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Stress and snacking: A diary study of daily hassles and between-meal snacking
Mark Conner \(^{a}\), Michelle Fitter \(^{a}\) & Wayne Fletcher \(^{a}\)
\(^{a}\) School of Psychology, University of Leeds, Leeds, LS2 9JT, UK
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STRESS AND SNACKING: 
A DIARY STUDY OF DAILY HASSLES AND 
BETWEEN-MEAL SNACKING 

MARK CONNER*, MICHELLE FITTER and WAYNE FLETCHER 

School of Psychology, University of Leeds, Leeds, LS2 9JT, UK 

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The relationship between self-reports of daily hassles and number of between-meal snacks consumed and the effect of moderating variables was investigated in a sample of 60 students. Respondents completed daily diaries for a period of 7 consecutive days reporting number and severity of daily hassles and number of snacks consumed. Questionnaire measures of emotional, external and restrained eating and gender were also taken. Number of hassles was significantly correlated with number of snacks consumed (r=0.312, p<0.001). This relationship was moderated by an individual difference variable, external eating: those high on external eating show significant positive relationship between hassles and snacking, while those low on external eating show no significant relationship. We found no support for the role of average severity of hassle, emotional eating, restrained eating or gender as moderators of the hassles-snacks relationship. The results suggest the need to consider external eating in examining stress-eating relationships. 

KEY WORDS: Stress, eating, hassles, diary study, external eating.

INTRODUCTION

Stress is commonly assumed to be the result of the individual's perception that the demands of the environment exceed the available resources to cope (Lazarus and Folkman, 1984). Such stress has long been considered to be an influence on eating. In a recent review of this area, Greeno and Wing (1994) suggested that two general hypotheses have been investigated. Firstly, a general effect hypothesis that stress changes consumption of food generally, and secondly, an individual difference hypothesis that stress leads to changes in eating in particular groups (e.g., the obese, restrained eaters, women). The current research concerns the second hypothesis and in particular the impact of external eating, emotional eating, restrained eating, gender and severity of stress on the relationship between stress and between-meal snacking. We draw upon recent developments in the measurement of stress (DeLongis, Coyne, Dakof, Folkman and Lazarus, 1982) and employ a longitudinal design to investigate both within-subject and between-subject differences in the relationship between the occurrence of minor stressors and between-meal eating.

Moderators of the Stress-Eating Relationship

Early research on the individual difference hypothesis (e.g., Schachter, Goldman and Gordon, 1968) suggested that stress leads to increased eating in the obese (e.g., Pine, 1985; Slowcher, Kaplan and Man, 1981). More recent findings have reported that stress

* Corresponding author.
leads to a reduction in eating amongst those of normal weight. For example, Stone and Brownell (1994) studied 95 normal weight individuals who completed daily records of stress and eating, and found that subjects were more likely to eat less than usual in response to stress. Explanations of these findings have focused on the role of various individual difference variables. Of particular interest to the present study were external eating, emotional eating, restrained eating and gender. In addition, the role of severity of stress has been a focus in other studies. Research addressing each of these moderator variables is briefly discussed below.

**External eating.** Externality theory (Schachter et al., 1968) suggests that external eaters eat in response to food related stimuli, regardless of the internal state of hunger and satiety. While internal eaters are more responsive to internal cues such as hunger in deciding to eat. Stress is assumed to reduce these internal cues to hunger and draw attention to external cues (e.g., Heatherton and Baumeister, 1991). Thus one might expect increased levels of stress to lead to reductions in eating in internal eaters, but increases in eating in external eaters.

**Emotional eaters.** Emotional eating refers to a tendency to eat more when anxious or emotionally aroused compared to non-emotional eaters who do not show such reactivity to emotion in their eating habits. Stress is assumed to lead to increased eating in emotional eaters (Kaplan and Kaplan, 1957) because they fail to distinguish between anxiety and hunger (i.e., they respond to stress as if it were hunger), whilst not affecting those low in emotional eating.

