

Palatable food eating motives, depression, anxiety and stress,
body appreciation and self-efficacy.

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BA (Honours) Psychology

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Table of Contents

Abstract	6
Introduction	7
Palatable food	7
Negative emotions and palatable food	8
Weight gain	10
Body appreciation	12
Self-efficacy	12
Rationale and hypotheses	14
Methods	15
Participants	15
Design	15
Measures	15
Procedure	17
Results	19
Descriptive statistics	19
Inferential statistics	23
Discussion	28
Body mass index	28
Stress	28
Depression	29
Positive body image	29
Self-efficacy	31
Health intervention strategies	31
Coping skills	32
Cognitive reappraisals	33
Gender differences	34
Limitations and future study	34
Conclusion	35
References	37
Appendices	47

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To my Dad, Michael, I miss you. Wish you were here. You were the best.

1LOVE.

Abstract

The numbers of overweight and obese people are at record levels globally. The proliferation of ultra-processed, palatable food that is high in fat, sugar and salt, continues to increase. The purpose of this study was to investigate palatable food eating motives, in relation to three negative emotional states; depression, anxiety and stress. In addition, to investigate body appreciation, a facet of Positive body image and self-efficacy in relation to palatable eating motives. Participants (N=303) were recruited by an anonymous, online survey. Answers to height and weight along with four questionnaires, Palatable Eating Motives Scales (PEMS), Depression, Anxiety and Stress scale (DASS-21), Body Appreciation Scale (BAS-2) and General Self-Efficacy Scale (GSES) were collected. Correlational investigation, a multiple regression and independent t-tests showed varying effects of the three emotional states, body appreciation and self-efficacy on palatable food motives, reflecting the complexity of the study. Coping was a consistent theme throughout the research. Coping as a motive to eat palatable food increased as depression, anxiety and stress increased and decreased as a motive when body appreciation and self-efficacy increased. This research points to future health interventions emphasising positive coping strategies.

Keywords: palatable eating motives, body appreciation, depression, anxiety, stress, self-efficacy

Introduction

Palatable food

Monteiro et al (2018) referencing the Global Panel on Agriculture and Food Systems for Nutrition (2016) coined the term “ultra-processed” to describe the manufactured industrial formulations for palatable food that are ready to consume; are high in fat, salt and sugar while being depleted in protein, dietary fibre, micronutrients and other bioactive compounds. The increased sales of ultra-processed, highly palatable beverages and foods has been dramatic; in fifteen years from the year 2000, sales in the upper-middle-income countries went from one third to more than half, of those in the high-income countries. No country to date has reversed a growing trend of obesity. In 2005 there were 1.33 billion overweight or obese people globally with estimates of that rising to 3.28 billion by 2030. Food choice is something the vast majority of people do every day and some research points to over two hundred food decisions daily while being only consciously aware of twenty of those (Wansink, 2007).

The widespread marketing and availability of highly palatable food has never been greater nor has the price been cheaper for these calorie-dense and nutrient-poor products, Gearhardt, Grilo, DiLeone, Brownell, and Potenza (2011) who describe engineered hyperpalatable food as having higher levels of fat, salt, sugar, additives, colourings and flavourings. They also show a significant positive correlation in obesity levels in both France and the UK and the increased number of McDonalds fast food outlets.

Research by Teagasc and University college Cork using data from the National Adult nutrition Survey (NANS) which was carried out over two years, 2008-2010 in the Republic of Ireland involving 1500 participants aged 18 and upwards showed that taste was the number one food choice motive (with men scoring higher than women and younger consumers higher than

older). Health was the second most important motive followed by nutrition, then cost and convenience. (McCarthy & McCarthy, 2017)

However, what has become increasingly clear in more recent research is the bidirectional nature of communication of the microbiota-gut-brain axis and that the key for improving both physical and mental health is nutrition status and diet composition (Sandhu et al., 2017). The global homogeneity of the “Western” diet (highly processed, carbohydrate rich) is impacting the diversity of gut microbiota which can be detrimental, as can a high-fat diet by increasing the risk of inflammation (Murphy, Velazquez, & Herbert, 2015). Burgess et al. (2014a) point out that in normal weight individuals, it would be beneficial to know one’s dominant palatable food eating motive in order to aid healthier food choices.

Negative emotions (Depression, anxiety and stress) and palatable food

The normal response is to eat more when calm than when distressed, as the physiological signals of the fight or flight response inhibit gastric contractions and spike the blood sugar for fuel instead of eating (Schachter, Goldman, & Gordon, 1968). The ‘individual-difference model’ by Greeno and Wing (1994) describes individual differences in attitudes, learning history, biology, etc which result in varying levels of vulnerability to stress and its physical or psychological change, as to whether eating or not is undertaken but that chronic stress or intense emotions suppress appetite.

The emotion/food axis is bi-directional in nature (Köster & Mojet, 2015). Macht (1999) looked at two approaches to food, firstly the emotion-congruent approach where positive mood equates to increased motivation and pleasure in eating and secondly negative mood equating to the opposite, that of the emotion-regulating approach, where food is consumed to elicit an emotion or elevate an unpleasant one.

Desmet and Schifferstein (2008) looked at 22 emotions experienced as a result of food consumption and found that the majority reported were pleasant emotions. The researchers put forward five sources of food emotions as reported by the students (aged 21-28 years), that vary from food property or sensory attributes; experienced consequences and anticipated consequences; the context of the meal with personal/cultural meanings and finally actions of associated agents.

Negative emotional states such as depression affect our food choices and can lead to disordered eating behaviour patterns such as restrained, emotional and uncontrolled eating in a healthy female cohort aged 18 years plus (Prefit & Szentagotai-Tătar, 2018). Anxiety affects eating habits in healthy adults (Yannakoulia et al., 2008). Oliver and Wardle (1999) working with students found that 80% perceived that stress influenced their eating habits with 42% eating more and 38% eating less however the study found no gender differences on overall intake. The type of food chosen did differ when under stress with the majority consistently choosing highly palatable “snack type” foods rather than “meal-type” foods and Baumeister et al. (2002) found that emotional eating was more likely to manifest in snacking. Emotional eating can be defined as “the tendency to overeat in response to negative emotions such as anxiety or irritability” (van Strien et al., 2007, p. 106).

In a study using the Palatable eating motives scale (PEMS), Boggiano et al. (2017) worked with undergraduates and showed that conformity (external motive) brought its own social pressures such as failure-based stress and was linked with all three subscales of the Emotional Eating Scale (EES); feelings relating to Anger/Frustration; Anxiety and Depression for females and for males both anxiety and anger/frustration. Palatable food choice for social (external) motives showed no gender difference but was triggered in males to reduce failure stress and in females by anxiety. The two internal motives of the PEMS, that of coping and

enhancement were characterised by greater BMI. Both genders experienced greater eating concern and emotion-triggered eating under the coping motive, along with binge-eating for females.

Irrespective of the reasons for mood enhancement or coping motives, Macht and Mueller (2007) showed that it was the palatability of food that caused the immediate and more durable desired effects from eating. Palatable food consumption is positively reinforcing by the pleasurable experience of its taste, etc and restoring homeostasis and also by the “comforting” effects of relieving negative moods. Depression, anxiety and stress have the potential to be comorbid factors in addiction like eating as described by Parylak, Koob, & Zorrilla (2011) with repeated palatable food consumption downregulating the brain reward pathways so that further consumption is required to elevate negative emotions.

In an fMRI study of undergraduates experiencing academic stress, Neseliler et al. (2017) displayed pictures of high calorie food to one group (non-food pictures in the other) and this group showed increased blood oxygen levels to the reward systems of the amygdala and the ventromedial prefrontal cortex (vmPFC) and a reduced functional connectivity between the vmPFC and the dorsolateral prefrontal cortex which is an area involved in self-control.

Weight gain

The root of habit formation is the brains process of “chunking” sequences of actions into smaller associated patterns and then automaticity becomes more habitual and a routine is formed. The habit loop is made up of cue, routine, reward (repeated cyclically) and the pattern unfolds automatically with the prefrontal cortex executive functioning diminishing in influence and the basal ganglia contribution to automaticity and habit learning, dictating the process (Duhigg, 2012).

