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Exploring the effects of positive and negative emotions on eating behaviours in children and young adults

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Running head: Emotions and eating behaviour

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Abstract

It is well established that stress can elicit change in a range of eating behaviours, however, less is known about these effects in children and young adults. In addition, there is a growing interest in investigating the role of positive as well as negative emotions as triggers of food intake in children. Therefore, the current study aimed to explore the relationship between positive and negative emotions and eating behaviour in children (aged 9-10 years old) and young adults together with the moderating effects of eating styles (emotional and external eating). A questionnaire design was used to investigate the effects of positive and negative emotions on snacking responses in children and young adults (children, *N = 53*, young adults, *N = 72*). Eating styles were assessed using the Dutch Eating Behaviour Questionnaire. We found that children reported wanting to eat more snacks in response to positive emotions, while young adults reported wanting to eat more snacks in response to negative emotions. Emotional and external eating styles moderated the positive and negative emotions – eating response relationship. Future research should include both positive and negative emotions when examining the influence of stress and emotions on eating, particularly when exploring the triggers of food intake amongst children.

Keywords: Stress, eating behaviour, snacking, unhealthy, children, young adults.

Introduction

It is well established that stress can elicit changes in a range of eating behaviours in adults (Greeno & Wing, 1994; O'Connor & Conner, 2011, Tomiyama, 2019). Hyperphagic and hypophagic eating responses have been documented (Oliver & Wardle, 1999), and more specifically, stress has been found to alter which foods are consumed (O'Connor, Jones, Conner, McMillan & Ferguson, 2008). However, recent evidence is emerging to suggest that stress can impact on eating behaviour in childhood as well as in adulthood. For example, a recent meta-analysis (Hill, Moss, Sykes-Muskett, Conner & O'Connor, 2018), confirmed that stress can influence eating behaviours in children as young as 8 years of age but that there was a paucity of research exploring stress and eating in younger samples.

It has also been well documented that stress and negative emotion often precede the consumption of high calorie, low nutrient foods (e.g., fast food, between-meal snacking, Hill et al., 2018; Oliver & Wardle, 1999; O'Connor & Conner, 2011). However, there is a growing interest in the role of positive emotion for understanding eating behaviour. For example, positive emotion has been shown to initiate the consumption of healthier food (e.g., fruit, Macht, 2008). Early work by Lyman (1982) demonstrated the 'food mood' theory where healthier foods were chosen more frequently (in response to 14 of 22 emotions) by university students when experiencing an array of emotions. The emotions explored included both positive (e.g., happiness) as well as negative (e.g., anger), suggesting that both types of emotion can elicit adaptive (i.e., healthy) and maladaptive (i.e., unhealthy) eating responses. More recently, another study found that the presence of positive emotion

was related to an increase in food consumption (Reichenberger et al., 2016). More specifically, a detailed investigation exploring the role of positive emotion as a trigger for food intake concluded that, positive emotions were important, but under-researched because they have been found to increase the consumption of unhealthy food snacks (Evers, Adriaanse, de Ridder & de Witt Huberts, 2013). Therefore, an important aim of the current study was to address this gap in the literature and to explore the relationship between emotions and snack intake in children and young adults. Moreover, based on the existing research evidence, it was predicted that both positive and negative emotions would be associated with healthy and unhealthy snack consumption.

Although there are many different eating behaviours that individuals engage in, and many that have been associated with emotional eating behaviour (where the presence of negative emotion initiates the consumption of palatable foods e.g., sweet, high fat foods, Macht, 2008; to provide 'comfort', Zellner et al., 2006), snacking behaviours are the focus of this study. Due to the age of the children in this study, it is important to appreciate that they will have less control over the food they consume. For example, it is likely that parents/caregivers choose and buy the food that is made available to their children (Wardle, 1995). Therefore, to avoid measuring parental eating behaviour, it is necessary to identify an eating behaviour where children have more individual control. Robinson (2000) identified that children reported themselves as having the most control over their breakfast and snack consumption. However, Robinson (2000) acknowledges that children are increasingly consuming snacks as a substitute for meals, a pattern that is particularly prevalent at breakfast. This provides support for focusing on snacking behaviours in the context of exploring stress-related eating behaviours.

Individual differences exist in the effects of stress on eating behaviour. Emotional, restrained and external eating styles are three variables that have frequently been explored as moderating variables of the stress-eating relationship. For example, Macht (2008) identified that adults' emotional eating style can initiate eating responses that try to 'regulate' prevalent emotions, and these often lead to the consumption of sweet, high fat foods. Newman et al. (2007) found that stressed individuals with high levels of external eating had greater bias for snack-related words, ultimately suggesting that such external cues may negatively impact on their consumption of snack foods.

