An exploration into the effects of stress on individual eating behaviour

Hanna Al-Afaleq

Supervised by: Lorna Hamilton

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Abstract

The aim of the present study was to investigate the effects of stress on individuals' eating behaviours. The study was a cross-sectional, between-subjects design, by which data were collected by use of an online survey. A total of 261 undergraduate participants were recruited by use of opportunity sampling. Participants were asked to complete two questionnaires, administered online. One measure aimed to establish individual's perceived stress levels, while the other examined their specific eating behaviours, both their typical eating patterns and current eating patterns. Significant differences in unhealthy eating changes were found between participants experiencing low levels of stress, and participants experiencing high levels of stress. Common increases and decreases of intake of food types, when stressed, were found. Significant correlations between a number of potential stressors were also found, including 'education', 'work-life' and 'finances'. The findings of this study have supported a range of previous research findings, regarding changes to eating behaviour. Strengths, limitations and suggestions for future improvements of the present study are discussed.

Key Words	Perceived stress	Eating behaviours	Potential stressors

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Introduction

The definition, symptoms and coping strategies of 'stress', vary considerably depending on the circumstances within which it is caused, and managed (Crocker & Luhtanen, 2003; Gyllensten & Palmer, 2005). For the purposes of the present study, however, it was defined generically as a 'physical, mental, or emotional strain or tension' (The American Institute of Stress, 2013). The effects of stress, on both humans and animals, have been extensively researched over time, and both commonalities, and individual differences, to resilience and coping of stress, have been found (Flier & Underhill, 1998; Lupien et al., 2009; McEwen & Stellar, 1993). Subsequently, general causes, signs and coping strategies of stress have been reviewed and made aware to society (National Health Service, NHS, 2013a). However, for some effects of stress, the exact association has not yet been determined, for example the effects of stress on eating behaviour (Torres & Nowson, 2007). The effects of stress on individual eating patterns, specifically the increase or decrease in food consumption, or a change to the type of foods consumed, is an area that has acquired a range of contradictory literature (Habhab et al., 2009; Peters & Langemann, 2010; White, 2012). The implications of these potential changes have recently become of primary concern to some researchers, due to the increasingly severe number of eating disorders and obesity cases within world-wide populations, specifically in young people (Hudson et al., 2007; Stice et al., 1994). It was due to this increasing prevalence that it was considered vital for further research to be conducted, in attempt to establish whether stress does, in fact, affect an individual's eating pattern. Further, if eating behaviours were found to be affected, the direction and extent of this change were similarly considered imperative to explore. It is assumed that through further, detailed exploration of this potential relationship, researchers can acquire further accurate knowledge, required to promote effective coping techniques, and methods of prevention to society. This present literature review will begin by identifying key theories of stress, before reviewing a range of existent literature that has previously explored the relationship between stress and eating behaviour. Potential factors that may moderate the effects of stress on eating behaviour, such as gender, will also be discussed.

Literature review

Selye (1956) defined stress as 'the non-specific response of the body to any demand made upon it'. This response was first considered to be a reaction of the 'fight or flight response'; the physiological reaction assumed responsible for preparing the body to either fight, or flee, from a particular stressful incident or environment (Cannon, 1932; The American Institute of Stress, 2013). Traditionally considered vital for survival, it has since been applied to modern-day situations, such as stress caused by responsibility in the workplace (Cannon, 1932; Dhabhar, 2009). It has been suggested that the reactions of the 'fight or flight response', more recently considered as stress, allows an individual to re-evaluate the situation, and act accordingly in order to reduce the effects of stress; protecting an individual on both a psychological and physical level (Dhabhar, 2009).

During this response period, the body is also affected substantially on a biological level (Davey et al., 2004). Production and release of the glucocorticoid, cortisol, known as the primary stress response, is accountable for coordinating a range of

internal processes to manage the stressor, involving the heart, metabolism and the skin (Simon, 2009). Proteins are also released, which are responsible for a number of behavioural and physical effects of stress, such as a reduction in sleep and feelings of anxiety. These changes aim to ensure that the individual is aware they are stressed, and need to reconsider their situation (Simon, 2009). Further research regarding the biological effects of stress has suggested that secretion of other glucocorticoids, and insulin, during periods of heightened stress substantially increases the impetus for food (Dallman, 2010). A review of physiological literature conducted by Dallman (2010), discussed the impact of behavioural responses to stress. It was concluded that eating when stressed creates a memorable, pleasurable feeling that an individual will seek to experience again, during future occurrences of stress.

Psychological research regarding stress and its effects on eating behaviour has also been conducted, but with considerably less emphasis on the physiological reactions (Nguyen-Rodrigueza et al., 2008; White, 2012). Relevant theories have since been suggested, such as Lazarus and Folkman's model of stress and coping (Lazarus & Folkman, 1984). Although formulated almost three decades ago, this theory is considered a classic model of stress and is still referred to as a significant foundation of our understanding of stress management. The theory suggests a process of evaluation that occurs during feelings of stress, consisting of primary appraisal; the first consideration of the situation, and secondary appraisal; the engaging in behaviour to deal with the situation. However, the way in which this evaluation occurs is based largely on individual differences, and consequently determines the way the stressor is managed (Lazarus & Folkman, 1984). One relevant example is emotional-based coping, the term given to the behaviours that occur when an individual feels as though they have little control of the situation, and cannot manage the problem. Behaviours such as increased alcohol intake, temperamental problems and changes to normal eating patterns are commonly reported as methods, and outcomes, of emotionally-based coping (Carver et al., 1989; Lazarus and Folkman, 1984). An alternative theory of stress and eating behaviour is the psychosomatic theory of obesity (Kaplan & Kaplan, 1957). Similar to the previous model of stress (Lazarus & Folkman, 1984), although a dated theory, it is still considered to form the basis of discussion regarding emotional eating, suggesting that eating is used as an emotional defense from negative affect, such as stress (Dallman, 2010; Kaplan & Kaplan, 1957).