**Restrained eating.** The concept of restrained eating developed from the "set point" theory of obesity (Herman and Polivy, 1975). Restrained eaters are assumed to restrict their food intake through self-control processes. When these self-control processes are undermined, disinhibition of eating occurs, and excessive food intake takes place. Stress is expected to affect restrained eaters through disrupting the control that they normally try to exert over their eating. Thus, individuals with high restraint scores should be more likely to respond to stress by eating, while those low in restraint should show no change. Heatherton, Herman and Polivy (1991) and Schotte, Cools and McNally (1990) both compared high and low restrained eaters, and found that not only did restrained women eat more than unrestrained women, but restrained women who were stressed, ate more than restrained women who were not stressed. Cools, Schotte and McNally (1992) used restraint as a continuous variable, rather than dividing subjects into high and low restraint groups and showed the stressed group consumed progressively more food as restraint scores increased.

**Gender.** Several studies have looked at male/female eating in response to stress. Grunberg and Straub (1992) looked at whether there are differences between women and men in vulnerability to stress induced eating. Sweet, salty and bland foods were provided for subjects while watching a video, and for half the subjects the video was unpleasant. Results showed that unstressed men consumed significantly more food than any other group. However, stressed women did consume twice as much sweet food as unstressed women, suggesting the importance of food type. Pine (1985) compared obese and non-obese men and women, and found that stress-induced eating was more pronounced among women than among men. Stone and Brownell (1994) examined the relationship between stress and eating for married couples, who completed daily records of stress and eating. Results showed both men and women were likely to eat less than usual in response to stress, and the tendency to eat less with an increasing severity of stress was
particularly pronounced in women. Thus the evidence for gender differences in stress-induced eating is somewhat contradictory. It is further complicated by the fact that gender is found to be correlated with emotional and restrained eating.

Severity of stress. The intensity of a stressor has also been considered as a possible moderator of the effects of stress on eating (Robbins and Fray, 1980). For example, Stone and Brownell (1994) report that severity of stress was linked to the likelihood of eating less, such that eating less was particularly likely at high (severe) levels of stress.

Focus of Present Study
Few studies have addressed the relative importance of these moderator variables. This is surprising given the relationship between variables. For example, restrained eaters are reported to be more likely also to be emotional eaters (Weissenburger, Rush, Giles and Stunkard, 1986) and external eaters (Heatherton and Baumeister, 1991). We have already noted the relationship of gender to emotional and restrained eating. The present study aimed to partially rectify this gap by examining the effects of these 5 moderators on the stress—eating relationship within a single study.

The present study is concerned with whether the number of daily stressors (hassles) affect eating behaviour (snacking), and whether external eating, emotional eating, restrained eating, gender, or severity of stress moderate this relationship. On the basis of the literature, we expected snacking to be used by respondents as a way of coping with stress (Lazarus and Folkman, 1984) and this coping mechanism to be particularly employed by particular groups (women, external, emotional and restrained eaters). To investigate these relationships, we chose a 7-day diary method because it allowed us to examine these interrelationships in everyday life, both between and within individuals. We selected the consumption of between-meal snacks as our measure of eating as this is a discrete form of eating commonly reported as a response to stress (Lazarus, 1984; Wheeler and Reis, 1991). The stressful events recorded were minor life events or hassles. Hassles are daily stressors, and can be defined as problems or difficulties that are part of everyday life. Hassles are events, thoughts or situations which, when they occur: produce negative feelings such as annoyance, irritation, worry or frustration, and/or make you aware that your goals and plans will be more difficult or impossible to achieve. Hassles occur more frequently than, for example major life events, and occur in most people. Thus, measuring hassles allowed quite a large number of stress occurrences in each respondent to be identified, making it possible to look at whether snacking coincided with hassles on a number of occasions, enabling a realistic view of eating in response to stress.

A considerable portion of stress research in the past 15 years has employed measures of such minor life events. The most popular method is to employ some form of standard checklist of minor events (Delongis et al., 1982; Stone and Neal, 1982). Hassles scales, such as that developed by Delongis, Folkman and Lazarus (1988), contain a number
of items, each of which is rated by the subject as how much each item was a hassle that day. However, some studies (e.g., Stone and Brownell, 1994) employ more open-ended measures which allow respondents to write-in the events they found stressful. Such measures have the advantage of not constraining respondents to a limited number of events. We decided to employ such an open-ended measure of hassles because standard checklists tend to contain many items which are irrelevant and omits many relevant items for the student population under study here.