Existing literature (e.g., O'Connor, 2018) acknowledges that there is a degree of uncertainty in regard to what measures are most suitable for measuring stress amongst children. Therefore, it is necessary to use the adult stress-eating literature to guide the current exploration of stress-eating in children. In this regard, we decided it would be most suitable to measure the stress-eating behaviours of both children and an older adult group. The reason behind this choice was twofold, first, it would allow us to see if child (age-appropriate) measures were able to identify well established stress-eating behaviours in adults and second, it would allow us to directly compare the stress-eating behaviours of children and young adults to see if any differences were present.

In summary, this study aimed to explore the relationship between positive and negative emotions and healthy and unhealthy snack responses in children and young adults. It was hypothesised that positive and negative emotions would be associated with both healthy and unhealthy snack responses.

Method

Study design

This study used a cross-sectional questionnaire design to explore the influence that positive and negative emotion had on snacking behaviour responses. A sample of children and young adults (undergraduate students) were recruited (N = 125). Participants' emotional and external eating styles were examined as potential moderating variables. Ethical approval was obtained from the Research Ethics Committee at the University School of Psychology (reference: 17-0093).

Participants: Children aged 9-10 years were recruited from the Leeds, West Yorkshire area. A total of 53 children took part, of which 36 were girls and 17 boys (mean 9.19 years). The young adults were recruited from the University of Leeds. A total of 72 undergraduate students took part in the study, of which 65 were female, 6 male, and 1 participant provided no gender information (mean age 19.63 years). The latter sample was included as a comparison group to allow the behaviour of children to be directly compared to a different aged group.

Study materials

Prospective participants were given a 'study information pack' which contained an age-appropriate study information sheet, consent form and the study questionnaire itself. The study questionnaire was identical for both groups, however, a snack picture sheet was also provided for the child participants. This picture sheet consisted of 24 pictures of food and drink snack items. The sheet contained both healthy and unhealthy snack items, and aimed to help children think of suitable snack response/s if they were unable to think of an appropriate food/drink item. The study questionnaire consisted of 2 parts, the first section contained a study specific emotion measure and the second contained an adapted version of the Dutch Eating

Behaviour Questionnaire (DEBQ, van Strien, Frijters, Bergers & Defares, 1986). Both parts were trialled in a pilot phase prior to study commencement to ensure the words within both sections of the questionnaire were appropriate for the child participants.

Questionnaire part one: Study emotion measure

This section of the questionnaire was created specifically for use in this study. This section consisted of 20 questions, each asked the participant whether or not they would eat a snack when experiencing a particular emotion or within a given situation. For example ‘If you were feeling happy, would you eat a snack?’ Participants were asked to provide an answer by ticking either ‘yes’ or ‘no’ in regards to the specific question. If a participant answered ‘yes’, they were asked to report what snack they would like to consume (open-ended response).

In the 20 questions, 7 focused on positive emotions (happy, relaxed, cheerful, energetic, excited, lively, being nice to you), and 7 on negative emotions (upset, bored, scared, lonely, sad, fallen out with your friends, nervous). These emotive words were taken from the Positive and Negative Affect Schedule (Ebesutani et al., 2012). The remaining 6 questions had a neutral focus to dilute the emotion focus for participants. Total snacking responses were summed by calculating the total number of responses for both positive and negative emotion items.

If, for example, a participant had ticked ‘yes’ and also provided a snack item as a response, this was coded as a ‘1’. In contrast, if a participant ticked ‘no’, and did not write a snack response, such responses were coded as a ‘0’. However, if a participant had ticked ‘no’ (they would not choose a snack), but had also reported a

specific snack response, such answers were coded as a ‘1’ because a snacking behaviour had been provided.

Coding snack responses

All snack responses were coded in regards to whether or not they were deemed healthy or unhealthy (in a similar manner to the work of Brown, Ogden, Vogele, & Gibson, 2008) or high in sugar or high in fat using the composition tables by McCance and Widdowson (2014), a method that has been previously used to measure the nutritional composition of foods (Bradbury et al., 2014). Food and drink items were deemed healthy if they were not heavily processed (e.g., an apple or water). However, if snack items were processed foods items (e.g., crisps or cheesestrings) they were classified as unhealthy.

