., Aronis, A., Maeir, A., & Pollak, Y. (2018). Dysfunctional eating patterns of adults with attention deficit hyperactivity disorder. *The Journal of Nervous and Mental Disease, 206*(11), 870–874. https://doi.org/10.1097/NMD.0000000000000894.

Howard, A. L., Robinson, M., Smith, G. J., Ambrosini, G. L., Piek, J. P., & Oddy, W. H. (2011). ADHD is associated with a "Western" dietary pattern in adolescents. *Journal of Attention Disorders, 15*(5), 403–411. https://doi.org/10.1177/1087054710365990.

Ikemoto, S., & Panksepp, J. (1999). The role of nucleus accumbens dopamine in motivated behavior: A unifying interpretation with special reference to reward-seeking. *Brain Research Reviews, 31*(1), 6–41.

Kessler, R. C., Adler, L., Ames, M., Demler, O., Faraone, S., Hiripi, E., et al. (2005). The world health organization adult ADHD self-report scale (ASRS): A short screening scale for use in the general population. *Psychological Medicine, 35*(2), 245–256.

Kim, E. J., Kwon, H. J., Ha, M., Lim, M. H., Oh, S. Y., Kim, J. H., et al. (2014). Relationship among attention-deficit hyperactivity disorder, dietary behaviours and obesity. *Child: Care, Health and Development, 40*(5), 698–705. https://doi.org/10.1111/cch.12129.

van Kleef, E., Otten, K., & van Trijp, H. C. (2012). Healthy snacks at the checkout counter: A lab and field study on the impact of shelf arrangement and assortment structure on consumer choices. *BMC Public Health, 12*, 1072. https://doi.org/10.1186/1471-2458-12-1072.

van der Laan, L. N., de Ridder, D. T., Viergever, M. A., & Smeets, P. A. (2011). The first taste is always with the eyes: A meta-analysis on the neural correlates of processing visual food cues. *NeuroImage, 55*(1), 296–303. https://doi.org/10.1016/j.neuroimage.2010.11.055.

Linné, Y., Barkeling, B., Rössner, S., & Rooth, P. (2002). Vision and eating behavior. *Obesity Research, 10*(2), 92–95. https://doi.org/10.1038/oby.2002.15.

Luman, M., Tripp, G., & Scheres, A. (2010). Identifying the neurobiology of altered reinforcement sensitivity in ADHD: A review and research agenda. *Neuroscience & Biobehavioral Reviews, 34*(5), 744–754. https://doi.org/10.1016/j.neubiorev.2009.11.021.

Marquis, M. (2005). Exploring convenience orientation as a food motivation for college students living in residence halls. *International Journal of Consumer Studies, 29*(1), 55–63. https://doi.org/10.1111/j.1470-6431.2005.00375.x.

Michielsen, M., Semeijn, E., Comijs, H. C., van de Ven, P., Beekman, A. T., Deeg, D. J., et al. (2012). Prevalence of attention-deficit hyperactivity disorder in older adults in The Netherlands. *British Journal of Psychiatry, 201*(4), 298–305. https://doi.org/10.1192/bjp.bp.111.101196.

Montazeri, A., Harirchi, A. M., Shariati, M., Garmaroudi, G., Ebadi, M., & Fateh, A. (2003). The 12-item general health questionnaire (GHQ-12): Translation and validation study of the Iranian version. *Health and Quality of Life Outcomes, 1*, 66. https://doi.org/10.1186/1477-7525-1-66.

Nigg, J. T. (2013). Attention-deficit/hyperactivity disorder and adverse health outcomes. *Clinical Psychology Review, 33*(2), 215–228. https://doi.org/10.1016/j.cpr.2012.11.005.

Ouwehand, C., & Papies, E. K. (2010). Eat it or beat it. The differential effects of food temptations on overweight and normal-weight restrained eaters. *Appetite, 55*(1), 56–60. https://doi.org/10.1016/j.appet.2010.04.009.

Pi-Sunyer, X. (2009). The medical risks of obesity. *Postgraduate Medical Journal, 121*(6), 21–33. https://doi.org/10.3810/pgm.2009.11.2074.

Piccinelli, M., Bisoffi, G., Bon, M. G., Cunico, L., & Tansella, M. (1993). Validity and test-retest reliability of the Italian version of the 12-item general health questionnaire in general practice: A comparison between three scoring methods. *Comprehensive Psychiatry, 34*(3), 198–205.

Polanczyk, G. V., Willcutt, E. G., Salum, G. A., Kieling, C., & Rohde, L. A. (2014). ADHD prevalence estimates across three decades: An updated systematic review and meta-regression analysis. *International Journal of Epidemiology, 43*(2), 434–442. https://doi.org/10.1093/ije/dyt261.

Ríos-Hernández, A., Alda, J. A., Farran-Codina, A., Ferreira-García, E., & Izquierdo-Pulido, M. (2017). The mediterranean diet and ADHD in children and adolescents. *Pediatrics, 139*(2), https://doi.org/10.1542/peds.2016-2027.

Sergeant, J. A. (2005). Modeling attention-deficit/hyperactivity disorder: A critical appraisal of the cognitive-energetic model. *Biological Psychiatry, 57*, 1248–1255.

Spencer, T. J., Faraone, S. V., Tarko, L., McDermott, K., & Biederman, J. (2014). Attention-deficit/hyperactivity disorder and adverse health outcomes in adults. *The Journal of Nervous and Mental Disease, 202*(10), 725–731. https://doi.org/10.1097/NMD.0000000000000191.

Thapar, A., & Cooper, M. (2016). Attention deficit hyperactivity disorder. *Lancet,*

387(10024), 1240–1250. https://doi.org/10.1016/S0140-6736(15)00238-X.
Tripp, G., & Wickens, J. R. (2009). Neurobiology of ADHD. *Neuropharmacology, 57*(7–8), 579–589. https://doi.org/10.1016/j.neuropharm.2009.07.026.
Wansink, B. (2015). Change their choice! Changing behavior using the CAN approach and activism research. *Psychology and Marketing, 32*(5), 486–500. https://doi.org/10.1002/mar.20794.
Wansink, B., Cheney, M. M., & Chan, N. (2003). Exploring comfort food preferences across age and gender. *Physiology & Behavior, 79*(4–5), 739–747.
Wansink, B., Just, D. R., Hanks, A. S., & Smith, L. E. (2013). Pre-sliced fruit in school cafeterias: children's selection and intake. *American Journal of Preventive Medicine, 44*(5), 477–480. https://doi.org/10.1016/j.amepre.2013.02.003.
Wansink, B., Westgren, R. E., & Cheney, M. M. (2005). Hierarchy of nutritional knowledge that relates to the consumption of a functional food. *Nutrition, 21*(2), 264–268. https://doi.org/10.1016/j.nut.2004.06.022.
Wilson, A. L., Buckley, E., Buckley, J. D., & Bogomolova, S. (2016). Nudging healthier food and beverage choices through salience and priming. Evidence from a systematic review. *Food Quality and Preference, 51*, 47–64. https://doi.org/10.1016/j.foodqual.2016.02.009.
Winterman, E., Sharp, K., McNamara, G., Hughes, T., & Brown, J. (2014). Support for mentors in clinical education. *Nursing Times, 110*(51), 21–23.
Woo, H. D., Shin, A., & Kim, J. (2014). Dietary patterns of Korean adults and the prevalence of metabolic syndrome: A cross-sectional study. *PloS One, 9*(11), e111593. https://doi.org/10.1371/journal.pone.0111593.