Explorative research, by use of a range of different participant samples and methodologies, have largely found and supported this relationship between increased stress levels and increased food consumption (Scott et al., 2011). Cross-cultural research by Nguyen-Rodrigueza et al. (2008) have similarly suggested a strong positive correlation between perceived stress levels and increased emotional eating. A total of 617 students from California participated in this study, and completed a survey that included an eating behaviour questionnaire, a perceived stress scale and enquired about their body mass index (BMI) and ethnicity. The Perceived Stress Scale (PSS) utilised in this study was designed and created by Cohen et al. (1983), and is currently one of the most widely used measures regarding an individual's perception of their own stress (Golden-Kreutz et al., 2004; Otte et al., 2007). Due to the PSS's high internal consistency and validity (Cohen et al. 1983), its use in this particular study substantially improved the reliability of the

stress scores, and subsequently the overall findings (Nguyen-Rodrigueza et al., 2008). Based on participants' BMI scores, this study also aimed to explore any potential relationships between stress levels and emotional eating of normal- and over-weight participants. However, no significant differences were found, suggesting that the effects of stress on eating behaviour are of similar concern for both normal- and over-weight individuals (Nguyen-Rodrigueza et al., 2008).

Further support for this relationship between stress and increased food consumption has been provided, alternatively however, by use of the less prevalent, online data collection. Ozier et al. (2008) aimed to explore the effects of stress and emotion, on eating and appraisal. A total of 822 participants were recruited, with a range of ages and body shapes; a participant sample not always available by use of paper questionnaires and opportunity sampling. It was concluded that increased stress levels was associated with increased consumption of food. Data collection by use of online questionnaires is becoming increasingly common in research, regardless of its topic (Kovic et al., 2008; Owen & Fang, 2003; Sandars & Schroter, 2007). Studies have suggested a number of advantages to this methodology over the traditional paper questionnaire, including its low administration costs, delivery and response speed, and its flexibility (Dillman, 2000; Kwak & Radler, 2002).

Other pieces of research have provided similar support for the relationship between stress and eating behaviour, alternatively however during the absence of hunger. Rutters et al. (2008) used two quantitative measures, and found that stressed participants that reported an absence of hunger, were still found to eat. Consequently, it was concluded that a relationship existed between psychological stress and eating, regardless of hunger levels (Rutters et al., 2008). Research by Spoor et al. (2007) provided support for this, as results found that some individuals eat as a method of distraction, in this instance from university work. These findings have clearly provided support to the theory that increased levels of stress were associated with increased intake of food, but the reasoning for this change is not unanimous. Some have suggested that this increase in food consumption was due to physiological processes, while others have insisted this was due to a method of distraction, without the presence of hunger (Dallman, 2010; Rutters et al., 2008; Spoor et al., 2007).

An alternative change to individual eating behaviour when stressed has also been explored (Simsa et al., 2008). Research has suggested that some individuals experiencing high levels of stress make changes to the specific type of food they consume, such as an increased intake of high-fat foods (Simsa et al., 2008). A study conducted by Habhab et al. (2009) aimed to investigate the food preferences of women with low and high stress levels, and suggested that those with high levels of stress preferred to eat sweeter, higher-fat foods than women with low stress levels. Further support includes research by Roberts (2008) and Epel et al. (2001) that also suggested that periods of increased stress levels were associated with changes in food choice, particularly an increase in high-fat and sweet foods.

A large amount of stress-related research has investigated the effects of acute, short-term stress (Torres & Nowson, 2007); however a study by Hirth et al. (2011) explored the changes to eating behaviours of individuals with long-term post-traumatic stress disorder (PTSD). A total of 3181 young females diagnosed with

PTSD, from Texas, USA, were recruited. Similarly however, findings suggested an increased frequency of consumption of fast food and soda, which consequently suggested no substantial differences between the effects of short- or long-term stress on eating behaviours (Epel et al., 2001; Roberts, 2008). Although Hirth et al. (2011) found an increase of fast food consumption, the BMI of participants were not found to be correlated with increased stress, which provided further support for findings of Nguyen-Rodrigueza et al. (2008), that expressed a similar concern for both normal- and over-weight individuals (Hirth et al., 2011).

As reviewed, research has suggested that stress can affect an individual's eating behaviour, whether it is the increased quantity or changes to the type of food (Scott et al., 2011; Habhab et al., 2009). However, there have been studies conducted that suggest otherwise. A study by White (2012) utilised a 21-day diary as the method of data collection, to explore any changes to eating behaviour during increased periods of stress. This longitudinal diary was considered a more reliable methodology than a standard cross-sectional design, as it had the potential to collect richer and more thorough information, over a longer period of time (Rindfleisch et al., 2008). White (2012) found that 'positive days', categorised subjectively by self-report low levels of stress, were associated with an increase in fruit and vegetable consumption, while 'negative days', categorised subjectively by self-report high levels of stress, were associated with less healthy eating patterns. These associations provided further support for the change in eating behaviours when stressed as discussed with Roberts (2008). White (2012) however, controversially found an overall decrease in food consumption, when stressed. This finding provided an alternative theory for discussion, as this was the opposite to the findings of a large number of existent studies. The methodology used in this study was considered a more reliable method of self-report, as it is less likely that participants would alter responses as a result of social desirability or demand characteristics, than in a cross-sectional questionnaire (Rindfleisch et al., 2008). Based on this, it would seem that this conclusion, although contradictory to the majority of existent stress-related research, may be reliable and consequently, accurate (White, 2012).

Additional support for this finding was provided by Stone and Brownell (1994) whose findings also suggested that individuals were considerably more likely to eat less than usual, than they were to eat more, in response to daily stressors. The study employed both a within- and between-subjects design and collected data by use of an 84-day diary; which similarly provided a more reliable methodology than a cross-sectional questionnaire, as used in the majority of other research (Rindfleisch et al., 2008). Stone and Brownell (1994) concluded that high levels of stress were associated with substantially less eating for both genders, however females were reported to be more than three times more likely to eat less when stressed, than to eat more (Stone & Brownell, 1994).

Research by Epel et al. (2001), as previously stated, suggested that food preferences can change during stressful periods; however the findings of this study were contradictory. This study, conducted on females, concluded that while some individuals eat more when stressed, others eat less. It was concluded from these and other findings, that the direction of change in eating behaviour, either an increase or decrease, and its respective reasoning, is still unclear (Epel et al., 2001).

Due to this contradictory literature, the present study aimed to explore and discuss potential reasons for the variation of these changes.