Three eating style moderators (restrained, external and emotional eating) were assessed by questionnaire. Recently, several scales have been developed incorporating all three constructs into one questionnaire, enabling data on each construct to be collected and compared more easily and reliably. The Dutch Eating Behaviour Questionnaire, developed by Van Strien, Frijters, Bergers and Defares (1986) is a good example and the one employed in the current study.

The present study differs from most previous research on stress-eating relationships in studying the effects of self-reported everyday stressors on eating in real-life situations over a prolonged time period (see Stone and Brownell, 1994 for a similar design). In addition, unlike previous studies, we specifically focus on between-meal snacking as our measure of eating.

METHOD

Respondents

There were 33 female and 27 male students at the University of Leeds, recruited to participate in a study of eating habits. They were all aged 18–22 years and from a range of academic disciplines.

Questionnaire

Respondents each completed a questionnaire containing self-report measures of gender (1 = male, 2 = female), the Dutch Eating Behaviour Questionnaire (DEBQ; Van Strien et al., 1986) and daily measures (completed at the end of each day for a one week period) of number of snacks consumed, number of hassles experienced and severity of each hassle (one page per day). The first page of the questionnaire gave details of how to complete the questionnaire and definitions of all measures.

The DEBQ assesses three dimensions of eating: restrained eating (10 items; e.g., ‘When you have put on weight, do you eat less than you usually do?’), emotional eating (13 items; e.g., ‘Do you have a desire to eat when you are irritated?’), external eating (10 items; e.g., ‘If food tastes good to you, do you eat more than usual?’). All items had 5-point response format (never, seldom, sometimes, often, very often; scored 1 to 5) and a score for each scale was calculated as a sum of appropriate items.

To measure the stress that subjects encountered, a measure of hassles was employed. In the questionnaire, three boxes were provided for respondents to write in the hassles that had occurred that day. Next to each hassle was a 3-point response format where respondents were required to indicate how severe a problem each hassle had been (somewhat, quite a bit, a great deal; scored 1 to 3). A range of events were reported as hassles (e.g., arguments, essays to complete, oversleeping). However, as our focus was the number of hassles reported for each respondent, we simply coded the number of hassles and severity
of hassles for each day. Clearly number of hassles and severity of hassles assessed in this way are likely to be highly intercorrelated. Therefore, rather than a sum of severity responses we computed a mean severity score for each respondent for each day of reporting (i.e., total severity divided by number of hassles).

Respondents were also required to record what snacks had been consumed each day in an open-ended response format (for each day, five spaces were provided for snack foods consumed that day to be written down). A snack was defined as any food consumed which does not constitute one of the main meals of the day. A variety of snacks were reported (e.g., crisps, biscuits, fruit, sweets). However, as the focus of our study was number of snacks consumed, we simply coded the number of snacks consumed each day.

RESULTS

Descriptive Statistics

The means and standard deviations of each of the different measures is shown in Table 1. The measures derived from the DEBQ possessed good internal reliability (Cronbach’s alpha: restrained eating = 0.912; emotional eating = 0.961; external eating = 0.830) and appeared to be roughly normally distributed. The diary measures indicated that the sample consumed on average 1.41 snacks per day, reported 0.981 hassles per day and the average severity of the hassles (M = 1.72 per day) was between ‘somewhat’ and ‘quite a bit’ of a problem. The correlations amongst measured variables is shown in Table 2. Number of snacks was significantly positively correlated with number of hassles (p < 0.01). Number of hassles and average severity of hassle were significantly positively correlated.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Means and standard deviations of measures employed (N = 60)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Snacks consumed (per week)</td>
<td>9.87</td>
</tr>
<tr>
<td>Hassles (per week)</td>
<td>6.87</td>
</tr>
<tr>
<td>Average severity of each hassle</td>
<td>1.72</td>
</tr>
<tr>
<td>External eating</td>
<td>31.1</td>
</tr>
<tr>
<td>Emotional eating</td>
<td>34.1</td>
</tr>
<tr>
<td>Restrained eating</td>
<td>23.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Correlations between measured variables (N = 60)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation</td>
</tr>
<tr>
<td></td>
<td>Snacks</td>
</tr>
<tr>
<td>Number of snacks (Snacks)</td>
<td>—</td>
</tr>
<tr>
<td>Number of hassles (Hassles)</td>
<td>—</td>
</tr>
<tr>
<td>Average severity of hassles (Severity)</td>
<td>—</td>
</tr>
<tr>
<td>Gender</td>
<td>—</td>
</tr>
<tr>
<td>Emotional eating (Emotional)</td>
<td>—</td>
</tr>
<tr>
<td>Restrained eating (Restrained)</td>
<td>—</td>
</tr>
</tbody>
</table>