Questionnaire part two: An adapted version of the DEBQ

The original version of this questionnaire measures emotional, external and restrained eating styles. These eating behaviour styles are defined by van Strien et al. (1986) who defined emotional eating as engaging in eating behaviours in response to experiencing certain emotions. External eating involves eating in ‘response to’ your external environment (independent of whether or not you are hungry). Lastly, restrained eating involves restricting the foods that are consumed, in an attempt to maintain a specific body weight. Due to the age of the child participants, it was not deemed appropriate to include the restrained eating style questions because of their focus on the restriction of or alteration to current eating behaviours. All of the emotional and external eating items were retained in this version of the questionnaire, however, some of the original wording was altered if it was not deemed age-appropriate (e.g., ‘desire’ was changed to ‘want to’). This

response scale ranged from 1: never to 5: very often. Cronbach's alphas were as follows: external eating (α = 0.79) and emotional eating (α = 0.87) styles (all participants), with children found to have slightly lower Cronbach's alpha (α = 0.76, for both external and emotional eating styles) compared to the young adults (α = 0.84 for both).

Statistical analysis

Data was analysed using IBM SPSS Statistics (Version 22). A series of four-way ANOVAs were utilised to examine the main and interaction effects of type of emotion (positive vs negative), age (children vs young adults), emotional and external eating styles (categorised as being either low vs high). For emotional eating behaviour, 49.6% of the sample had scores of 31 or below and 50.4% had scores of 32 or above. The former were classified as being low on emotional eating and the latter were classified as being high on emotional eating. For external eating behaviour, 49.6% of participants' responses had a value of 34 or below and 50.4% had scores of 35 or above. The former were classified as being low on external eating and the latter as high on external eating. The neutral question items acted as a means of disguising the questionnaire's emotion focus, and as such these responses were not subsequently analysed. Snacking responses were analysed using the following categories: healthy and unhealthy snacks. Post hoc, Bonferroni tests were conducted on any significant interaction effects that had been identified within the ANOVA analyses.

Results

Descriptive statistics

Within this study, 80% (n = 101) of the total sample was female. The young adults had higher levels of both emotional (M = 34.33) and external (M = 34.51) eating compared to the emotional (M = 31.31) and external eating (M = 33.58) styles seen in the child sample.

[Insert Table 1 about here]

Table 1 shows the means and standard deviations for snacking responses for positive and negative emotions in children and young adults.

Effects of age, type of emotion, emotional and external eating styles on healthy snacking responses

In the first ANOVA, the impact of emotion type, age, emotional and external eating styles on the healthy snacking responses were examined. It was identified that there were two significant main effects, one for age ($F(1,110) = 150.57$, $p < .001$), and one for type of emotion ($F(1,110) = 11.05$ $p = .001$). Exploring these main effects, the effect of age was found to reflect the fact that younger children reported they would consume more healthy snacks (M = 4.45, SD = 2.35) compared to the young adults (M = 0.56, SD = 0.93) in response to positive and negative emotion. The main effect for type of emotion was found to reflect that more healthy snacks were reported to be consumed in response to positive emotions (M = 1.32, SD = 1.59) compared to negative emotions (M = 0.89, SD = 1.35). No other significant main effects or interactions were identified.

Effects of age, type of emotion, emotional and external eating styles on unhealthy snacking responses

For unhealthy snacking, the influence of age, type of emotion, emotional and external eating styles were explored. The analysis identified that there were 4 significant main effects: positive versus negative emotion ($F(1,110) = 12.71$, $p = .001$), age ($F(1,110) = 15.58$, $p < .0001$), emotional eating style ($F(1,110) = 7.89$, $p < .01$) and lastly, external eating style ($F(1,110) = 5.49$, $p < .05$). The effect of type of emotion indicated that participants reported eating more unhealthy snacks in response to negative compared to positive emotions (negative: M = 3.75, SD = 1.71; positive, M = 3.20, SD = 2.59).

In terms of age, children reported wanting to eat more unhealthy snacks in response to positive and negative emotion (M = 9.09, SD = 3.14) compared to the young adults (M = 6.61, SD = 2.54). Finally, rates of unhealthy snacking in response to positive and negative emotion were greater for high versus low levels of emotional (low: M = 7.23, SD = 3.23; high: M = 8.10, SD = 2.83) and external (low: M = 6.85, SD = 3.18; high: M = 8.46, SD = 2.73) eating styles.