Considerable amounts of research have explored potential factors that may help explain the direction of change in eating behaviour (Stone & Brownell, 1994; Torres & Nowson, 2007). Individual personality traits, or life experiences, are considered to influence this direction. For example, two individuals experiencing high levels of employment-related stress may express this is in substantially different ways, based on previous experiences. This refers back to Lazarus and Folkman's model of stress, which suggested that the chosen method, and behaviour, to manage the stressful situation, is dependent on the way in which the initial consideration of the situation is interpreted; leading to a variation of individual coping techniques of stress (Lazarus & Folkman, 1984). Alternatively, the cause of stress may also affect the expression and management of the situation. For example, an individual that has been involved in a motor vehicle accident, may be affected, cope, and react, in an entirely different manner to an individual suffering with employment-related stress (Lanius et al., 2003; Van der Klink et al., 2001).

Other research has suggested that resilience to stress and coping strategies can vary dependent on gender (Oliver et al., 2000). Sanlier and Ogretir (2008) suggested that males, in general, were more likely to be optimistic than females. Findings also suggested that females were more likely to eat more during both positive, and negative moods, than males (Sanlier & Ogretir, 2008). Further, Nguyen-Michela et al. (2007) reported that males were more likely to eat more fruit and vegetables whilst stressed, than females. Similarly, research conducted by Stone and Brownell (1994) found that changes to females' eating behaviours, occurs as a result of medium, and high, levels of stress, while males' eating behaviours are assumed to change only as a result of high levels of stress. These findings suggested that females, in general, appeared more sensitive to the effects of stress than males, providing further support for gender as an influence of the effects of stress on eating behaviour (Stone & Brownell, 1994).

The present study

Based on the range of contradicting findings suggested by researchers, specifically the different changes to eating behaviours during periods of heightened stress, it was considered important to explore this association further, in attempt to provide further support for this discussion (Nguyen-Rodrigueza et al., 2008; White, 2012). The current exploration also incorporated additional factors, including the effects of the different intensities of perceived stress, and gender differences.

The participants involved in the present study were undergraduate students, a decision partially influenced by the increasing concern for the well-being of students (Macht et al., 2005). Research conducted on university students has suggested a number of common stressors that students must contend with on a daily basis (Pena & Reis, 1997). Common problems assumed to be associated with increased stress levels included the uncertainty of their future, constant academic pressures and continuous financial difficulties (Macht et al., 2005; Shaikh et al., 2004). Similarly, research conducted by Ross et al. (1999) suggested the most prevalent stressors experienced by students were changes to sleeping patterns, changes to eating

habits, increased work load and financial difficulties. The incessant exposure to such stressors is causing an increasing concern for the well-being of students, and consequently was explored in the current study.

This present study primarily aimed to explore the relationship between stress and eating behaviour, and its direction of change. In order to explore this, the key variables investigated were individual perceived stress levels, types of common stressors, gender, typical/daily eating behaviour and current eating behaviour, during the previous month.

Based on the literature reviewed above, the hypotheses for the present study were;
Highly stressed participants will show greater change from their typical eating behaviours to their current eating behaviours, than participants experiencing low levels of stress.

There will be a significant difference between genders in changes to type of food when highly stressed.

Method

Design

The present, cross-sectional study used a between-subjects design, by use of self-report, online questionnaires. There were a total of two independent variables; gender and intensity of perceived stress, and one dependent variable; individual changes in eating behaviour, operationalised as the difference between typical eating behaviours and current eating behaviours. Gender had two levels; male or female, while the other independent variable, the intensity of perceived stress had three levels; high, medium or low perceived stress levels. Data were also collected regarding potential types of stressor and the type of food eaten, both typically and currently, to explore the relationship between stress and eating behaviour in more detail.

Participants

A total of 281 participants were recruited from York St John University, by use of opportunity sampling. All participants were undergraduate students, from a total of 17 different undergraduate degree courses, including psychology, product design and occupational therapy. A full list of degree programmes, from which the participants were recruited, is attached within the appendix. Heads of programme for all degree programmes taught at York St John University were contacted to ask for permission to contact the students in their programme. All students, years one, two and three, whose head of programme gave permission, were contacted. An estimated 2200 students were contacted, asking for their participation by e-mail, of whom 281 gave consent and completed the questionnaire. Data from 55 participants were removed from the dataset as 12 or more questions were left unanswered. As parts of the questionnaire was based on scales rather than averages, to leave this incomplete data in would have distorted the data considerably.

The table below shows the descriptive statistics of the total sample, including the number of participants and age. A final total of 226 participants' data were used in the present study, the majority of which were females. The age of participants ranged from 18 to 58, with an average age of 22.25 years old.

Table 1; Descriptive statistics of the total participant sample

	Female	**Male**	**Total**
Number of participants (% of total sample)	198 (87.60%)	28 (12.40%)	226
Mean age *(S.D)*	22.05 (6.21)	23.68 (9.74)	22.5 (6.74)

Despite the thorough attempt made to recruit a representative sample, the opportunity sampling used in the present study resulted in the poor recruitment of males, possibly due to the female dominant student population at York St John University (York St John University, 2013b). No further students were contacted as either their head of programme had not given permission to contact their students, or

the student had declined the opportunity to participate. By re-sending the e-mail containing the questionnaire, to either head of programme or student, may have been considered as unethical by forcing or persuading individuals to take part. Time restrictions also limited possible opportunities to resolve this problem. The poor recruitment of male participants meant that gender differences could not be analysed using inferential statistics; however, descriptive and correlational statistics were presented for gender groups.

Measures

The study utilised two questionnaires that were answered sequentially; The Perceived Stress Scale (Cohen et al., 1983) with additional, unique questions attached, and a questionnaire created solely for the purposes of this study, to assess participants' typical and current eating behaviours.

The Perceived Stress Scale (PSS) is a standardised, 10-item questionnaire that aims to evaluate individuals' perceived stress levels, created by Cohen et al. (1983). The questionnaire probes participants about their thoughts and feelings during the last month, with regard to stress. Response options were scored on a 5-point likert scale; 0 – never, 1 – almost never, 2 – sometimes, 3 – fairly often and 4 – very often (Cohen et al., 1983). The scoring of the questions combines to produce an overall perceived stress score, suggesting the level of stress each participant had felt during the last month. Internal consistency of this scale, using cronbach's alpha has previously been reported as 0.84, 0.85 and 0.86; suggesting high internal reliability (Cohen et al., 1983). The original PSS does not aim to establish any potential reasons that may assist in the perceived stress score, just the score alone (Cohen et al., 1983). In the present study, seven additional items, which were formulated solely for the purposes of this study, were added to the PSS in attempt to establish any possible reasons for the perceived stress of participants. The additional items were presented in the same format as the PSS, by asking participants how stressed they had felt about certain common stressors during the last month (Cohen et al., 1983). These common potential stressors were suggested by the NHS (NHS, 2013a). Participants were asked to respond to these additional items in the same format as the previous 10 items of the PSS, with the same 5-point likert scale. The full version of the amended questionnaire and exactly how it was administered can be found in the appendix. The responses to these questions were utilised in a descriptive analysis of the high-stress participant group that aimed to identify potential reasons for the perceived high stress levels.