Palatable food, especially sucrose and fat have been shown to up-regulate hunger and satiety signal expression while in turn down-regulating the responses to satiety signals and at the same time activating opioids, dopamine and serotonin in the reward system resulting in excess eating and potential food addiction (Erlanson-Albertsson, 2005). Non homeostatic or ‘hedonic’ eating involves cognitive, emotional and reward factors and relies on the cortico-limbic structures of the brain and not the hypothalamus area which functions as a homeostatic regulator (Berthoud, 2011). Remick, Polivy, and Pliner (2009) discussed the positive and negative effects of variety of food from an evolutionary perspective but showed what is clear today is that variety has a great influence on increased food consumption.

Weight gain is a concern to young adults and college students are a risk population for rapid-weight gain, Nikolaou, Hankey, and Lean (2015) 63% of the 1,275 participants (first-year undergraduates) gained weight over a nine-month period with a mean gain of 1.8Kg (S.D:2.6kg) with students living away from home at higher risk due to obesogenic behaviours. A longitudinal study in a random sample of the general population showed that ambivalence to the content of palatable food was disclosed as an extra overeating behaviour beyond emotional eating and predicted weight fluctuations and that emotional eating predicted weight fluctuations (Keller & Siegrist, 2015).

When researching both perceived and chronic stress in relation to food, Groesz et al. (2012) found that both stresses led to a drive to eat and that non-nutritious palatable food consumption increased. Perceived stress was associated with decreased levels of healthy food choices such as vegetables and whole grain foods. The study also found that stress was related to higher levels of rigid restraint, which is an eating behaviour more associated with overeating. In a two-year longitudinal study of 192 college students eating palatable food to cope is associated with body mass index (Boggiano et al., 2015a).

Body appreciation

Body appreciation is a dimension of positive body image and is made up of four areas covered in the Body Appreciation Scale (BAS) namely; having positive opinions of the body, being in tune with the body's needs, being proactive in healthy behaviours and buffering unrealistic media ideals of bodies (Avalos, Tylka, & Wood-Barcalow, 2005). In a study exploring eating and weight related disturbances (external eating, emotional eating and restrictive eating) and associated depressive symptoms (as a result of one or more of those eating habits), Rawana, McPhie, and Hassibi (2016) found that body appreciation was negatively associated to those symptoms for both genders.

Gillen (2015) in a paper investigating associations between positive body image, mental and physical health, used the BAS to assess positive body image. The results showed that higher scores on the BAS resulted in lower depression levels, less participating in unhealthy dietary behaviors and more health-related behaviours for both genders. In a study of college women, Avalos and Tylka (2006) found that body appreciation predicted Intuitive eating. Intuitive eating is rooted in hunger and satiety cues as opposed to emotional, external or situational cues (Tylka, 2006).

Self-efficacy

Self-efficacy (SE) can be described as one's beliefs in one's ability to do what is required (and when) to achieve a desired level of attainment (Bandura, 1998). Perceived SE reflects a confidence to utilise skills that are required in a given situation to meet the situational demands such as cope with stress, resist temptation, procrastinate reward, etc (Bandura, 1997). General self-efficacy (GSE), as the name suggests, is an efficacy across a broad range of human behaviours. Luszczynska, Scholz, and Schwarzer (2005) found that strong GSE was related to

lower anxiety and depression in students as well as GSE having a positive correlation with self-regulation as explored in a meta-analysis of social-cognitive variables involving athletes, patients and students.

Self-regulation is the basis of purposeful action, Bandura (1991) and it encompasses self-efficacy which is central to the sense of personal agency and impacts thought, motivation, affect and action. Self-efficacy has been shown to predict both intentions and actual dietary behaviours in the general public by Povey, Conner, Sparks, James, and Shepherd (2000) and also self-efficacy as a component of the theory of planned behaviour (Armitage & Conner, 1999). Hollmann et al. (2012) when using an fMRI to investigate the volitional regulation of food demonstrated that thinking of the long-term costs of eating unhealthy food engaged areas of the prefrontal cortex associated with inhibitory response.

Rationale

Depression, anxiety and stress have been shown to increase palatable food consumption beyond homeostasis. Body appreciation has been shown to promote self-care & intuitive eating in line with homeostasis. Self-efficacy has been shown to predict and maintain healthy eating behaviours. This study will investigate the influences of body appreciation, self-efficacy, depression, anxiety and stress, in relation to palatable eating motives.

Hypothesis

Hypothesis 1. Scores on the depression, anxiety and stress scales will correlate to scores on the palatable eating motives scale.

Hypothesis 2. Body appreciation and self-efficacy will moderate the relationship between depression, anxiety and stress, with that of palatable eating motives.

Hypothesis 3. Body mass index will be positively correlated with the palatable eating motives score.

Methods

Participants

The current research comprised of 303 participants recruited via social media. 144 males (47%) and females (52.5%), total sample (N=303) were over 18 years. The sampling method was non-probability, convenience sampling in which 523 responded to the online survey with a 60% completion rate.

Design

This study used a quantitative, with-in subjects, correlational, cross-sectional design that targeted the accessible sample by way of convenience sampling. The anonymity of the respondents was a priority and was maintained in the design. The criterion variable was palatable eating motives and the predictor variables were depression, anxiety, stress, body appreciation and self-efficacy.

Measures

There were four questionnaires used to produce the data; The Palatable Eating Motives Scale (PEMS) (Burgess et al., 2014). The Depression Anxiety Stress Scale (DASS-21), (Lovibond & Lovibond, 1995). The Body Appreciation Scale-2 (BAS-2), Tylka and Wood-Barcalow (2015) and the General Self-Efficacy Scale-12 item (GSES-12), Bosscher and Smit (1998) and all are self-report. All four scales can be viewed in the appendix.

The Palatable Eating Motives Scale (PEMS)

This questionnaire consists of 19 questions with the answers rated on a 1-5 likert scale ranging from 1 (*Almost never/Never*) to 5 (*Almost always/Always*) to ascertain an individual's motives to consume foods that are high in fat, sugar and salt and sugary drinks, that are also referred to as palatable food. A high score relates to high consumption of palatable food. There are four sub-scales motives comprising the PEMS scale; Social motive with a Cronbach's alpha of .87, Conformity motive with a Cronbach's alpha of .73. Coping motive and Enhancement motive with a Cronbach's alpha of .91 and .83 respectively (Burgess, Turan, Lokken, & Boggiano, 2014).

The Depression, Anxiety and Stress Scale (DASS-21)

The DASS-21 consists of three scales containing seven items designed to measure the emotional states of depression, anxiety and stress. The rating score applied to a 4-point likert scale questions are zero (*Did not apply to me at all*) to three (*Applied to me very much or most of the time*). The total score is multiplied by two to get the final score as it is a more parsimonious version of the original DASS-42 scale. It is not a diagnostic tool for psychological disorders directly and is not designed to replace a clinical face to face interview. The DASS-21 demonstrates general psychological distress but with enough variance specific to each scale. The internal consistencies of the DASS-21 were Cronbach's alpha .88 for depression, .82 for anxiety and .90 for stress and .93 for the total score (Henry & Crawford, 2005). Scores range on each subscale but in all three scales a low score is labeled normal, through mild, moderate and severe to a high score of extremely severe. There is no reverse coding.

The Body Appreciation Score-2 (BAS-2)

This is a 10-item scale with the responses for each item ranging on a Likert scale from 1 (*Never*), 2 (*Seldom*), 3 (*Sometimes*), 4 (*Often*) and 5 (*Always*) to statements such as the examples,

I am attentive to my body's needs and *I am comfortable in my body*. The scoring procedure is to average the participants' responses to Items 1–10. A low score indicates a low body appreciation and a high score the opposite. There is no reverse coding. Tylka and Wood-Barcalow (2015), in a psychometric evaluation of this scale found support for the construct validities of convergent, incremental and discriminant, as well as test-retest reliability and internal consistency.

The General Self-Efficacy Scale (GSES-12)

The test format is a 12 item, 4-point Likert scale responses of 1 (*Not at all true*), 2 (*Barely true*), 3 (*Moderately true*) and 4 (*Exactly true*). The scale has three categories; Initiative, Effort and Persistence. Initiative has three statements that are all reverse coded, e.g: *If something looks too complicated, I will not even bother to try it*. Effort has 5 statements, e.g: *Failure just makes me try harder*. Persistence has 3 statements that are all reverse coded, e.g: *When I set important goals for myself, I rarely achieve them*. The GSES-12 originated in a 17-item measure Sherer et al. (1982) which in turn was rooted in the Self-efficacy theory of Bandura (1977). The GSES has been multiculturally validated in various studies across 25 countries (Luszczynska, 2003). The cronbach's alpha for the three subscales and the total scale ranged from .63 to .69 (Bosscher & Smit, 1998).