*p < 0.05 **p < 0.01 ***p < 0.001.
Average severity of hassles was also positively correlated with gender \( (p < 0.05) \); women reported hassles to be more severe, and emotional eating \( (p < 0.01) \). Gender was correlated with emotional and restrained eating, such that females had higher restrained \( (p < 0.01) \), and emotional \( (p < 0.001) \) eating scores. Finally, emotional and restrained eating \( (p < 0.01) \), and emotional and external eating \( (p < 0.001) \) were significantly positively correlated (Table 2).

**Stress and Snacking**

Table 2 shows the overall correlation between the number of snacks consumed and the number of reported hassles. A moderate positive correlation \( (r = 0.312, p < 0.01) \) was observed between the number of hassles and number of snacks consumed. Examination of the same correlations day-by-day revealed considerable variation between days \( (r = -0.023 \text{ to } 0.564; \text{mean } r = 0.302) \), but no evidence of different patterns between weekdays and weekends. In order to examine within-subjects relationships between hassles and snacking we used a form of hierarchical multiple regression which uses person days as the unit of analysis (Stone and Brownell, 1994). These analyses address the question of whether, on days when people have high levels of hassles, they report eating greater numbers of snacks, compared to days when they have lower levels of hassles. By removing between-subjects effects from both independent and dependent variables prior to examining within-subjects effects, within-subjects effects are not confounded by between-subjects effects. This was accomplished in the first step of a regression analysis by regressing number of snacks on a set of \( N_{\text{subject}} - 1 \) dummy coded variables (Stone and Brownell, 1994). This explained a significant proportion of the variance in snacking \( (R^2 = 0.276, F(59,360) = 2.33, p < 0.001) \). Then in a second step of the regression, the number of hassles was entered. This explained a further significant proportion of the variance in snacks \( (R^2 \text{ change } = 0.063, F(1,359) = 34.2, p < 0.001) \). Examination of beta weights revealed a significant effect for hassles despite removing between subjects effects \( (\beta = 0.334, t(359) = 5.85, p < 0.0001) \). Thus on days subjects report greater numbers of hassles they also report consuming more snacks compared to days on which they report few hassles. Examination of tests of autocorrelation revealed this not to be a problem in this data after removing between-subjects effects.\(^1\)

**Moderators of the Stress-Snacking Relationship**

We next examined the moderating role of external eating, emotional eating, restrained eating, gender and average severity of hassles on the stress-snacking correlations. Moderation implies that the relationship between two variables changes as a function of the moderator variable. The classic way to test this moderator effect is to examine the correlations between the two variables of interest (hassles and snacks here) at high and low levels of the moderator variable. However, in examining moderator effects, Baron and Kenny (1986) caution that this approach can lead to problems where the independent variable has different variances at different levels of the moderator variable.\(^1\) One solution to this problem is to analyse non-standardised regression coefficients which are not subject to this problem. The exact analysis to be employed depends upon the

\(^1\) Durbin-Watson statistic = 2.17. This is a test of serial correlation of adjacent error terms. Values close to 2, as observed here, indicate residual terms are not correlated.
model of how the moderator variable operates. Where the moderator is a dichotomy, such as is the case for gender, then the appropriate analysis is to run a regression of snacks on hassles separately for men and women and then compare the unstandardised regression coefficients (Baron and Kenny, 1986, Case 2). A moderator effect would be demonstrated by a significant difference in regression coefficients. Where the moderator is a continuous variable and one assumes a linear relationship between the effect on the dependent variable of the independent variable and the levels of the moderator variable, then a regression using both hassles, the moderator and the product of hassles and the moderator as independent variables and snacks as the dependent variable is appropriate (Baron and Kenny, 1986, Case 4). A significant moderator effect would be demonstrated by a significant interaction, whether there is a main effect for the moderator variable or not. This would appear to apply to our moderators of external eating, emotional eating, restrained eating and average severity of hassles. However, because the predictor variables were intercorrelated (Table 2), the component variables were mean centred (transformed to deviations from mean scores) before interaction terms were computed to alleviate problems of interpretation in the presence of multicollinearity among predictors (Cronbach, 1987; Jaccard, Turrisi and Wan, 1990; Aiken and West, 1991).