The second part of the questionnaire was created solely for the purpose of the present study and aimed to identify participants' eating behaviours, both typically, and currently/during the previous month. The questionnaire was divided into two parts, both of which provided the same list of 12 different food groups and types, with relevant examples, and required participants to score their intake frequency of each type of food. The food types consisted of 6 healthy food groups; 'fruit and vegetables', 'legumes and grains', 'light meat', 'dairy', 'seafood' and 'nuts, seeds and oils', and 6 unhealthy food groups; 'fast food', 'crisps, sweets and biscuits', 'red meat', 'chocolate', 'desserts' and 'alcohol', as suggested by the NHS (NHS, 2013b). The first part of this questionnaire asked participants to state the intake frequency of each food type during their typical, normal day, while the second part asked

participants to state the frequency of each food type consumed during the last month. This 12-item questionnaire used the same 5-point Likert Scale as the previous part of the questionnaire; 0 – never, 1 – almost never, 2 – sometimes, 3 – fairly often and 4 – very often (Cohen et al., 1983). The internal reliability for the present study was calculated for four individual subscales. For the typical eating behaviours part of the questionnaire, the unhealthy subscale was found to have an internal reliability score of 0.52, while the typical healthy subscale was found to have a value of 0.48. Similarly, for the current eating behaviours part of the questionnaire, the unhealthy subscale was found to have an internal reliability score of 0.61, while the current healthy subscale was found to have a value of 0.50. The overall aim of this questionnaire was to identify any changes between their normal/typical and their current eating behaviour, and to compare any potential changes with their current perceived stress levels. The full version of this questionnaire can be found in the appendix.

Procedure

Before the final survey was conducted, a pilot study was carried out, to ensure that all questions were comprehensible and the estimated time-scale for completion of the survey was accurate. The participants recruited for the pilot study were 10 undergraduate third year psychology students at York St John University, by opportunity sampling. They were individually approached by the researcher, and if willing, completed the questionnaire in the exact same format as the participants of the finalised study. All participants of the pilot study were clearly advised that their responses would not be used or analysed in any way, and that their participation was solely for the purpose of enabling improvements to be made to the final survey. Verbal responses after completion of the pilot study indicated minor confusion about the instructions, which were suitably amended. The time-scale of the study was accurately established at 5-10 minutes. Any responses given by participants of the pilot study were then discarded and as guaranteed, not recorded or used further in any manner.

After the pilot study was conducted and the amended survey was finalised, the main study and data collection began. Participants were recruited by opportunity sampling, via e-mail. Only if and when each head of programme gave consent to contact the students taking part in their particular subject programme, would students be e-mailed personally, to ask for their consideration to participate in this study. The e-mails sent to each head of programme and prospective participants are included within the appendix. Basic information was given to prospective participants within the e-mail, however further information regarding the study and its ethical considerations were supplied on the formal consent form, accessed through a link on the e-mail. The full consent form can be found within the appendix. If prospective participants were willing to take part, they were required to supply a pseudonym and press ‘next’ at the bottom of the consent form page, to begin the survey. The final page of the survey was an information page, which debriefed participants and supplied them with relevant contact details for if they had any concerns, wished to withdraw their data or were feeling distressed at a later date. Participants were then asked to exit the browser when they were finished and the survey was then complete.

Ethical considerations

The present study adhered closely to The British Psychological Society's Code of Ethics and Conduct (2009) and York St John University's Independent Ethical Guidelines (2013a). If, when prospective participants were contacted, they were interested or willing to take part, they were asked to follow a link on the e-mail that took them directly to the formal consent form. This consent form supplied all the information about how ethical guidelines had been considered and put into practice, for their own information; ensuring informed consent was given. The consent form also included clear but basic instructions for participants to follow during the study, including advice on withdrawal and minimising any distress caused to participants. On providing consent, individuals were required to provide a pseudonym, a false name or number, which they were asked to make a note of, before the survey began. This was to adhere to guidelines regarding confidentiality, anonymity and withdrawal. Data may have been withdrawn from the study at a later date, and was made clear in the consent form that should they wish to withdraw from the study, they were to simply exit the browser. Contact details of York St John University's administrative team was also provided on the debrief page, so if a participant wanted their responses to be removed from the study, they just had to ring or e-mail the team using their pseudonym. This ensured that anonymity of participants was maintained.

An issue that may have arisen within the present study was the potential of causing harm to participants, as questions regarding potentially sensitive issues, specifically stress and eating behaviours were asked. The present study employed a number of measures intended to prevent and/or reduce feeling of distress for participants. The principal method was to ensure that participants were not deceived in any way. All information regarding the study was accurate and was supplied before individuals consented to and started the survey. When participants gave consent to take part, they were advised that they were not required to answer every question and that they could omit particular questions if the individual desired. As an additional measure for preventing or minimising any potential distress caused as a result of the present study, an informative de-brief form was supplied as the last page of the survey. It provided all relevant contact details for support if participants required them.

Results

Descriptive statistics

Descriptive statistics were run for the overall stress score, both for the full sample and split by gender. Participants' scores on the PSS were combined to form an overall stress score for each individual. In order to achieve this, four items of the PSS were reversed (four, five, seven and eight) for scoring purposes. Based on the overall stress score, it was assumed that the higher this figure, the more stressed the individual was feeling. The table below illustrates the mean stress scores of participants, with standard deviations and skewness and kurtosis levels. The stress scores ranged from 5 to 38 and data were found to be normally distributed.

Table 2; Mean stress scores for males, females and the total sample

	Female	**Male**	**Total**
Mean (S.D)	20.56 (7.41)	17.14 (8.15)	20.14 (7.58)
Skewness	0.17	0.44	-0.00
Kurtosis	0.34	0.86	-0.80

For the purposes of this analysis, participants were divided into 3 categories; low stress, medium stress or high stress, by calculating the z-scores. Based on these z-scores, those that scored $\geq$1 S.D above the mean were categorised as falling within the high stress group, those that scored $\leq$1 S.D below the mean were categorised as falling within the low stress group, and those in between -1 and 1 S.D, were categorised as falling within the medium stress group. The table below shows descriptive statistics of each of these stress groups. Specifically, it shows the number of participants categorised within each group, and their gender.