Procedure

The survey was created on www.surveymonkey.com and the link was posted online via social media on Facebook, LinkedIn and www.reddit.com. The link was also sent via Whatsapp messenger. The survey contained 66 questions on six pages, that utilised page randomisation on Survey monkey to minimise order bias. The survey commenced with an information sheet (see appendix) stating why the research was being carried out, the nature of the survey, approximately how long it took and the fact that the study was being carried out under the ethical guidelines of

the National college of Ireland and the Psychology society of Ireland. Most importantly, the anonymous, voluntary conditions of the survey were clearly stated and the participants right to withdraw prior to completion of the survey was emphasised. Contact details for the researcher and the supervisor were furnished along with The Samaritans website, phone number and email address.

The first question was a qualifying, over 18 years old and an answer of ‘yes’ brought the participant to the start of the questionnaires. Contact details and The Samaritans details were supplied again in a debriefing sheet at the end of the survey (see appendix).

Results

Categorical descriptives

Table: A

Frequencies for Categorical Data of Demographic Variables (N = 303)

Variable	Frequency	Valid Percentage
Gender		
Male	144	47.5
Female	159	52.5

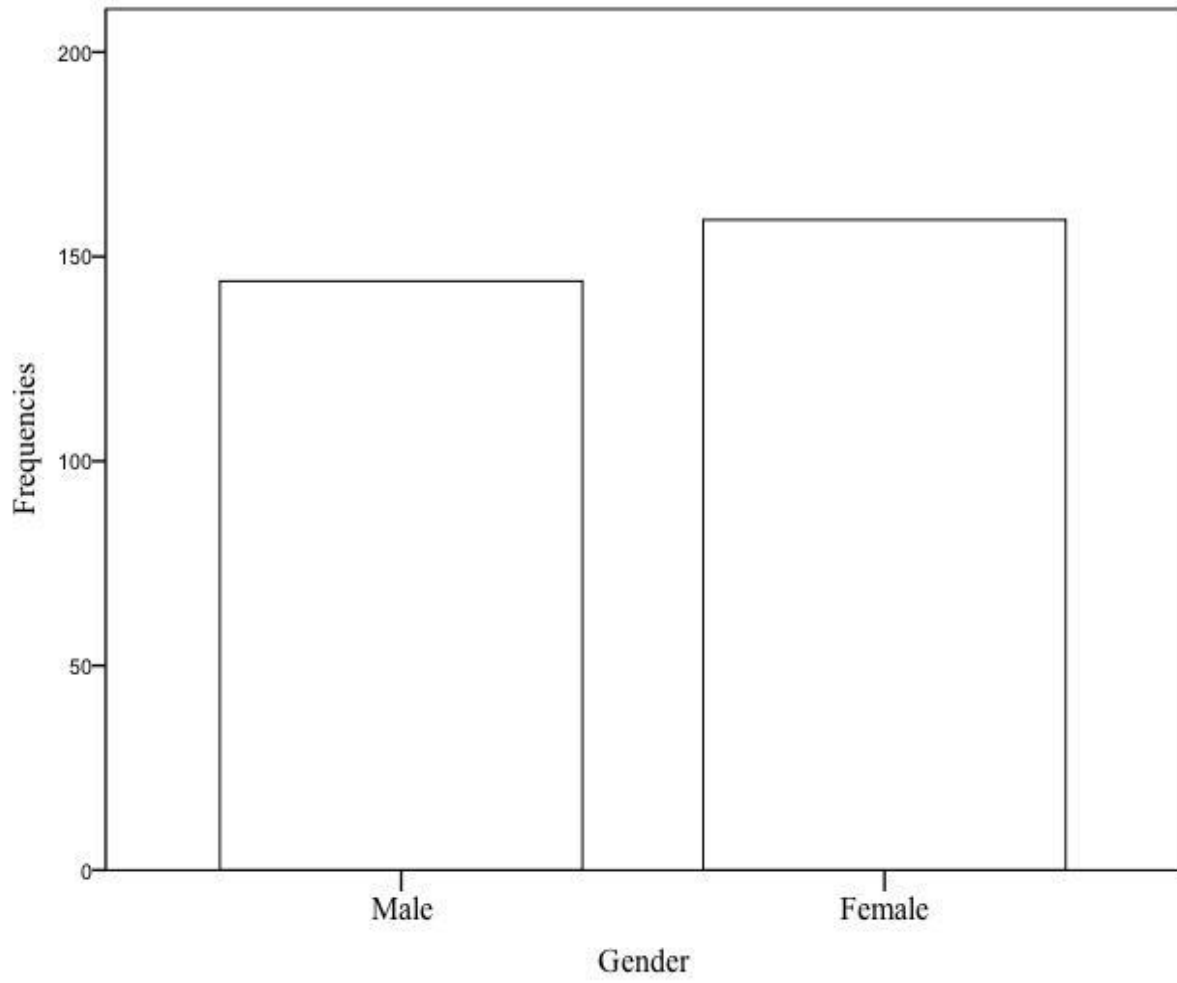


Figure 1. Gender bar chart.

Table: B

Frequencies of BMI Weight Categories WHO (2019), (n=299)

Variable	Frequency	Valid percentage
BMI weight categories		
Under weight	15	5
Normal weight	149	49.8
Over weight	83	27.8
Obese	52	17.4