These main effects were qualified by one significant two-way interaction. This was between type of emotion and age ($F(1,110) = 73.18$, $p < .0005$ (see Figure 1)). For positive emotions, children (M = 3.23, SD = 1.58) reported wanting to eat significantly ($p < .005$) more unhealthy snacks compared to the young adults (M = 0.89, SD = 1.10). However, the opposite pattern was found for negative emotions, where young adults reported wanting to eat significantly ($p = .001$) more unhealthy snacks (M = 3.22, SD = 1.52) than children (M = 2.38, SD = 1.55).

[Insert Figure 1 about here]

Additionally, amongst children there was also a significant difference ($p = .001$) between the number of snacks reported to be eaten in response to positive (M

= 5.75, SD = 1.43) compared to negative (M = 4.30, SD = 1.84) emotions. For young adults, there was a significant difference (p = .001) between the number of snacks reported to be eaten in response to positive (M = 1.32, SD = 1.32) compared to negative (M = 3.35, SD = 1.50) emotions, although the difference was in the opposite direction to that for children. Within this analysis, there were no significant three-way interaction effects.

Discussion

The current results are novel because they show that positive emotions may be important triggers of self-reported unhealthy snack consumption in children, whereas, negative emotions may be most important triggers for young adults. The finding that children responded most towards positive emotion is particularly noteworthy because of the dominant focus on negative emotion within current stress-eating literature and much of the broader triggers of eating literature. However, this finding provides support for research highlighted earlier that identified positive emotion as key factor in initiating eating behaviours (Macht, 2008; Reichenberger et al., 2016). More specifically, the current study found children were found to report eating more amongst positive emotions using both healthy and unhealthy snacking responses. This is an interesting observation and suggests that the relative influence of positive and negative emotions may change as children move into adolescence and early adulthood. It is also interesting because it suggests that children may be more emotion-driven in their snack consumption compared to young adults. Alternatively, it may be that children simply snack more. However, the latter is unlikely given that in the current study, young adults reported eating more unhealthy snacks following negative emotions.

It is possible that the ‘reward based eating theory’ (Adam & Epel, 2007) provides evidence to explain the increase in snack consumption identified in children within the current study. For example, children’s (reported) snack responses could have been acting as a hypothetical (because actual snack consumption was not measured) reward in the presence of positive emotions. However, it is important not to overlook the importance of the experimenter. Herman, Polivy, and Silver (1979) found that participants’ food consumption was different when an observer was present. The same influence may be present in the current study, potentially leading participants to under or over-report their reported snack behaviours. Although the current findings indicate that children seem to be more emotion driven when engaging in snacking behaviours, it would be useful to further explore the impact of an experimenter amongst children to determine how much of an impact their presence had on the reporting of snacking behaviours.

A main effect of emotional eating was identified in unhealthy snacking responses, where the group with high emotional eating was found to report more snacking responses compared to those with low emotional eating style. This is consistent with O’Connor et al. (2008) who found that emotional eating style was the pre-eminent moderator of stress-related eating. There was also a main effect of positive and negative emotion across both healthy and unhealthy snacking responses, with more healthy and unhealthy snacks chosen for negative emotions. One main effect of external eating style was found for unhealthy snacking responses, showing that individuals’ snacking responses were affected by their level of external eating.

The study findings do share some parallels with previous findings in adults, by identifying that young adults reported eating more unhealthy snacks in response to negative emotions. In this respect, it seems that young adults have similar eating behaviours to adults (e.g., O'Connor & O'Connor, 2004; Evers, Marijn Stok, & de Ridder, 2010) because overconsuming food in response to stress has been seen to occur in both groups. Hyperphagia allows individuals to divert their attention away from themselves or their stressful situation so they can focus on consuming food. In such occasions, eating acts as a tool that provides the individual with a stimulus on which they can focus all their attention. This behaviour also provides comfort for the individual, subtly reinforcing their decision to overconsume (Evers et al., 2010).

The 'food mood' theory (Lyman, 1982) could have played a part in the results of this study, however, it is imperative to note that collectively, children were found to report eating more healthy snacks compared to the young adults. Lyman's (1982) theory may be the explanation for this, however, because of their age, it is likely that parents will choose the foods that are bought and made available to their children at home. As a consequence, children may have been predisposed to choosing healthy foods more frequently as a result.