Table 3; Number of participants assigned to each of the stress groups

Stress group	**n (% of total sample)**	**Males**	**Females**
Low	39 (17.26%)	9	30
Medium	144 (63.72%)	17	127
High	43 (19.02%)	2	41

In order to achieve an indication of participants' eating behaviours, and any potential differences between what they typically eat and what they currently eat, the individual frequency scores were combined and an overall healthy and unhealthy score was calculated. Healthy foods consisted of 'fruit and vegetables', 'legumes and grains', 'light meat', 'dairy', 'seafood' and 'nuts, seeds and oils', while unhealthy foods consisted of 'fast food', 'crisps, sweets and biscuits', 'red meat', 'chocolate', 'desserts' and 'alcohol' (NHS, 2013b). The healthy score was then subtracted from the unhealthy score, providing an overall score indicating healthiness of eating. It was assumed that the lower the score, the healthier the eating behaviour, and conversely, the higher the score, the unhealthier the eating behaviour. This procedure was carried out for both typical and current eating behaviours.

Descriptive statistics were run for both the overall typical eating behaviour score and the overall current eating behaviour score. The table below illustrates the mean eating behaviour scores, and skewness and kurtosis levels for typical and current eating behaviours. The table also shows the mean change in eating behaviours, from typical to current, and respective skewness and kurtosis values. Scores for each gender, as well as the scores for the overall sample are displayed.
For typical eating behaviour, the scores ranged from -14 to 15, while for current eating behaviour, the scores ranged between -15 and 14. All data were found to be normally distributed.

Table 4; Eating behaviour scores for typical, current and the change in eating behaviours

	Typical eating behaviour score			**Current eating behaviour score**			**Change in eating behaviour score**		
	Female	**Male**	**Total**	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
Mean (S.D)	-1.12 (4.74)	1.27 (6.66)	-0.83 (5.05)	0.15 (5.36)	1.31 (7.06)	0.61 (5.58)	1.58 (3.54)	0.12 (2.35)	1.40 (3.45)
Skewness	0.18	0.46	0.19	0.18	0.46	-0.02	0.18	0.46	0.17
Kurtosis	0.35	0.89	0.25	0.35	0.89	-0.25	0.36	0.90	0.34

Analysis 1; The exploration into the effects of stress on eating behaviours

In order to explore the relationship between stress levels and eating behaviours, as an investigation of hypothesis one, inferential statistics were conducted. Differences between the three stress groups were explored, including differences between typical eating behaviour, current eating behaviour and the change in eating behaviour. The table below illustrates the mean change in eating behaviour, for all three stress groups, individually. As noted previously, it was assumed that the lower the score, the healthier the eating behaviour change, and conversely, the higher the score, the unhealthier the eating behaviour change

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Table 5; Mean change in eating behaviour score, of each stress group

Stress group	**Mean change in eating behaviour score *(S.D)***
Low	0.11 (1.95)
Medium	1.50 (3.35)
High	2.28 (4.44)

As table 5 below shows, the high stress group had the highest mean eating behaviour score, suggesting the largest unhealthy change in eating behaviour. The low stress group had the lowest mean eating behaviour score, suggesting a slightly unhealthy change, but the least change out of all other groups.

Homogeneity of variance was not below 4; however this may have been due to the considerable gender imbalance. Skewness and kurtosis were found to be within reasonable limits therefore data were found to be normally distributed, and parametric assumptions were achieved. The one independent variable was the stress level category; low, medium or high, and the dependent variable was the eating behaviours; typical, current or the change in eating behaviour.

A one-way ANOVA was conducted to explore any significant differences between typical eating behaviours and all three stress groups, but no significant differences were found, $F(2,214) = 0.066$, p=ns, $\eta^2 = 0.001$, post hoc = 0.06.

Similarly, a one-way ANOVA was conducted to explore any significant differences between current eating behaviours and all three stress groups, but no significant differences were found, $F(2,213) = 0.732$, p=ns, $\eta^2 = 0.007$, post hoc = 0.173.

A further one-way ANOVA was conducted, to establish any differences between the change between typical and current eating behaviour, between all three stress groups. Findings suggested a significant difference between the three conditions, $F(2,206) = 4.057$, $p<0.05$, $\eta^2 = 0.038$, post hoc = 0.72. Differences between the group were examined using Tukey's post hoc tests and the results found that the low stress group was significantly different to the high stress group, $p<0.05$. Low stress and medium stress groups, and medium stress and high stress groups were found to be non-significant, p=ns.

In summary, a significant difference in eating behaviour between those experiencing low levels of stress and those experiencing high levels of stress was found, with a generic increase in unhealthy foods among those within the high stress group.

Analysis 2; The exploration of the high stress group

As discussed earlier, the paucity of male participants in the present study meant that exploration of any gender differences, by use of inferential statistics, could not be conducted. Alternatively, further exploration of the high stress group as a whole, was conducted.

The table below provides the descriptive statistics of the participants within the high-stress group, including the number of participants, their mean age, mean stress score and mean change in eating behaviour. Similarly, it is assumed that the lower the score, the healthier the eating behaviour change, and conversely, the higher the score, the unhealthier the eating behaviour change.

Table 6; Descriptive statistics of high stress group participants

	Total sample
Female n	41
Male n	2
Mean age *(S.D.)*	22.40 (5.07)
Mean stress score *(S.D.)*	30.86 (2.50)
Mean change in eating behaviour score *(S.D.)*	2.28 (4.44)

The participants within the high stress group were, on average, among the younger of the overall participant sample, which ranged between 18 and 58 years old. As anticipated, participants within the high stress group displayed high levels of stress, and generally, an unhealthy change in eating behaviour.

It was also considered beneficial to explore the change to individual food types when experiencing high levels of stress. The table below presents the change in each food group, with the negative values being a decrease in consumption, positive values being an increase in consumption and 0 being no change between typical and current eating behaviours. The scale used was the 5-point likert scale; 0 – never, 1 – almost never, 2 – sometimes, 3 – fairly often and 4 – very often. By use of this scale as an example, '-4 of fast food' as reported in the table, would be from an individual that reported typically eating 'fast food' 4/very often, but is currently eating 'fast food' 0/never. Similarly, '+2 of fruit & vegetables' would be from an individual that has reported currently eating this food 2 stages higher than they typically would, for example, typically eating 'fruit & vegetables' 2/almost never but is now, currently eating 'fruit & vegetables' 4/fairly often. The table also presents the percentage of individuals reporting each change, out of the total high stress group sample.