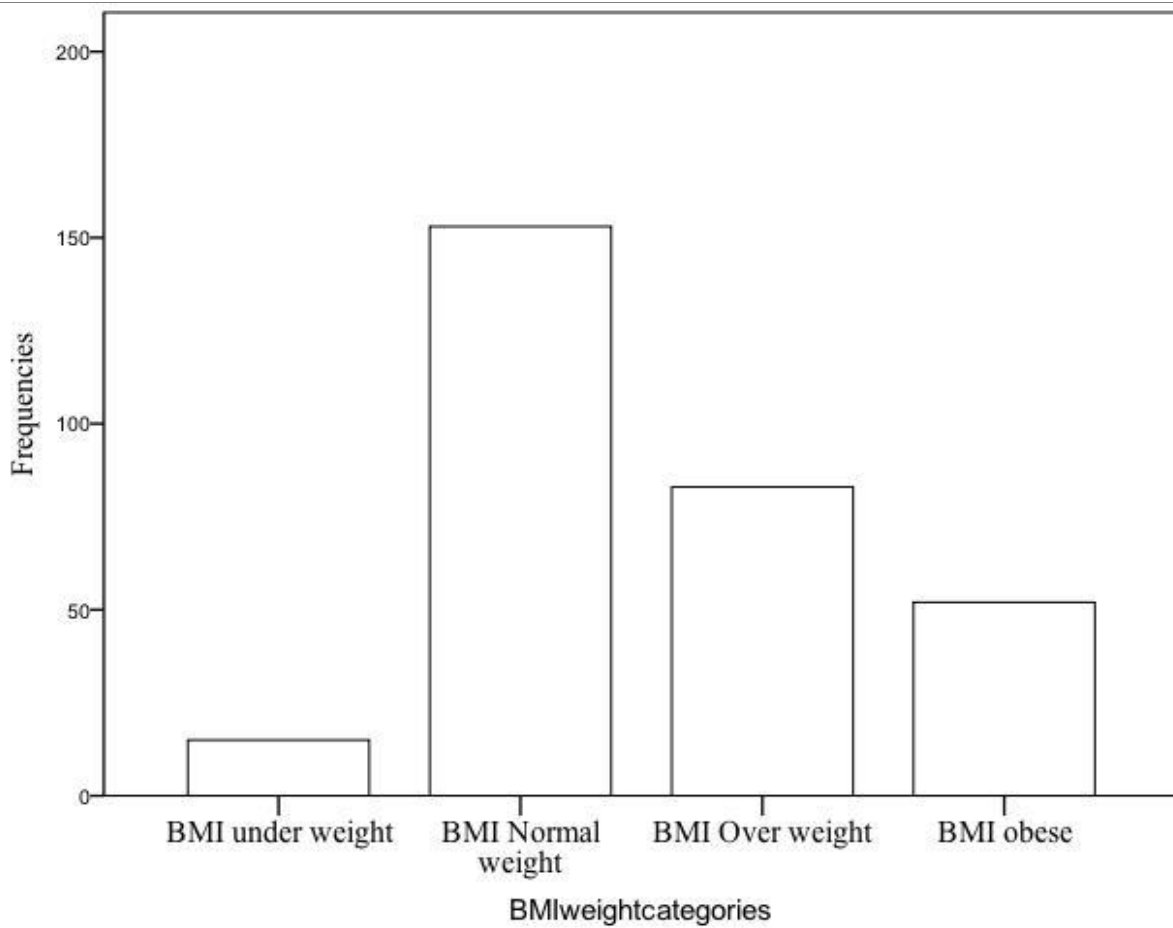
*Figure 2. BMI weight categories.*

Table: C

Descriptive Statistics of Continuous Variables

	Mean (95% Confidence Intervals)	Std. Error Mean	Median	SD	Range
Palatable eating motives	36.71 (35.45-37.98)	.64	35	11.17	19-84
Depression	13.01 (11.60-14.42)	.72	8	12.46	0-42
Anxiety	8.47 (7.48-9.46)	.50	6	8.77	0-58
Stress	14.69 (13.67-15.72)	.52	12	9.07	0-42
Body Appreciation	31.60 (30.55-32.64)	.53	32	9.23	10-50
Self-efficacy	35.36 (34.55-36.16)	.41	36	7.09	17-48

Table: D

Displaying Correlations Between all Continuous Variables

Variables	1	2	3	4	5	6
1.Palatable eating motives	1					
2.Depression	.01	1				
3.Anxiety	.20**	.58**	1			
4.Stress	.28**	.70**	.70**	1		
5.Body Appreciation	-.18**	-.59**	-.40**	-.53**	1	
6.Self-efficacy	-.12*	-.63**	-.43**	-.55**	.49**	1

Note: Statistical significance: * $p < .05$, ** $p < .01$, *** $p < .001$

Table: E.

Hierarchical Multiple Regression of Palatable Eating Motives.

	<i>R</i>	<i>R</i> ²	<i>R</i> ² <i>Change</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>
Step 1	.31	.10***					
Depression				-.17	.07	-.19*	-2.49
Anxiety				.04	.10	.03	.38
Stress				.49	.11	.40***	4.45
Step 2	.33	.11	.09				
Depression				-.22	.07	-.24**	-2.93
Anxiety				.04	.10	.03	.39
Stress				.46	.11	.37***	4.10
Body appreciation				-.14	.08	-.11	-1.66
Step 3	.33	.11	.09				
Depression				-.22	.08	-.24**	-2.76
Anxiety				.04	.10	.03	.39
Stress				.46	.11	.37***	4.06
Body appreciation				-.14	.09	-.11	-1.63
Self-efficacy				-.00	.11	-.00	-.02

Note: Statistical significance: * $p < .05$; ** $p < .01$; *** $p < .001$

Hierarchical multiple regression was performed to investigate the ability of depression, anxiety and stress to predict levels of palatable eating motives and adding two other variables, body appreciation and self-efficacy for further analysis. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. Additionally, the correlations amongst the first three predictor variables (depression, anxiety and stress) were examined and these are presented in Table C. All correlations were moderate ranging between $r = .58$ to $.70$ but passed the tolerance and VIF tests for multicollinearity. All five continuous variables were correlated (1-tailed) with palatable eating motives which indicates that the data was suitable for multiple linear regression analysis. Depression (sig: .04) and self-efficacy (sig:.02) did not survive after the bonferroni correction of .003 for statistical significance (1-tailed).

Since no *a priori* hypotheses had been created to determine the order of entry of the predictor variables, a direct method was used for the analysis. In the first step of hierarchical multiple regression, three predictors were entered: depression, anxiety and stress. This model was statistically significant $F(3, 299) = 10.82; p < .001$ and explained 10% of variance in palatable eating motives (see Table E for full details). After the entry of body appreciation at Step 2 the total variance explained by the model was 11% ($F(4, 298) = 8.85; p < .001$). The introduction of self-efficacy at step 3 did not explain any additional variance in palatable eating motives however the model was statistically significant (R^2 Change = .00; $F(5, 297) = 7.05; p < .001$).

In the final model, stress was the strongest predictor ($\beta = .37, p < .001$) and depression ($\beta = -.24, p < .01$) predicted palatable eating motives to a statistically significant degree. The Anova table was statistically significant at each block and as a whole model.

T-tests

T-tests were conducted to compare males and females in relation to all the continuous variables; the statistically significant ones are reported here.

An independent samples t-test was conducted to compare levels of PEMS between males and females. There was a significant difference in scores ($t(301) = 2.18, p = .03$) with females ($M = 38.04, SD = 11.39$) scoring higher than males ($M = 35.25, SD = 10.77$). The magnitude of the differences in the means (mean difference = 2.79, 95% CI: 5.30 - .27) was small (Cohen's $d = .25$).

An independent samples t-test was conducted to compare levels of social motives between males and females. There was a significant difference in scores ($t(301) = 2.78, p = .006$) with females ($M = 11.72, SD = 4.67$) scoring higher than males ($M = 10.31, SD = 4.15$). The magnitude of the differences in the means (mean difference = 1.41, 95% CI: 2.42 - .42) was small (Cohen's $d = .32$).

Correlations

The palatable eating motives scale (PEMS) has four subscales; coping motives, enhancement motives, social motives and conformity motives. The relationships of these subscales and the five predictor variables depression, anxiety, stress, body appreciation and self-efficacy were all examined using a Pearson product-moment correlation coefficient.

Stress had a moderate, positive correlation with coping, $r = .42$ [95% CI = .31 - .51], $n = 303$, $p < .001$; a small, positive correlation with conformity, $r = .25$ [95% CI = .13 - .36], $n = 303$, $p < .001$ and also had a small, positive correlation with enhancement, $r = .18$ [95% CI = .06 - .29], $n = 303$, $p = .002$ but no significant correlation with the social palatable eating motives.

Depression was moderately and positively correlated to coping, $r = .34$, [95% CI = .23 - .45], $n = 303$, $p < .001$; had a small, negative correlation to social $r = -.12$ [95% CI = -.22 - -.03], $n = 303$, $p = .03$ but was not significantly correlated to either enhancement or conformity.

Anxiety was moderately, positively correlated with coping, $r = .3$ [95% CI = .19 - .41], $n = 303$, $p < .001$ and had a small, positive correlation with conformity $r = .29$, [95% CI = .17 - .42], $n=303$, $p < .001$.

Correlations (cont.)

The relationship between body appreciation and coping was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a moderate, negative correlation between the two variables ($r = -.40$ [95% CI = $-.49 - -.29$], $n = 303$, $p < .001$). This indicates that the two variables share approximately 16% of variance in common. Results indicate that higher levels of body appreciation are associated with lower coping motives in relation to palatable eating. No other PEMS subscale had a significant relationship to body appreciation.

The relationship between self-efficacy and coping was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a moderate, negative correlation between the two variables ($r = -.31$ [95% CI = $-.42 - -.20$], $n = 303$, $p < .001$). This indicates that the two variables share approximately 10% of variance in common. Results indicate that higher levels of self-efficacy are associated with lower coping motives in relation to palatable eating. No other PEMS subscale had a significant relationship to self-efficacy.

The relationship between body mass index and palatable eating motives scale was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. No correlation between the two variables was found ($r = -.00$ [95% CI = $-.13 - .11$], $n = 303$, $p = .97$). None of the four PEMS subscales were significantly correlated to BMI either.

Discussion

Body Mass Index

Hypothesis 3 was investigated using a Pearson product-moment correlation coefficient to ascertain if body mass index was correlated to the palatable eating motives scale (PEMS) and no statistical significance was found and neither was there a meaningful, correlation with BMI and any of the four subscales of the palatable eating motives. Although this finding was contrary to a lot of previous data, Gearhardt et al. (2011), this hypothesis is now rejected.

Boggiano et al (2015b) found that scores on the PEMS did predict BMI scores. Boggiano et al (2017) examining the four subscales of PEMS found coping and reward enhancement were characterised by greater BMI. Burgess et al. (2014b) showed that while high scores on all the subscales may be linked with higher BMI scores, the coping subscale accounted for unique variance in their findings.