We carried out the above analyses using the respondent as the unit of analysis. For gender, there was a non-significant effect of hassles on snacking for men (\( b = 0.210, \beta = 0.187, t(25) = 0.950 \)), but a significant effect for women (\( b = 0.430, \beta = 0.513, t(31) = 3.32, p < 0.01 \)). However, the difference in unstandardised regression coefficients was not significant (\( t(56) = 0.629 \)). Hence, this data does not support the suggestion that gender moderates the relationship between hassles and snacking, although the relationship does appear to be stronger for women than for men. For the moderators measured on a continuous variable (and for gender for completeness) the results are shown in Table 3.

### Table 3: Moderator effects on the hassles–snacks relationship examined by multiple regression (\( N = 60 \))

<table>
<thead>
<tr>
<th>Moderator variable</th>
<th>Hassles</th>
<th>Moderator</th>
<th>Hassles × Moderator</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual moderator effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External eating</td>
<td>0.429***</td>
<td>0.020</td>
<td>0.436***</td>
<td>0.272***</td>
</tr>
<tr>
<td>Emotional eating</td>
<td>0.346**</td>
<td>0.074</td>
<td>0.236</td>
<td>0.148*</td>
</tr>
<tr>
<td>Restrained eating</td>
<td>0.306*</td>
<td>-0.132</td>
<td>0.075</td>
<td>0.122</td>
</tr>
<tr>
<td>Average severity of hassle</td>
<td>0.318**</td>
<td>0.088</td>
<td>0.203</td>
<td>0.128*</td>
</tr>
<tr>
<td>Gender</td>
<td>0.330**</td>
<td>0.044</td>
<td>0.111</td>
<td>0.111</td>
</tr>
<tr>
<td><strong>Combined moderator effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External eating</td>
<td>0.397**</td>
<td>-0.042</td>
<td>0.513**</td>
<td>0.317*</td>
</tr>
<tr>
<td>Emotional eating</td>
<td>0.043</td>
<td>-0.030</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrained eating</td>
<td>-0.079</td>
<td>-0.213</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average severity of hassle</td>
<td>0.100</td>
<td>0.098</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.086</td>
<td>0.086</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^* p < 0.05 \quad ** p < 0.01 \quad *** p < 0.001.\)

1 It was not possible to use the day as unit of analysis because this analysis requires the removal of between-subject variation through the use of dummy variables in order to be able to interpret the findings. In addition, our moderator variables were also between-subject variables (no variation across days) and therefore removing between-subject variation would also remove the effects of the moderator variables of interest. Nevertheless these analyses provided substantively identical results to those reported.
(upper panel). For emotional and restrained eating, and average severity of the hassles (and gender) the pattern of results were very similar. There were positive main effects for hassles, but not for the moderator variable or interaction term. Thus none of these variables shows evidence of moderating the relationship between hassles and snacking. In contrast, external eating did show evidence of moderating the relationship between hassles and snacks: a significant positive main effect of hassles and a significant positive interaction term (Table 3). This suggests a different relationship between hassles and snacking at different levels of external eating. We return to the precise nature of the interaction after considering the combined effects of all moderators.

In our final analysis, we regressed number of snacks consumed each day onto number of hassles, and onto external, emotional, and restrained eating scores, average severity of hassles, gender and the interaction of these variables with number of hassles. We wished to see whether any of the moderator effects were significant when other moderator variables were present. The results (Table 3, lower panel), indicate that there is significant main effect for hassles (positive $\beta$ weight) and a significant interaction between hassles and external eating (positive $\beta$ weight). None of the other effects were significant.\(^3\) We interpret this as evidence of a moderating effect of external eating on the hassles–snacking relationship. We investigated the nature of the interaction by plotting the regression lines at the mean level of external eating and at one standard deviation above and below the mean (Aiken and West, 1991). This is shown in Figure 1. At low levels of external eating there is a non-significant negative impact of number of hassles on number of snacks consumed.

\[\begin{align*}
\text{Figure 1} & \quad \text{Plot of the hassle–snacking relationship at different levels of external eating.}
\end{align*}\]

\(^3\) Examination of the variance inflation factor (VIF scores) for each independent variable did not reveal any problems of multicollinearity (all VIF scores < 3). Large VIF scores would indicate an independent variable is a linear combination of other independent variables.
consumed. However, at high levels of external eating the relationship is a significant positive one \((p<0.001)\), indicating that higher levels of hassles are associated with higher levels of snacking.