Table 7; The number of participants that report change of food types, and the specific changes reported

	-4	**-3**	**-2**	**-1**	**0**	**+1**	**+2**	**+3**	**+4**
Fast food	0 (0%)	0 (0%)	0 (0%)	5 (11.63%)	26 (60.46%)	10 (23.26%)	2 (4.65%)	0 (0%)	0 (0%)
Fruit & vegetables	0 (0%)	1 (2.36%)	3 (6.98%)	11 (25.58%)	25 (58.14%)	2 (4.65%)	1 (2.36%)	0 (0%)	0 (0%)
Legumes & grains	0 (0%)	1 (2.36%)	5 (11.63%)	6 (13.95%)	30 (69.77%)	1 (2.36%)	0 (0%)	0 (0%)	0 (0%)
Crisps, sweets & biscuits	0 (0%)	0 (0%)	2 (4.65%)	8 (18.60%)	22 (51.56%)	7 (16.28%)	3 (6.98%)	1 (2.36%)	0 (0%)
Light meat	0 (0%)	1 (2.36%)	5 (11.63%)	8 (18.60%)	28 (65.12%)	1 (2.36%)	0 (0%)	0 (0%)	0 (0%)
Red meat	0 (0%)	1 (2.36%)	1 (2.36%)	10 (23.26%)	29 (67.44%)	2 (4.65%)	0 (0%)	0 (0%)	0 (0%)
Dairy	1 (2.36%)	0 (0%)	3 (6.98%)	11 (25.58%)	23 (53.49%)	2 (4.65%)	3 (6.98%)	0 (0%)	0 (0%)
Chocolate	0 (0%)	1 (2.36%)	0 (0%)	5 (11.63%)	30 (69.77%)	5 (11.63%)	1 (2.36%)	1 (2.36%)	0 (0%)
Seafood	0 (0%)	0 (0%)	2 (4.65%)	13 (30.23%)	27 (62.79%)	1 (2.36%)	0 (0%)	0 (0%)	0 (0%)
Desserts	1 (2.36%)	0 (0%)	1 (2.36%)	6 (13.95%)	27 (62.79%)	6 (13.95%)	1 (2.36%)	1 (2.36%)	0 (0%)
Nuts, seeds & oils	0 (0%)	0 (0%)	2 (4.65%)	15 (34.88%)	22 (51.56%)	1 (2.36%)	3 (6.98%)	0 (0%)	0 (0%)
Alcohol	0 (0%)	1 (2.36%)	2 (4.65%)	5 (11.63%)	27 (62.79%)	6 (13.95%)	1 (2.36%)	1 (2.36%)	0 (0%)

The table above suggests a range of different eating behaviour changes. According to these findings, the food groups that were reported to be eaten more often, when experiencing high levels of stress were ‘fast food’ and ‘crisps, sweets & biscuits’, but an increase in consumption of every food group was also reported. Similarly, a decrease in consumption of each food group was reported, with the largest decrease being of ‘nuts, seeds & oils’, ‘fruit & vegetables’ and ‘dairy’. The food types reported to endure the least change were ‘chocolate’ and ‘legumes & grains’. The findings

suggested no unanimous changes to eating behaviours when highly stressed, but in fact varied considerably.

Subsequent to the exploration of the individual changes of food groups, the potential reasons for these changes were analysed. The table below presents the median and mode of each potential stressor, to explore any obvious commonalities between stressors of students at York St John University. The scale used for each of the potential stressor was as follows; 0 – never, 1 – almost never, 2 – sometimes, 3 – fairly often and 4 – very often.

Table 8; Descriptive statistics of the stressors of high stress group participants

	Median	**Mode**
Finance	3	4
Education	4	4
Work-life	3	4
Relationships	3	4
Diet	3	4
Family	3	4
Other	3	3

As suggested by table 10, there was little difference between the occurrences of each stressor. ‘Education’ as a stressor was reported to be marginally more prevalent and concerning for participants.

A Spearman’s Rho correlation was conducted to investigate any potential associations between individual stress scores and each of the listed stressors. The table below presents the Spearman’s Rho correlation coefficients and respective significance levels, for the relationship between individual stress scores and each stressor of participants within the high stress group.

. Table 9; Spearman's Rho correlation coefficient and significance values of stressor and individual stress score

	Stress score	**Finances**	**Education**	**Work-life**	**Relationships**	**Diet**	**Family**	**Other**	**Total stressors**
Stress score	1.00								
Finances	0.130	1.00							
Education	0.221	0.336*	1.00						
Work-life	0.068	0.297	0.324*	1.00					
Relationships	0.282	-0.110	0.72	-0.148	1.00				
Diet	-0.033	0.089	0.78	-0.327*	-0.066	1.00			
Family	0.054	0.261	-0.019	-0.178	0.262	0.237	1.00		
Other	-0.055	0.001	0.066	-0.180	0.259	0.270	0.364*	1.00	
Total stressors	0.114	0.622**	0.513**	0.282	0.324*	0.279	0.546**	0.390*	1.00

* Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level

No significant correlations were found between stressors and stress score. Findings suggested significant correlations, at the 0.05 level, between 'finance' and 'education', 'education' and 'work-life', 'work-life' and 'diet', and 'family' and 'other', which suggest a range of relationships and potential areas for further exploration.

Discussion

The analyses of the present study have suggested a range of interesting findings. The one-way ANOVAs conducted on the total sample, suggested no significant differences between the low, medium and high stress groups on their typical eating behaviour, or their current eating behaviour. A further one-way ANOVA however, that explored the change between typical and current eating patterns, found a significant difference between the low and high stress groups, which suggested that those categorised as highly stressed were eating significantly more unhealthily than those experiencing low stress levels. Based on these findings, the present study has failed to reject hypothesis one that predicted that highly stressed participants will show greater change from their typical eating behaviours to their current eating behaviours, than participants experiencing low levels of stress. These findings support research discussed previously, that suggested increased levels of stress are associated with increased unhealthy food consumption (Epel et al., 2001; Habhab et al., 2009; Roberts, 2008; Simsa et al., 2008; White, 2012).