Stress

Hypothesis one is rejected and the null accepted as not all the data supported the hypothesis. In the first step of the hierarchical multiple regression model, depression, anxiety and stress accounted for 10% of the shared variance with palatable eating motives, however anxiety levels were at a non-significant level. In step three of the model; only stress was a positive, statistically significant predictor of palatable eating motives, depression was a negative predictor of palatable eating motives and anxiety was not statistically significant throughout the three steps.

Stress by itself is anorexigenic and undereating during times of stress is a physiologically adaptive response of the HPA axis in the short-term (Bazhan & Zelena, 2013). Fundamentally, food is necessary for life and when consumption does take place, the reward system in the body releases dopamine which is linked with motivational “wanting” and opioids and benzodiazepines which are linked with “liking” (Berridge & Robinson, 1998). These chemicals in conjunction with other elements such as meal size and type of food, timing, expectation, sensation, etc can make food very pleasurable, mood altering and stress alleviating (Gibson, 2006). Palatable foods have been shown to disrupt appetite regulation and this can lead to hyperphagia (Erlanson-Albertsson, 2005). This research found no significant correlation between stress and BMI and revealed that the social motive for palatable eating was the least related to stress, as was also found by Boggiano et al. (2015a).

Depression

This research revealed that as depression levels increased the social motive of palatable food choice decreased. Females scored higher on social motives than males. The relationship between depression and the whole palatable eating motives scale was nonsignificant in this research. Macht (1999) found that participants food consumption was low and positively correlated to BMI when experiencing negative emotions. Recent research by Rawana et al. (2016) demonstrated links between depression and hedonic food consumption.

Positive Body Image

In a study by Tylka (2011) the body appreciation scale is described as the most empirically backed measure of positive body image, defined as an ‘individuals’ connection with their physical selves in an appreciating, protecting and accepting manner’. Positive body

image is a different construct from negative body image, in the sense that one is not present simply in the absence of the other; in the same way that happiness is more than an absence of sadness.

Self-care maintenance inherently involves eating behaviour and Tylka (2011) states that high positive body image is a buffer to dieting behaviours and maladaptive eating. Moreover, body appreciation in a behavioural context has been linked with eating in accordance with physiological hunger and satiety signals in what is also referred to as intuitive eating. The body appreciation scale assesses four aspects of positive body image namely; body acceptance, body appreciation, self-care and media literacy but as a construct positive body image is a lot more than just body appreciation. Individuals possessing a positive body image consistently engage in healthy behaviours; eat intuitively, exercise for pleasure, are optimistic and have adaptive stress relief strategies (Tylka, 2011).

Body appreciation has positive correlations to self-esteem in both genders in US college students Tylka (2013), British adults, Swami et al. (2013) and Austrian adults (Swami, Stieger, Haubner, & Voracek 2008). Self-compassion, a related construct to positive body image has been associated with high self-esteem and fewer depressive symptoms and less body preoccupation in females (Wasylikiw, MacKinnon, & MacLellan, 2012).

While this research found the addition of body appreciation, in the second step of the hierarchical regression model, did not improve the variance with palatable eating motives and was therefore a contributing factor in the second hypothesis not being upheld and the null accepted; body appreciation was correlated with coping, explaining approximately 16% of the variance in a moderate, negative correlation, with increased body appreciation leading to less coping motives in relation to palatable food choice.

Self-efficacy

The application of self-efficacy to health behaviours was a natural progression of investigation after the seminal paper of Bandura (1977) that outlined the theory of self-efficacy and Sallis, Pinski, Grossman, Patterson, and Nader (1988) were the first to study self-efficacy expectations of the general population in relation to eating and exercise behaviours. They found that self-efficacy was strongly related to attempts to change and maintain dietary and exercise habits.

While the addition of general self-efficacy in step 3 of the hierarchical multiple regression model did not increase the prediction of palatable eating motives; it was nevertheless negatively correlated to coping, meaning higher self-efficacy resulted in less coping motives in relation to palatable food choice, explaining 9.6% of the variance. However, as neither body appreciation nor general self-efficacy moderated the relationship of depression, anxiety and stress collectively with palatable eating motives, the second hypothesis was rejected and the null accepted.

Health intervention strategies

Prestwich et al. (2014) in a meta-analysis of randomised controlled trials consisting of research into healthy eating interventions and the underlying self-efficacy, (otherwise described in the study as ‘beliefs about capabilities’) investigated 26 behavioural change techniques (BCTs) to analyse the most effective and their association with self-efficacy, by using a meta-regression. The results showed that ‘Prompt self-monitoring’ and ‘prompt review of behavioural targets’ were two internal strategies that yielded modest success and increased self-efficacy; while ‘performance feedback’, ‘contingent rewards’ and ‘social support’ as external sources, also provided modest increases to self-efficacy.

The two internal strategies relate to performance accomplishment, one of the four sources of self-efficacy according to Bandura (1977). The external sources relate to two other self-efficacy sources, that of verbal persuasion and/or vicarious experience aka modelling. The remaining fourth source of self-efficacy is the physiological state. Bandura believed that a state of high arousal impeded performance and that the body interpreted this as tension and stress, which in turn could lead to attrition of self-efficacy. High self-efficacy results in fewer high arousal states, with the accompanying reduction in anxiety and stress. Prestwich et al. (2014) found strong evidence to single out stress-management, as a technique that was the most effective component of any intervention strategy and the most effective regarding dietary self-efficacy across all analyses.

Coping skills

Boggiano et al. (2015a) showed that an increase in coping skills predicted a reduction in BMI over two years. Coping was the only PEMS subscale in this research that was significantly correlated to all three negative mood states of the predictor variables, meaning that when depression, anxiety and stress increased; coping as a motive for palatable food choice increased as well.

In lieu of the coping skills and the potential self-efficacy reducing effects on arousal people can turn to food as a comfort. The relationships between physiological arousal, emotions and mood are bound to be complex. They are subjective, effected by the environment, motivational state and personality, cognition, etc, Gibson (2006) who wrote “emotions can be defined as short-term affective responses to appraisals of particular stimuli, situations or events having reinforcing potential” (p.54).

Lazarus and Folkman (1987) studied emotions and coping; looking at daily stress, appraisal and coping. A consistent theme in coping as a process is contextual appraisal. Coping has problem-focused forms and emotion-focused forms. While problem-focused forms tended to be highly variable across situations, emotion-focused coping such as self-controlling coping and positive reappraisal were found to be relatively stable within the person.

Cognitive reappraisals

Cognitive reappraisals to food cravings have been shown in research, using functional magnetic resonance imaging (fMRI) by Yokum and Stice (2013), to increase activation in the inhibitory regions and decrease activation in the attention-related regions in both Obese and normal weight individuals in response to palatable food images. The three reappraisal strategies were all cost/benefit based and concentrating on the *long-term benefits of not eating the food* was found to be most successful strategy. Another study using a fMRI by Neseliler et al. (2017) investigating stress-reactivity and appetite control areas of the brain suggest a personality-dependent impulsivity to palatable food cues may lead to a vulnerability to hedonic consumption. Personality factors have been raised in other studies, for example with Wallis and Hetherington (2004) who identified “emotional-eaters” as prone to excessive eating and the researchers proposed that this was an attempt to escape from self-awareness. Jordan, Wang, Donatoni, and Meier (2014) advocate self-awareness and self-acceptance through both trait and state mindfulness leading to mindful eating that predicts healthier eating.

In what is still a relatively new field, Allen, Dinan, Clarke, and Cryan (2017) investigated the bidirectional relationship between the brain-gut-microbiome axis, point to

the high comorbidity of gastrointestinal problems and psychological distress and that clinical psychologists should be aware of the ability to alleviate distress through dietary intervention and probiotic supplementation. A healthy body is a healthy mind (Rogers, 2001; Weinstein & Erickson, 2011).

Gender differences

Wardle et al. (2004) in a large study involving over 23 countries, found gender differences in health behaviours, with females more likely to try to limit salt, avoid high-fat foods, eat more fruit and fiber but also be more likely to be ‘dieting’ than males. Health beliefs accounted for approximately 40% and dietary behaviour an additional 10% of the gender differences. The current research had a sample size of 303 with nearly a 50% split in males and females and results found gender differences in the palatable eating motives scale, with an independent t-test showing females scored higher, with a small effect size (Cohen’s $d = .25$). Boggiano et al (2017) found gender-divergent eating patterns across the palatable eating motives scale which reflected the complexity and heterogeneity of hedonic eating in a non-clinical sample.