However, due to a lack of literature within the domain, the triggers of eating behaviour in children remains under explored, so the current study contributes to improving understanding of the role of emotions in children. To conclude, the current study identified that both positive and negative emotions are related to the reported snacking behaviours of 9-10 year old children and young adults. More specifically, it was found that children reported consuming more healthy snacks in the presence of positive emotions and negative emotions compared to the young adults. Similarly,

children were found to report consuming more unhealthy snacks in the presence of positive emotions, however, the young adults reported consuming more unhealthy snacks when negative emotions were present.

This study utilised hypothetical positive and negative emotion scenario questions to elicit an array of different emotions amongst participants. However, as Adolphs (2017) appreciate, it is difficult to induce an emotion state simply by thinking of the emotion itself. As a result, it is not clear how easy it was for children to answer such questions. The questions adopted an inquisitive style that asked participants about their snacking behaviours, and as such, this intentional language (e.g., 'would you eat a snack?') may have been influential. Therefore, if volitional language (e.g., 'when you are feeling happy, do you want to eat a snack?') had been used, the findings may have been different to those identified here, subsequently, an alternative method of inducing emotion should be sought for use in future exploration.

Therefore, future research should continue to explore the nature of this relationship to identify when the impact of positive and negative emotions on eating behaviour tracks into adulthood and at what stage negative emotions become more important. Such research could utilise a daily diary style design to further explore the occurrence and frequency of positive (daily uplifts) and negative (daily hassles) emotions with individuals' snacking behaviours (cf., O'Connor, Armitage & Ferguson, 2015). In addition, it would also be useful to explore other dietary behaviours children engage in, for example meal consumption (at school and at home) to identify if emotion-related eating changes occur in these behaviours too.

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Author Contributions

RM, DO and MC designed this study. RM acted as primary researcher, and undertook the recruitment and data collection. RM conducted the data analysis under the supervision of DO and MC. RM, DO and MC wrote the manuscript. All authors checked the final manuscript and are happy to be accountable for this paper.

References

Adam, T. C., & Epel, E. S. (2007). Stress, eating and the reward system. Physiology & Behavior, 91(4), 449-458. doi: 10.1016/j.psysbeh. 2007.04.0 11

Adolphs, R. (2017). How should neuroscience study emotions? By distinguishing emotion states, concepts, and experiences. *Social Cognitive and Affective Neuroscience, 12(1),* 24-31. doi: 10.1093/scan/nsw153

Austin, A. W., Smith, A. F., & Patterson, S. M. (2009). Stress and dietary quality in black adolescents in a metropolitan area. *Stress and Health: Journal of the International Society for the Investigation of Stress, 25(2),* 171-178. doi: 10.1002/smi.1234

Bradbury, K. E., Crowe, F. L., Appleby, P. N., Schmidt, J. A., Travis, R. C., & Key, T. J. (2014). Serum concentrations of cholesterol, apolipoprotein A-I, and apolipoprotein B in a total of 1 964 meat-eaters, fish-eaters, vegetarians, and vegans. *Europe Journal of Clinical Nutrition, 68(2),* 178-183. doi:10.1038/ejcn .2013.248.

Brown, K. A., Ogden, J., Vogele, C., & Gibson, E. L. (2008). The role of parental control practices in explaining children's diet and BMI. *Appetite, 50,* 252-259. doi: 10.1016/j.appet.2007.07.010

Ebesutani, C., Regan, J., Smith, A., Reise, S., Higa-McMillan, C., & Chorpita, B. F. (2012). The 10-Item Positive and Negative Affect Schedule for Children, Child and Parent Shortened Versions: Application of Item Response Theory for

More Efficient Assessment. *Journal of Psychopathology and Behavioral Assessment, 34(2),* 191-203. doi:10. 1007/s10862-011-9273-2

Evers, C., Adriaanse, M., de Ridder, D. T., & de Witt Huberts, J. C. (2013). Good mood food. Positive emotion as a neglected trigger for food intake. *Appetite, 68,* 1-7. doi: 10.1016/j.appet.2013.04.007

Evers, C., Marijn Stok, F., & de Ridder, D. T. (2010). Feeding your feelings: Emotion regulation strategies and emotional eating. *Personality and Social Psychology Bulletin, 36(6),* 792-804. doi: 10.1177/0146167210 371383

Greeno, C. G., & Wing, R. R. (1994). Stress-induced eating. *Psychological Bulletin, 115(3),* 444-464.