As stated, the gender imbalance within the participant sample restricted the inferential analyses that could have been conducted. Subsequently, the present study was not able to reject or fail to reject hypothesis two which predicted that there will be a significant difference between genders in changes to type of food, when highly stressed.

Descriptive and correlational analyses of the high stress group, however, were conducted. Exploration of specific changes to consumption of each food type, presented a more detailed understanding of this unhealthy change. It was suggested that each food type was consumed more, and less, during periods of perceived high stress, than normal, dependent on the individual. The most prevalent of these changes however, were found to be increases in ‘fast food’ and ‘crisps, sweets & biscuits’ consumption. The majority of participants within the high stress group were female, 41, as opposed to two males, and so the findings regarding changes to food types, provide direct support for research conducted by Habhab et al. (2009). This study, as previously discussed, suggested that highly stressed females were more likely to eat sweeter and higher-fat foods than those experiencing low levels of stress (Habhab et al., 2009). The findings of the present study also provide support for Roberts (2008) and Epel et al. (2001), who similarly suggested that increased stress levels were associated with an increase in high-fat and sweet foods.

As illustrated, a number of researchers suggested an increase in unhealthy foods when experiencing high levels of stress, but few pieces of research discussed any specific changes in healthy food intake (Roberts, 2008). It was unknown as to whether healthy eating behaviours were replaced entirely by unhealthy ones, or whether individuals substituted only part of their diet for unhealthy foods, while maintaining some healthy food choices. Interestingly, as well as suggesting an increase in unhealthy foods, the findings of the present analysis also suggested a decrease in particular healthy food groups, the most common of which were ‘nuts, seeds & oils’, ‘fruit & vegetables’ and ‘dairy’. These changes suggested an alternative change in eating behaviour, and perhaps the unhealthiest type of change, by both increasing unhealthy foods, and decreasing healthy foods. An improvement for further research may be to explore the activity undertaken immediately prior to

eating, exact portion sizes and times between each meal, to develop a more thorough and accurate idea of exactly how high perceived levels of stress can affect eating patterns.

Participants were asked to report how often they felt stressed about each of the potential stressors included in the survey. These stressors were included in an attempt to identify exactly what was causing the feelings of stress, as previously discussed. Findings of the Spearman's Rho correlational analyses of these stressors and individual stress levels, however, suggested no significant correlations. This suggests that perhaps the listed stressors were too vague, or were not useful in explaining the entire reasoning for the experienced stress. The median and mode for the stressor option 'other' was reported as 3/fairly often on the survey scale, which suggests that other stressors, aside from those listed, are involved, and so must be investigated further. An alternative explanation for the non-significant correlations may be that there was little variance in the individual stressor variables within the high stress group; suggesting that a large number of participants may have been experiencing each stressor, relatively often. Future developments may be to provide a considerably more expansive list of stressors, and to ask participants to select which of these, and the extent to which these were causing them stress; producing a more exhaustive account of the exact stressors of students. Further analyses that aimed to investigate any possible correlations between the different stressors, found a number of significant correlations. Results found significant correlations between 'finance' and 'education', 'education' and 'work-life', 'work-life' and 'diet', and 'family' and 'other'. Interestingly, 'finance' and 'education', and 'education' and 'work-life' specifically demonstrated expected common clusters of stressors for students (Shaikh et al., 2004). That is, the battle between having a large amount of university work and consequently, limited time to take employment and earn money. This is considered to often result in students having to make the decision of either struggling with 'finance' and 'education' by not working, or struggling with 'education' and 'work-life' by working and leaving less time to do university work (Ross et al., 1999; Shaikh et al., 2004). The findings of these correlational analyses provide support for conclusions made by both Shaikh et al. (2004) and Ross et al. (1999), who reported that two of the most common stressors for students were increased work load and financial difficulties. Based on previous research and the support of the present study, it is considered that the decrease of these stressors would be most beneficial to reduce student stress, and consequently assist them in maintaining their normal eating behaviours (Ross et al., 1999; Shaikh et al., 2004).

The findings of the present study suggested a range of associations between the effects of stress on individual eating behaviour; however confounding variables that may have influenced these results, must also be discussed. Potential influences may include socio-economic factors, nutritional knowledge and the role of the media (Galobardes et al., 2001; Harrison et al., 2006; Neumark-Sztainer et al., 2003). The socio-economic status of an individual is considered to influence the types of food available to them, for reasons such as transport accessibility and financial situations (Galobardes et al., 2001; Glanz et al., 2007). Cultural norms or life styles may also affect an individual's eating behaviour, for example having a busy schedule that may not give them the opportunities, facilities and time to prepare nutritional meals (Neumark-Sztainer et al., 2003). This could however, also be associated with stress, as generally those with busy, over-filled schedules are likely to be more stressed

than others leading a more leisurely lifestyle. The recent 'obsession' with the 'ideal' body shape, that has become increasingly prevalent in society, and combined with a lack of nutritional knowledge about diet, may also have influenced a large number of participants' eating behaviours (Harrison et al., 2006; Hawkes, 2005). These possible influences of individual's eating behaviours have the potential to have affected participants' responses and consequently the results of the present study, and so must be considered as alternative factors, other than stress, that can affect individual eating behaviour. Future areas for development may be to construct a more detailed understanding of each participant, by enquiring about more personal details, so that the effects of these potential socio-economic and educational factors can be explored further.

Gender differences were intended to have been inferentially analysed however, as reported, the considerable gender imbalance within the present study did not allow for this to happen. Consequently, it is assumed both necessary, and of interest, to explore why so fewer males than females were willing to participate in the study. The sample of prospective participants provides a potential explanation for this imbalance. Participants were all York St John University undergraduate students, from a varied and representative range of degree programmes. The 2012/13 academic year is reported to have accommodated a total of 6,462 students; however, only 36% of these students are males (York St John University, 2013b). This female dominant sample of prospective participants suggests a plausible explanation for the female dominant participating sample.

An alternative explanation for the lack of male participants may be the topic of the study. Although research generally suggests a minimal difference in eating behaviours between genders when stressed, there is a suggested difference in openness to talk about stress between genders, with males being considerably more reserved than females (Pappas, 2010; Torres & Nowson, 2007). It may have been that, as males are reported to be more reserved, they were generally less willing to discuss their own experiences of stress and participate in the study, even though anonymity and confidentiality was guaranteed (Pappas, 2010).