Limitations and future study

This research was a cross-sectional design and as such causal claims are weak and limited as opposed to a longitudinal study which can tease out the relationships investigated in this study better. The self-report measure used is subjective by nature and prone to biases, for example, recall bias, confirmation bias and social desirability. Survey monkey, the website used to construct the questionnaire gave an estimated completion time of 11 minutes, however the actual, average completion time was 5 minutes 35 seconds. Considering there was 66 questions, mostly of an introspective nature, that completion time gives less than 10

seconds per question. There was no data collected regarding alcohol consumption which could be a factor in body mass index. The BMI itself has come in for some criticism and is far from a perfect anthropometric measure, Prentice and Jebb (2001). While this research had respondents from several different continents, there was no ethnicity data collected nor was there an age question other than the qualifying over 18 years of age question. These would have added to the research as previous study has shown that body appreciation fluctuates over age groups and gender (Tylka, 2011).

General self-efficacy has been related to active coping, self-regulation and positively correlated to self-efficacy beliefs about specific behaviours (Luszczynska et al., 2005). However, future research might choose a domain specific self-efficacy. Self-esteem as a facet of positive body image might be interesting in relation to palatable eating motives. Future research could look at the differences in body appreciation between the four BMI weight groups. This did not form part of the hypotheses of this research, however the researcher found statistically significant differences of moderate effects, not reported here. The researcher acknowledges that there are many confounding factors such as education attainment levels, socio-economic status, exercise, etc.

Conclusion

This research aimed to be an addition to the worlds of health and positive psychology by investigating the relationships between palatable eating motives, negative emotional states of depression, anxiety and stress and the potential positivity of body appreciation and self-efficacy. This research was interested in the motivations of food choice in a non-clinical sample.

In a hierarchical regression model (HRM), stress was found to be an emotion that was correlated positively with palatable food eating motives, depression was negatively correlated with palatable food eating motives and anxiety was not statistically significant. Although neither body appreciation nor self-efficacy had a significant effect on the HRM, both individually had a moderate, negative correlation to the coping motives of the palatable eating motives scale, which is most associated of the four subscales with stress and weight gain. When depression, anxiety and stress increased, so too did coping as a motive in relation to palatable food choice. Body appreciation and self-efficacy had a moderate to large, negative correlation to all three emotional states. Body appreciation and self-efficacy were found to have a positive, moderate, correlation.

The coping motive of the palatable eating motives scale was the most consistent theme in this study. It would be beneficial in future health interventions to promote body appreciation as part of positive body image education and teach self-efficacy as a concept. Furthermore, coping skills/Life skills should be on the curriculum from primary school age level, if we are to furnish children with the knowledge and tools to cope with the lifelong realities of emotions and food choices. The researcher suggests positive body image and mental health education classes for primary schools onwards.

References

- Allen, A. P., Dinan, T. G., Clarke, G., & Cryan, J. F. (2017). A psychology of the human brain–gut–microbiome axis. *Social and Personality Psychology Compass, 11*(4), e12309.
- Alliance, I. U. N. (2011). National Adult Nutrition Survey.
- Armitage, C. J., & Conner, M. (1999). Distinguishing perceptions of control from self-efficacy: Predicting consumption of a low-fat diet using the theory of planned behavior 1. *Journal of Applied Social Psychology, 29*(1), 72-90.
- Avalos, L., Tylka, T. L., & Wood-Barcalow, N. (2005). The body appreciation scale: Development and psychometric evaluation. *Body Image, 2*(3), 285-297.
- Avalos, L. C., & Tylka, T. L. (2006). Exploring a model of intuitive eating with college women. *Journal of Counseling Psychology, 53*(4), 486.
- Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191.
- Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes, 50*(2), 248-287.
- Bandura, A. (1997). Theoretical perspectives. *Self-efficacy: The exercise of control*, 1-35.
- Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology and Health, 13*(4), 623-649.
- Baumeister, R. F., Heatherton, T. F., Tice, D. M., Boekaerts, M., Pintrich, P. R., & Zeidner, M. (2002). Losing control: How & why people fail at self-regulation and Handbook of self-regulation. *Journal of Psychiatry & Law, 30*(2), 283–284. Retrieved from

<http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2002-11064-008&site=ehost-live>

- Bazhan, N., & Zelena, D. (2013). Food-intake regulation during stress by the hypothalamo-pituitary-adrenal axis. *Brain Research Bulletin, 95*, 46-53.
- Berridge, K. C., & Robinson, T. E. (1998). What is the role of dopamine in reward: hedonic impact, reward learning, or incentive salience?. *Brain Research Reviews, 28*(3), 309-369.
- Berthoud, H. R. (2011). Metabolic and hedonic drives in the neural control of appetite: who is the boss?. *Current Opinion in Neurobiology, 21*(6), 888-896.
- Boggiano, M. M., Wenger, L. E., Turan, B., Tatum, M. M., Morgan, P. R., & Sylvester, M. D. (2015a). Eating tasty food to cope Longitudinal association with BMI. *Appetite, 87*, 365–370. <https://doi.org/10.1016/j.appet.2015.01.008>
- Boggiano, M. M., Wenger, L. E., Turan, B., Tatum, M. M., Sylvester, M. D., Morgan, P. R., ... & Burgess, E. E. (2015b). Real-time sampling of reasons for hedonic food consumption: Further validation of the Palatable Eating Motives Scale. *Frontiers in Psychology, 6*, 744.
- Boggiano, M. M., Wenger, L. E., Burgess, E. E., Tatum, M. M., Sylvester, M. D., Morgan, P. R., & Morse, K. E. (2017). Eating tasty foods to cope, enhance reward, socialize or conform: What other psychological characteristics describe each of these motives? *Journal of Health Psychology, 22*(3), 280–289. <https://doi.org/10.1177/1359105315600240>
- Bosscher, R. J., & Smit, J. H. (1998). General Self-Efficacy Scale—12 Item. *PsycTESTS*. <http://dx.doi.org/10.1037/t16705-000>
- Burgess, E. E., Turan, B., Lokken, K. L., Morse, A., & Boggiano, M. M. (2014a). Palatable Eating Motives Scale. *PsycTESTS*. <http://dx.doi.org/10.1037/t29813-000>

- Burgess, E. E., Turan, B., Lokken, K. L., Morse, A., & Boggiano, M. M. (2014b). Profiling motives behind hedonic eating Preliminary validation of the Palatable Eating Motives Scale. *Appetite*, *72*, 66–72. <https://doi.org/10.1016/j.appet.2013.09.016>
- Desmet, P. M. A., & Schifferstein, H. N. J. (2008). Sources of positive and negative emotions in food experience. *Appetite*, *50*(2–3), 290–301. <https://doi.org/10.1016/j.appet.2007.08.003>
- Duhigg, C. (2012). *The power of habit: Why we do what we do in life and business*. New York, NY: Random House. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2012-09134-000&site=ehost-live>
- Erlanson-Albertsson, C. (2005). How palatable food disrupts appetite regulation. *Basic & Clinical Pharmacology & Toxicology*, *97*(2), 61-73.
- Gearhardt, A. N., Grilo, C. M., DiLeone, R. J., Brownell, K. D., & Potenza, M. N. (2011). Can food be addictive? Public health and policy implications. *Addiction*, *106*(7), 1208–1212. <https://doi.org/10.1111/j.1360-0443.2010.03301.x>
- Gibson, E. L. (2006). Emotional influences on food choice: sensory, physiological and psychological pathways. *Physiology & Behavior*, *89*(1), 53-61.
- Gillen, M. M. (2015). Associations between positive body image and indicators of men’s and women’s mental and physical health. *Body Image*, *13*, 67–74. <https://doi.org/10.1016/j.bodyim.2015.01.002>
- Global Panel on Agriculture and Food Systems for Nutrition (2016) Food Systems and Diets: Facing the Challenges of the 21st Century. London: Global Panel; available at <http://glopan.org/sites/default/files/ForesightReport.pdf>

- Greeno, C. G., & Wing, R. R. (1994). Stress-induced eating. *Psychological Bulletin*, *115*(3), 444.
- Groesz, L. M., McCoy, S., Carl, J., Saslow, L., Stewart, J., Adler, N., ... & Epel, E. (2012). What is eating you? Stress and the drive to eat. *Appetite*, *58*(2), 717-721.
- Henry, J. D., & Crawford, J. R. (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, *44*(2), 227-239.
- Hollmann, M., Hellrung, L., Pleger, B., Schlögl, H., Kabisch, S., Stumvoll, M., ... & Horstmann, A. (2012). Neural correlates of the volitional regulation of the desire for food. *International Journal of Obesity*, *36*(5), 648.
- Jordan, C. H., Wang, W., Donatoni, L., & Meier, B. P. (2014). Mindful eating: Trait and state mindfulness predict healthier eating behavior. *Personality and Individual Differences*, *68*, 107-111.
- Keller, C., & Siegrist, M. (2015). Ambivalence toward palatable food and emotional eating predict weight fluctuations. Results of a longitudinal study with four waves. *Appetite*, *85*, 138-145.
- Köster, E. P., & Mojet, J. (2015). From mood to food and from food to mood: A psychological perspective on the measurement of food-related emotions in consumer research. *Food Research International*, *76*, 180-191.
- Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality*, *1*(3), 141-169.