We should note that for all the regression equations reported in Table 3, the actual amount of explained variability in number of snacks consumed is relatively modest \((11.1\% - 31.7\%)\), indicating that there are probably other important variables which explain variability in snacking behaviour, such as attitudes and beliefs. We also investigated the possibility that the moderator variables might interact. Interaction terms between the moderator variables (2-way interactions) and between pairs of moderators and hassles (3-way interactions) were created and entered into a regression equation with the variables described in Table 3. In no case did these higher order interaction terms explain significant portions of the variability in snacking or have significant beta weights in the final regression equation. Indicating no evidence for interactions amongst moderator variables in their effect on stress–snacking relationships.

**DISCUSSION**

**General Findings**

The aim of this study was to examine the effect of stress on snacking behaviour in a normal weight population and examine the moderating effect of various different variables. Overall, the number of hassles and number of snacks were found to be moderately positively correlated — as number of reported hassles increased, so did the reported number of snacks consumed. This relationship remained when we removed between-subject variance. This confirms the findings of a number of other studies that stress leads to increased eating in normal weight populations (see Greeno and Wing, 1994). However, it is in direct contrast to the findings of Stone and Brown (1994) who, using a similar methodology, reported stress being more consistently related to eating less \((72\%\) of consistent respondents) than eating more \((28\%\) of consistent respondents). However, a major difference between the two studies is the dependent variable, which was eating more or less generally in their study, and number of snacks consumed in our study. It may well be that eating more snacks is associated with a general reduction in the amount eaten or amount perceived to be eaten, through breaking up the pattern of meals eaten. This might usefully be investigated in future studies. The present findings suggest that stress may increase the consumption of snacks. This may be important no matter what the effect on general eating patterns because of the suggestion that between-meal snacking can lead to problems of weight control (Conner and Norman, 1996; Grogan *et al.*, 1997).

**Moderator Effects**

We also investigated a number of variables which have been considered as moderators of the relationship between stress and eating. We only found evidence for a moderating effect of external eating on the relationship between hassles and snacking. Individuals high on external eating showed the same effect as that observed across the sample: increased levels of hassles were associated with greater number of snacks consumed compared to lower levels of hassles. However, for individuals low in external eating, there was no discernible pattern: increased levels of hassles were not associated with a
change in the number of snacks consumed compared to low levels of hassles. These latter findings conflict with those of Stone and Brown (1994) who reported that higher levels of stress produce more eating in general.

These results partially support the Schachterian/Externality theory on which the external eating scale of the Dutch Eating Behaviour Questionnaire is based (Van Strien et al., 1986). Externality theory proposes that eating in non-external eaters decreases in response to stress. Our data revealed such a negative relationship, although it was not statistically significant. The definition of external eating used by Van Strien et al. (1986) is “eating in response to food related stimuli, regardless of the internal state of hunger and satiety” (p. 296). However, since stress has also been shown to draw attention to external cues (e.g., Heatherton and Baumeister, 1991) one might expect stress to lead to increased eating in external eaters by making (external) cues to eating more salient, whilst having no impact upon non-external eaters. This might explain the increase in eating in response to stress observed in our high external eating group. However, we should perhaps not place too much emphasis on these suggestions until confirmed by direct test.