Self-selection bias may also have been a contributing factor as to why such a small number of males participated in the present study (Thompson et al., 2003). Based on the number and range of individual differences assumed present amongst the prospective participants, it is expected that there will have been some individuals that were more inclined to participate in an online survey than other individuals (Eysenbach & Wyatt, 2002). This may have led to a systematic bias, and have affected the generalisability of the participant sample, as perhaps only one particular 'type' of individual, in terms of personality, completed the questionnaire. By use of this explanation, it may have been that male students at York St John University are generally less likely to take part in online surveys, due to personality differences (Wright, 2005). To eliminate all self-selection bias' is considered difficult, as participants ultimately must volunteer to take part, however an area for future development may be to change the opportunity sampling design. Random or stratified sampling techniques could be used as an alternative method of recruitment that may result in a more generalisable sample (Fife-Schaw, 2000).

The final area for exploration in attempt to explain the low levels of male participation is drop-out rates (Frick et al., 2001). A total of 55 participants' data were removed from the present study's analysed data set, due to lack of responses. Only 38 of these participants however, supplied their gender; 28 females, and 10 males. Frick et al. (2001) suggested that lack of financial incentives and social desirability effects are potential reasons for high drop-out rates, particularly if a participant has supplied any personal or identifiable information at the beginning of the survey. Although no financial incentives were offered, which may have increased overall participation, no personal, identifiable information was required, so issues with anonymity and confidentiality, theoretically, should not have been a problem. Research does not suggest a difference in drop-out rates between genders, suggesting that the drop-out rate is unlikely to have been the sole reason for the gender imbalance (Frick et al., 2001).

Aside from already discussed features of the present study, and ideas for future improvement, the present study has further strengths and weaknesses that are also considered necessary to discuss. More specifically, the reliability and validity of the methodology, measures, and findings, of the current study will be discussed, to allow and encourage for future replication and appropriate developments to occur.

Two measures were used within the present study, the PSS (Cohen et al., 1983) and a unique measure of eating behaviour, created only for the purposes of the present study. The PSS has been used in a number of studies, and has been praised for its comprehension and validity to measure an individual's current perceived stress level (Golden-Kreutz et al., 2004; Otte et al., 2007). Consequently, it was assumed that the overall stress score, calculated and used as the basis for analysis in the present study, was accurate and valid (Cohen et al., 1983); however the unique eating behaviour questionnaire may have had methodological issues. More data on reliability and validity of this scale would have been useful; however if the scale is used again in another study, this can then be evaluated. The internal reliability was calculated for four individual subscales, as stated previously, which ranged from 0.48 to 0.61. These values are not as high as was anticipated, however no alternative and appropriate questionnaires were available, so the present internal reliability values were accepted, but with awareness and caution.

The food groups that were selected for the questionnaire consisted of 6 'healthy' food groups and 6 'unhealthy' food groups, based on governmental research (NHS, 2013b). These food groups were considered as either healthy or unhealthy, as components of a balanced diet, which on reflection may have affected the accuracy of the findings. For example, a participant may score 4/very often for 'nuts, seeds and oils' which although considered a healthy food group, are not considered healthy when eaten excessively (NHS, 2013b). Similarly for the purposes of the questionnaire, 'red meat' is considered as an unhealthy food group, however a small quantity of red meat is advised to be eaten as part of a balanced diet, and so the scoring system of the questionnaire may have had problems for accuracy and validity (NHS, 2013b). Although lack of time and resources may have resulted in an imperfect measure, it was considered appropriate to use, as already existent questionnaires were not specific to the present study's aims, as previously discussed (Karlsson et al., 2000).

Participants were asked to state how often they typically eat certain foods and how often they have recently eaten the same foods, which, although a pilot study was conducted and changes were made accordingly, this may have been difficult to respond to. A participant may not have noticed they were currently eating differently to normal, and so responses may not have been accurate; a limitation of a cross-sectional survey. A longitudinal design was considered for the present study, by administering the same survey twice at different times, however due to a restricted time scale, a cross-sectional design was used (Rindfleisch et al., 2008). The use of a longitudinal study however, could be an area for future development, as this is often considered to achieve a more accurate set of responses, and therefore more reliable data (Rindfleisch et al., 2008). A longitudinal design could also explore any annual changes to eating behaviour. The present study was conducted during winter and the Christmas period, and as is commonly assumed, different foods are consumed over winter, such as pie, compared to food preferred in summer, such as salad, so responses could have been influenced by this (Sobal et al., 2006).

There is an extensive amount of literature that presents both advantages and disadvantages of using a self-report measure, regardless of whether it is administered online or on paper (Andrews et al., 2003; Wright, 2005). Benefits of using a self-report questionnaire include the efficiency of administration and its ability to collect large amounts of data within a short period of time (Wright, 2005). This method has also been praised for its lack of researcher bias, as is occasionally an issue with qualitative methods, such as interview. However, there are also disadvantages associated with self-report measures, including the individually different interpretation of questions, which may have affected the accuracy of responses (Wright, 2005). Frequent issues associated with social desirability have also been suggested within studies using self-report measures; however a large number of these studies are completed in public, for example in a classroom or in the workplace. Based on this, the risk of social desirability effects was assumed to be reduced in the present study due to the online administration of the questionnaires, as it is less likely that others are completing and/or discussing the survey nearby. Regardless of this, some research has suggested that social desirability can also affect those completing questionnaires alone, suggesting that social desirability may have affected participants' responses (Wright, 2005).

Conclusion

The present study has explored the changes to individuals' eating behaviours when experiencing different levels of stress. No significant differences were found between the eating behaviours of all three stress categories of typical eating behaviour, nor of the three stress categories of current eating behaviour. However, the change from typical to current behaviours, between low and high stress groups, was found to be significant. Highly stressed participants were found to adopt significantly more unhealthy eating behaviours than participants experiencing low levels of stress. There were considerably more females that reported to be feeling high levels of stress than males, suggesting that perhaps males are generally more resistant to the effects of stress than females. Significant correlations were also found regarding a number of common stressors amongst the highly stressed participants, including 'education', 'work-life' and 'finances', suggesting a number of common stressors amongst students, which can now be explored further and in more detail. Further recommendations have been suggested, and it is firmly considered that if these are to take place, researchers will then be able to explore, more thoroughly, the effects of stress and the specific variables that are involved in changing an individual's eating behaviour. Prevention or stress management plans may then be devised and put into practice, in attempt to reduce and/or eliminate the potentially detrimental effects of stress, for good.

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