- Lovibond, S. H., & Lovibond, P. F. (1995). Depression Anxiety Stress Scales. *PsycTESTS*.
<http://dx.doi.org/10.1037/t01004-000>
- Luszczynska, A. (2003). General Self-Efficacy Scale: Multicultural Validation Studies in 25 Countries. *General Self-Efficacy Scale: Multicultural Validation Studies in 25 Countries*, 2. <https://doi.org/10.1037/e355242004-001>
- Luszczynska, A., Scholz, U., & Schwarzer, R. (2005). The general self-efficacy scale: Multicultural validation studies. *The Journal of Psychology: Interdisciplinary and Applied*, 139(5), 439–457. <https://doi.org/10.3200/JRLP.139.5.439-457>
- Macht, M. (1999). Characteristics of eating in anger, fear, sadness and joy. *Appetite*, 33(1), 129–139. <https://doi.org/10.1006/appe.1999.0236>
- Macht, M., & Mueller, J. (2007). Immediate effects of chocolate on experimentally induced mood states. *Appetite*, 49(3), 667–674. <https://doi.org/10.1016/j.appet.2007.05.004>
- McCarthy, M., & McCarthy, S. (2017) *The sweet spot for health and taste*. Retrieved from Teagasc <https://www.teagasc.ie/media/website/publications/2017/16-The-sweet-spot-for-health-and-taste.pdf>
- Monteiro, C. A., Cannon, G., Moubarac, J. C., Levy, R. B., Louzada, M. L. C., & Jaime, P. C. (2018). The UN Decade of Nutrition, the NOVA food classification and the trouble with ultra-processing. *Public Health Nutrition*, 21(1), 5-17.
- Murphy, E. A., Velazquez, K. T., & Herbert, K. M. (2015). Influence of high-fat-diet on gut microbiota: A driving force for chronic disease risk. *Current Opinion in Clinical Nutrition and Metabolic Care*, 18(5), 515.

- Neseliler, S., Tannenbaum, B., Zacchia, M., Larcher, K., Coulter, K., Lamarche, M., ... Dagher, A. (2017). Academic stress and personality interact to increase the neural response to high-calorie food cues. *Appetite, 116*, 306–314.
<https://doi.org/10.1016/j.appet.2017.05.016>
- Nikolaou, C. K., Hankey, C. R., & Lean, M. E. J. (2015). Weight changes in young adults: a mixed-methods study. *International Journal of Obesity, 39*(3), 508.
- Oliver, G., & Wardle, J. (1999). Perceived effects of stress on food choice. *Physiology & Behavior, 66*(3), 511-515.
- Parylak, S. L., Koob, G. F., & Zorrilla, E. P. (2011). The dark side of food addiction. *Physiology & Behavior, 104*(1), 149–156. <https://doi.org/10.1016/j.physbeh.2011.04.063>
- Povey, R., Conner, M., Sparks, P., James, R., & Shepherd, R. (2000). Application of the Theory of Planned Behaviour to two dietary behaviours: Roles of perceived control and self-efficacy. *British Journal of Health Psychology, 5*(2), 121-139.
- Prefit, A. B., & Szentagotai-Tătar, A. (2018). Depression and disordered eating behaviors: The role of emotion regulation difficulties. *Journal of Evidence-Based Psychotherapies, 18*(1), 95–106. <https://doi.org/10.24193/jebp.2018.1.8>
- Prentice, A. M., & Jebb, S. A. (2001). Beyond body mass index. *Obesity Reviews, 2*(3), 141-147.
- Prestwich, A., Kellar, I., Parker, R., MacRae, S., Learmonth, M., Sykes, B., ... & Castle, H. (2014). How can self-efficacy be increased? Meta-analysis of dietary interventions. *Health Psychology Review, 8*(3), 270-285.

- Rawana, J. S., McPhie, M. L., & Hassibi, B. (2016). Eating- and weight-related factors associated with depressive symptoms in emerging adulthood. *Eating Behaviors*, 22, 101–108. <https://doi.org/10.1016/j.eatbeh.2016.04.002>
- Remick, A. K., Polivy, J., & Pliner, P. (2009). Internal and external moderators of the effect of variety on food intake. *Psychological Bulletin*, 135(3), 434–451. <https://doi.org/10.1037/a0015327>
- Rogers, P. J. (2001). A healthy body, a healthy mind: long-term impact of diet on mood and cognitive function. *Proceedings of the Nutrition Society*, 60(1), 135-143.
- Sallis, J. F., Pinski, R. B., Grossman, R. M., Patterson, T. L., & Nader, P. R. (1988). The development of self-efficacy scales for health-related diet and exercise behaviors. *Health Education Research*, 3(3), 283-292.
- Sandhu, K. V., Sherwin, E., Schellekens, H., Stanton, C., Dinan, T. G., & Cryan, J. F. (2017). Feeding the microbiota-gut-brain axis: diet, microbiome, and neuropsychiatry. *Translational Research*, 179, 223-244.
- Schachter, S., Goldman, R., & Gordon, A. (1968). Effects of fear, food deprivation, and obesity on eating. *Journal of Personality and Social Psychology*, 10(2), 91.
- Sherer, M., Maddux, J. E., Mercandante, B., Prentice-Dunn, S., Jacobs, B., & Rogersok, R. W. (1982). General Self-Efficacy Scale. *PsycTESTS*. <https://doi.org/10.1037/t03070-000>
- Swami, V., Stieger, S., Haubner, T., & Voracek, M. (2008). German translation and psychometric evaluation of the Body Appreciation Scale. *Body Image*, 5(1), 122-127
- Swami, V., Tran, U. S., Brooks, L. H., Kanaan, L., LUESSE, E. M., Nader, I. W., ... & Voracek, M. (2013). Body image and personality: Associations between the Big Five Personality

- Factors, actual-ideal weight discrepancy, and body appreciation. *Scandinavian Journal of Psychology*, 54(2), 146-151.
- Turner, S. A., Luszczynska, A., Warner, L., & Schwarzer, R. (2010). Emotional and uncontrolled eating styles and chocolate chip cookie consumption. A controlled trial of the effects of positive mood enhancement. *Appetite*, 54(1), 143-149.
- Tylka, T. L. (2006). Development and psychometric evaluation of a measure of intuitive eating. *Journal of Counseling Psychology*, 53(2), 226.
- Tylka, T. L. (2011). Positive psychology perspectives on body image. In T. F. Cash & L. Smolak (Eds.), *Body image: A Handbook of Science, Practice, and Prevention*, 2nd ed. (pp. 56–64). New York, NY: Guilford Press. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2011-20792-007&site=ehost-live>
- Tylka, T. L. (2013). Evidence for the Body Appreciation Scale's measurement equivalence/invariance between US college women and men. *Body Image*, 10(3), 415-418.
- Tylka, T. L., & Wood-Barcalow, N. L. (2015). Body Appreciation Scale-2. *PsycTESTS*. <http://dx.doi.org/10.1037/t41129-000>
- Tylka, T. L., & Wood-Barcalow, N. L. (2015). The Body Appreciation Scale-2: Item refinement and psychometric evaluation. *Body Image*, 12, 53–67. <http://dx.doi.org/10.1016/j.bodyim.2014.09.006>
- van Strien, T., van de Laar, F. A., van Leeuwe, J. F., Lucassen, P. L., van den Hoogen, H. J., Rutten, G. E., & van Weel, C. (2007). The Dieting dilemma in patients with newly