We failed to find evidence of a moderating effect for severity of stressor, emotional eating or restrained eating and non-significant support for gender. This may be attributable to the limited sample size. Often large sample sizes are required to detect interactions of the nature proposed (Aiken and West, 1991). However, the data do indicate that of the moderation effects hypothesised, only that associated with external eating was of sufficient magnitude to be detected in the present data. It is unclear whether our failure to detect other moderation effects is attributable to the measure of eating behaviour employed (number of snacks consumed) or due to other characteristics of the study (self-report diary study versus experimental manipulation). In relation to gender as a moderator, our results did not produce unequivocal support for expectations produced from the literature that the effect of stress-induced eating was more pronounced among females than among males (e.g., Pine, 1985), although differences were in the predicted direction. Evidence in this area has been very contradictory and many studies have found no gender differences in eating in response to stress (e.g., Grunberg and Straub, 1992; Stone and Brownell, 1994). Our data would support that of Stone and Brownell (1994) in showing that there were few differences in the effects of stress on eating in men and women when assessed in field studies, and using daily records of stress and eating.

Previous studies have also suggested relationships between the three constructs of the Dutch Eating Behaviour Questionnaire in their impact on stress-eating relationships. In particular, links between restrained and emotional eating have been implied (e.g., Dewberry and Ussher, 1994; Weissenburger et al., 1986) and between restrained and external eating (e.g., Heatherton and Baumeister, 1991). However, the current data provided no support for these or other possible two-way interactions between these variables, at least in terms of their moderating effect on hassles-snacking relationships.

**Study Limitations**

There are a number of potential limitation to the present study. Most importantly, the data are self-report and may be open to a variety of social desirability effects. It may be that respondents guessed the nature of our hypotheses and altered their responses accordingly. We believe this to be unlikely for several reasons. Firstly, the effects we observed were relatively consistent when we examined them in a variety of different ways. Secondly, it would be fairly difficult for respondents to produce a set of responses which fit the
hypotheses, particularly in relation to the moderator effects. This would require socially desirable responding to be related to the moderator variables and we know of no research which would support this view. Thirdly, respondents did not report guessing the nature of the effects we expected during debriefing, although some commented on snacking more in response to things going wrong (i.e., hassles) in their lives.

Future Studies

Future studies might usefully address a number of factors. Firstly, we would recommend the use of larger scale studies with diverse sample followed over prolonged periods, such as employed by Stone and Brownell (1994). This would allow one to further examine the moderator variables assessed here within individuals in order to assess whether individuals show different patterns of responding and also to examine whether these effects are similar across different populations. Secondly, examination of different types of stressors upon eating would seem warranted. For example, do uplifts (DeLongis et al., 1981) produce similar or the opposite effects upon snacking to hassles? Finally, other aspects of eating than a simple measure of the number of snacks consumed might be examined. For example, does stress lead to greater consumption of food at meal times as well as snacking. Also, does stress lead to the consumption of foods with particular characteristics, such as sweet foods (Grunberg and Straub, 1992), or high fat foods (Michaud, Kahn, Musse, Burlet, Nicolas and Mejean, 1990). Our data suggested that both these types of foods were well represented in the foods individuals snacked upon, but that the numbers were too small to permit further analysis. A final area of research that would be interesting to explore would be that looking at the types of stressors that lead to eating, and whether particular types of stressors lead to eating only in particular groups of people. This study did not distinguish between different types of stressors. However, Heatherton, Herman and Polivy (1992) showed that disinhibition of eating can be seen with ego threatening situations, but not with physically threatening situations. This suggests that the type of stressor experienced has an impact on whether eating will result or not. A number of different strands of research could be followed in terms of the effects that type of stressors has on eating, which may help to explain the possible processes involved in stress-induced eating. However, further development of theory is most likely to advance understanding in this area.

CONCLUSIONS

It has been shown here that some groups are more likely to respond to stress by eating – those high on external eating show stronger positive hassles–snacking relationships – while others are less likely to respond to stress by eating – those low on external eating show no hassles–snacking relationships. Snacking may be seen as an attempt at coping with the stressor (Lazarus and Folkman, 1984). Heatherton and Baumeister (1991) argue that stress-induced eating helps individuals to escape distress by focusing on external stimuli. This explanation seems to apply particularly well to external eaters. Since external eaters rely on food-related stimuli to trigger eating, and not the internal hunger state, it seems viable that over-awareness of food cues is likely to increase when under stress, since stress has been shown to focus attention on external stimuli. Increased over-awareness of food cues might force the individual to focus on the immediate situation and avoid
meaningful thought about the problem. Food consumption would thus be likely to increase, since external eaters rely on these cues to trigger eating, and so eating in external eaters could be seen as a coping attempt.

References


Rockville: National Centre for Health Services Research.