Herman, C. P., Polivy, J., & Silver, R. (1979). Effects of an observer on eating behavior: The induction of “sensible” eating 1. Journal of Personality, 47(1), 85-99. doi: 10.1111/j.1467-6494.1979.tb00616.x

Hill, D. C., Moss, R. H., Sykes-Muskett, B., Conner, M., & O'Connor, D. B. (2018). Stress and eating behaviors in children and adolescents: Systematic review and meta-analysis. *Appetite, 123,* 14-22. doi: 10.1016/ j.appet.2017.11.109

Lyman, B. (1982). The nutritional values and food group characteristics of foods preferred during various emotions. *The Journal of Psychology, 112(1),* 121-127. doi: 10.1080/00223980.1982.9923544

Macht, M. (2008). How emotions affect eating: a five-way model. *Appetite, 50(1),* 1-11. doi: 10.1016/j.appet.2007.07.002

McCance, R. A., & Widdowson, E. M. (2014). The composition of foods: Seventh summary edition (Vol. 7). Location: Royal Society of Chemistry.

Newman, E., O'Connor, D. B., & Conner, M. (2007). Daily hassles and eating behaviour: the role of cortisol reactivity status. *Psychoneuroendocrinology, 32(2),* 125-132. doi: 10.1016/j.psyneuen.200 6.11.006

O'Connor, D. B. (2018). Effects of stress and cortisol on eating behaviour in children and adolescents. In P. Murphy (Eds.), Routledge International Handbook of Psychobiology. Psychology Press, pp 179-191.

O'Connor, D.B., Armitage, C.J., & Ferguson, E. (2015). Randomized Test of an Implementation Intention-Based Tool to Reduce Stress-Induced Eating, *Annals of Behavioral Medicine, 49,* 331-343. doi: 10.1007/s12160-014-9668-x

O'Connor, D. B., & Conner, M. (2011). Effects of stress on eating behaviour. In The Handbook of Stress Science: Biology, Psychology and Health. Springer Publishing Company, pp 275-286.

O'Connor, D. B., Jones, F., Conner, M., McMillan, B., & Ferguson, E. (2008). Effects of daily hassles and eating style on eating behavior. *Health Psychology, 27(1).* doi: 10.1037/0278-6133.27.1

O'Connor, D. B. & O'Connor, R. C. (2004). Perceived changes in food intake in response to stress: the role of conscientiousness. *Stress & Health, 20,* 279-291. doi: 10.1002/smi.1028

Oliver, G., & Wardle, J. (1999). Perceived effects of stress on food choice. *Physiology and Behavior, 66(3),* 511-515. doi: 10.1016/S0031-9384(98)0032 2-9

Reichenberger, J., Kuppens, P., Liedlgruber, M., Wilhelm, F. H., Tiefengrabner, M., Ginzinger, S., & Blechert, J. (2016). No haste, more taste: An EMA study of

the effects of stress, negative and positive emotions on eating behavior. *Biological Psychology, 131,* 54-62. doi: 10.1016/j.biopsycho.20 16.09.002

Robinson, S. (2000). Children's perceptions of who controls their food. *Journal of Human Nutrition and Dietetics*, *13*(3), 163-171. doi: 10.1046/j.1365-277x.200 0.00229.x

Tomiyama, A. J. (2019). Stress and obesity. *Annual Review of Psychology, 70,* 703-718. doi: 10.1146/annurev-psych-010418-102936

van Strien, T., Frijters, J. E., Bergers, G. P., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders, 5(2),* 295-315. doi: 10.1002/1098-108X(198602)5:2<295::AID-EAT2260050209>3.0.CO;2-T

Wardle, J. (1995). Parental influences on children's diets. *Proceedings of the Nutrition Society*, *54*(3), 747-758. doi: 10.1079/PNS19950074

Zellner, D. A., Loaiza, S., Gonzalez, Z., Pita, J., Morales, J., Pecora, D., & Wolf, A. (2006). Food selection changes under stress. Physiology & Behavior, 87(4), 789-793. doi: 10.1016/j.physbeh.2006.01.014

Table 1. Descriptive statistics illustrating the mean (M) and standard deviation (SD) values for the total number of snacking responses reported for positive and negative emotions.

Snacking response	M (SD)	
	Children	Young Adults
Total healthy snack responses to positive emotion	2.53 (1.64)	0.43 (0.75)
Total healthy snack responses to negative emotion	1.92 (1.44)	0.13 (0.53)
Total unhealthy snack responses in positive emotion	3.23 (1.58)	0.89 (1.10)
Total unhealthy snack responses in negative emotion	2.38 (1.55)	3.22 (1.52)

Figure 1. A profile plot illustrating the significant two-way interaction between type of emotion and age for unhealthy snacking responses.