- diagnosed type 2 diabetes: does dietary restraint predict weight gain 4 years after diagnosis?. *Health Psychology*, 26(1), 105.
- Wallis, D. J., & Hetherington, M. M. (2004). Stress and eating: the effects of ego-threat and cognitive demand on food intake in restrained and emotional eaters. *Appetite*, 43(1), 39-46.
- Wansink, B. (2007). *Mindless eating: Why we eat more than we think*. Bantam. London.
- Wardle, J., Haase, A. M., Steptoe, A., Nillapun, M., Jonwutiwes, K., & Bellisie, F. (2004). Gender differences in food choice: the contribution of health beliefs and dieting. *Annals of Behavioral Medicine*, 27(2), 107-116.
- Wasylikiw, L., MacKinnon, A. L., & MacLellan, A. M. (2012). Exploring the link between self-compassion and body image in university women. *Body Image*, 9(2), 236-245.
- Weinstein, A., & Erickson, K. (2011). Healthy body equals healthy mind. *Generations*, 35(2), 92-98.
- WHO (2019) www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi
- Yannakoulia, M., Panagiotakos, D. B., Pitsavos, C., Tsetsekou, E., Fappa, E., Papageorgiou, C., & Stefanadis, C. (2008). Eating habits in relations to anxiety symptoms among apparently healthy adults. A pattern analysis from the ATTICA Study. *Appetite*, 51(3), 519-525.
- Yokum, S., & Stice, E. (2013). Cognitive regulation of food craving: effects of three cognitive reappraisal strategies on neural response to palatable foods. *International Journal of Obesity*, 37(12), 1565.

Appendices

Appendix 1.

Palatable Eating Motives Scale (PEMS)

Instructions:

Below is a list of reasons that people sometimes give for eating tasty foods and drinks such as:

- Sweets like chocolate, snack bars, doughnuts, cake, ice cream, other desserts.
- Salty snacks like crisps and crackers, etc.
- Fast foods like hamburgers, cheeseburgers, pizza, fried chicken and French fries.
- Sugary drinks like carbonated soft drinks, milkshakes, and sweet coffee drinks.

Thinking of all the times you ate these kinds of foods/drinks, how often would you say that you ate/drank them for each of the following reasons? Circle the answer that best describes you from the selection of the 5 underlined italic answers below:

A.Almost never/Never

B.Some of the time

C.Half of the time

D.Most of the time

E.Almost always/ Always

- 1.To forget your worries
2. Because your friends want you to eat/drink them
3. Because it helps you enjoy a party
4. Because it helps you when you feel depressed or nervous
5. To be sociable
6. To cheer up when you are in a bad mood
7. Because you like the feeling
8. So that others won't kid you about not eating or drinking these items
9. Because it's exciting

10. To get “high-like” feelings
11. Because it makes social gatherings more fun
12. To fit in with a group you like
13. Because it gives you a pleasant feeling
14. Because it improves parties and celebrations
15. * Because you feel more self-confident and sure of yourself**
16. To celebrate a special occasion with friends
17. To forget about your problems
18. Because it’s fun
19. To be liked
20. So you won’t feel left out

*Question 15 was omitted from the analyses due to poor factor loading, consistent with a recent validation study of the DMQ-R (Hauck-Filho et al., 2012). **As a result of this information the researcher may or may not proceed with this question pending a review.

Appendix 2.

DASS-21

Depression Anxiety Stress Scale–21 (DASS–21)

DASS–21 Stress scale

The DASS uses a 4-point Likert scale of frequency or severity of the participants' experiences over the last week. The rating scale is as follows: 0 = Did not apply to me at all; 1= Applied to me to some degree, or some of the time; 2= Applied to me to a considerable degree, or a good part of time; 3 = Applied to me very much, or most of the time.

I was intolerant of anything that kept me from getting on with what I was doing (14). I felt I was rather touchy (18).

I found it difficult to relax (12).

I found myself getting agitated (11).

I felt that I was using a lot of nervous energy (8). I found it hard to wind down (1).

I tended to over-react to situations (6).

DASS–21 Depression scale

I felt that life was meaningless (21).

I felt that I had nothing to look forward to (10).

I couldn't seem to experience any positive feeling at all (3). I was unable to become enthusiastic about anything (16).

I felt that I wasn't worth much as a person (17).

I felt down-hearted and blue (13).

I found it difficult to work up the initiative to do things (5).

DASS–21 Anxiety scale

I was aware of the action of my heart in the absence of physical exertion (e.g., . . .) (19).

I experienced breathing difficulty (e.g., . . .) (4).

I experienced trembling (e.g., in the hands) (7).

I felt I was close to panic (15).

I felt scared without any good reason (20).

I was worried about situations in which I might panic and make a fool of myself (9). I was aware of dryness of my mouth (2).

Appendix 3.

Body Appreciation Scale-2 (BAS-2)

Test Format: Item responses range from 1 (never), 2 (seldom), 3 (sometimes), 4 (often), and 5 (always) on a 5-point scale. Please respond to all 10 statements.

Please indicate whether the question is true about you never, seldom, sometimes, often, or always.

1. I respect my body.

2. I feel good about my body.

3. I feel that my body has at least some good qualities.

4. I take a positive attitude towards my body.

5. I am attentive to my body's needs.

6. I feel love for my body.

7. I appreciate the different and unique characteristics of my body.

8. My behaviour reveals my positive attitude toward my body; for example, I hold my head high and smile.

9. I am comfortable in my body.

10. I feel like I am beautiful even if I am different from media images of attractive people (e.g., models, actresses/actors).

Scoring Procedure: Average participants' responses to Items 1–10

Appendix 4.

General Self-Efficacy Scale—12 Item (GSES-12)

Test Format: The General Self-Efficacy Scale—12 Item utilises a 4-point Likert scale ranging from: Not at all true, Barely true, Moderately true, to Exactly true. Please give an answer to all 12 items.

Initiative

- (1) If something looks too complicated, I will not even bother to try it.
- (2) I avoid trying to learn new things when they look too difficult.
- (3) When trying to learn something new, I soon give up if I am not initially successful.

Effort

- (1) When I make plans, I am certain I can make them work.
- (2) If I can't do a job the first time, I keep trying until I can.
- (3) When I have something unpleasant to do, I stick to it until I finish it.
- (4) When I decide to do something, I go right to work on it.
- (5) Failure just makes me try harder.

Persistence

- (1) When I set important goals for myself, I rarely achieve them.
- (2) I do not seem capable of dealing with most problems that come up in my life. (3) When unexpected problems occur, I don't handle them very well.
- (4) I feel insecure about my ability to do things.

Appendix 5.

Information sheet.

My name is Simon O'Connor and I am a final year Psychology student in the National college of Ireland (NCI). As part of my dissertation project, I am inviting you to participate in this study if you are over the age of 18.

The purpose of this study is to investigate the association between eating behaviour, depression, anxiety, stress, self-efficacy and body appreciation. It falls under the categories of Health and Positive Psychology.

You will be required to complete several multiple-choice questions. There are no right or wrong answers. It will take approximately 12 minutes to complete.

The information obtained in this study will be anonymous and the IP address will be unidentifiable. Your identity will be completely anonymous.

Participation in the study is voluntary. You are free to withdraw at any time by leaving the questionnaire before submitting the answers. This study is being carried out under the National College of Ireland and the Psychology society of Ireland code of Ethics.

If you have any further questions about my research, please contact me on x15008436@student.ncirl.ie or my supervisor Dr. Matthew Hudson at matthew.hudson@ncirl.ie.

This research has been deemed low risk but in the unlikely event that you feel any discomfort or risk please call:

The Samaritans:

116 123 (24-hour free phone helpline)

text: 087 260 9090 (standard rates apply)

email: jo@samaritans.ie

Appendix 6.

Debriefing sheet.

Thank you for completing the survey! All the data is anonymous. Your participation is appreciated.

Please contact: x15008436@student.ncirl.ie or matthew.hudson@ncirl.ie should you have any queries.

This research has been deemed low risk but in the unlikely event that you feel any discomfort or risk please call:

The Samaritans:116 123 (24-hour free phone helpline) text: 087 260 9090 (standard rates apply)
email: jo@samaritans.ie or contact The Samaritans in your local area.

Appendix 7.

Demographic questions

Question Title

**1. What is your gender?*

Female

Male

Prefer not to say

Question Title

**2. What is your height in metres?*

Question Title

**3. What is your weight in Kilos?*

