SNACKING FREQUENCY, MENTAL HEALTH, HEALTH BELIEFS AND PHYSICAL HEALTH

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ABSTRACT: The aims of the current study were to examine associations between snacking frequency and mental health, health related behaviors, health beliefs and physical health. Snacking frequency per se was examined in addition to frequency of consumption of specific snack items. One hundred and thirty six participants (96 females, 40 males, mean age 37 years), including both students and members of the general public took part in the study. Participants completed a variety of psychosocial questionnaires and a snacking questionnaire. Participants who had a snack everyday reported significantly less depression than those who did not. Snacking frequency positively correlated with chocolate, crisp and biscuit consumption. Participants who consumed snacks like crisps and chocolate reported greater concerns about their current and future health status and also had less motivation to be healthy. No differences were found with respect to physical health. Participants who ate snacks such as chocolate and crisps ate a lot of fried foods and had more worries about their health. The participants who consumed snacks such as fruit and yoghurt had better diets and were optimistic about their future health. It is not possible to determine from the present results whether eating habit determines health concerns or whether health determines eating habits.

KEY WORDS: Health Beliefs, Mental Health, Physical Health, Snacking Frequency

INTRODUCTION

Snacking or a grazing pattern of eating is becoming more popular as opposed to eating three straight meals a day. There is still a lack of agreement on a definition of snacking however this has been addressed in our previous research (Chaplin and Smith, in press) and for the purposes of this study snacking will be defined as food or drink eaten between main meal times (unless stated otherwise). Regardless of how snacking is defined it contributes significantly to an individual's nutritional intake (Gregory et al, 1990; 1995). It is believed that snacks contribute 15-20% of our daily energy intake (Summerbell et al., 1995), 15-20% of our daily mineral intake and 13-17% of our daily vitamin intake.

Some researchers have argued that snacks provide empty and extra calories which are a predisposition for obesity (Booth, 1988). These researchers believe that the current rise in obesity is related to the rise in snacking. However many of these claims are based on anecdotal assumptions. Scientific studies have provided evidence that frequent eating episodes (snacking) are actually associated with lower body weight than eating fewer meals per day (Fabry et al., 1964; Fabry et al., 1966).

Metzner et al. (1977) examined eating frequency and adiposity and found an inverse relationship between the two. The participants consuming 6 meals per day were significantly thinner than those who ate 2 meals per day were. Edelstein et al. (1992) found a significant difference with respect to waist hip ratio; again those participants with a higher eating frequency had a lower waist hip ratio than those with a lower eating frequency.

A study of 7147 adults from America is one of a few studies to examine the long-term effects of eating frequency on body weight (Kant, 1995). Baseline data were collected between 1971 and 1975 and followed up data between 1982 and 1984. The outcome measures were body weight change, BMI and skin fold thickness. At baseline significant differences were found for all three of the outcome measures between participants who ate 2 meals and fewer and participants who ate 7 meals or more. However no significant differences were found for any of the outcome measures at the follow up. It is not possible however to conclude that eating frequency has no effect on body weight due to a number of methodological problems with the study.

It has been suggested that there is an issue of causality.
Some researchers argue that a decrease in meal frequency is a result of increased body weight as opposed to the cause. Many people will skip a meal in an attempt to lose weight. Another possible suggestion is dietary induced thermogenesis (DIT); this is a measure of the heat energy which is produced through digestion and metabolism of food. However, studies comparing energy expenditure on nibbling and gorging diets have failed to find any significant differences (Verboeket-van de Venne and Westerterp, 1991; 1993, Verboeket-van de Venne et al., 1993). These findings suggest that DIT does not seem to be affected by the frequency of eating occasions.

Frequent snacking appears to be less efficient than eating the same number of calories in larger meals and therefore tends to keep the metabolic rate higher and results in an increase of total daily expenditure (Drummond et al., 1995). However, more research is needed in this area due to conflicting evidence (Belko and Barbieri, 1987; Kinabo and Durnin, 1990). It is proposed that those individuals that snack frequently are more physically active. Frequent snackers are more physically active which in turn leads to an increase in energy expenditure, this in turn acts as an appetite stimulant and they snack more (Drummond et al., 1995).

The current literature has mainly considered physiology and physical health with respect to the relationship between snacking frequency and body weight/obesity. The current study aims to examine any association between snacking frequency and consumption of specific snack foods and mental health. This is based on a methodology used to examine correlations between breakfast consumption, mental health, physical health and health related behaviors (Smith, 1998; 1999; 2003). These studies found that regular breakfast cereal consumption was associated with less stress, depression and emotional distress. Smith (1999; 2003) also found regular breakfast cereal consumption was associated with fewer physical symptoms. It is interesting whether the same findings can be obtained between snacking frequency, mental health, physical health and health related behaviors.

One study has examined snacking and mental health (Smith, submitted). Participants who snacked everyday scored lower on all measures of mental health (stress, depression, emotional distress and anxiety) than those participants who reported never snacking. However none of these differences were significant. This result was found in four samples: one from the general population (aged 20-60); one from late teens living at home; one from a student population (aged 18-30) and one from an elderly sample (aged 65+). Although no significant benefits of snacking were found no negative effects of snacking were identified which suggests that snacking should not be avoided. A number of suggestions have been made about why no effect was found after a mid morning snack. There are questions about whether the type of snack, the frequency of snacking and the timing of snacks produce different effects on mental health.

The current study aimed to examine snacking frequency and physical health, mental health, health related behaviors and health beliefs. In addition to snacking frequency per se, frequency of consumption of specific snacks was considered.

METHOD

Participants

A total of 136 participants were recruited from two populations: 82 students and 55 members of the general public. The participants consisted of 96 females and 40 males. The mean age was 37 years (range age was 17 -80 years). Students were either contacted via a student participant database and were sent the material via the post or they were recruited from Cardiff University through poster advertisements. The members of the general public were recruited from the general public participant database. They were then sent the material to complete through the post. All participants were paid for participating in this study.

Procedure

Participants from the databases were sent a letter and information sheet detailing the study and a consent form. Participants were requested to complete the consent form and a variety of psychosocial questionnaires in addition to a snacking questionnaire and return them in the free post envelope provided. Participants recruited through the poster campaign came to the laboratory and were given the same information sheet detailing the study and consent form. Participants completed the questionnaires in the laboratory.

Snack Food consumption

Overall snack food consumption on a weekly basis was measured using a 5 point Likert scale where 0 = never and 4 = everyday.

Consumption of 20 specific snack foods were measured using a 7 point Likert scale where 0 = never and 6 = 3 to 4 times a day. Consumption of each item was categorised into three groups:

(1) The non-consumer—never consumed the snack.
(2) The weekly consumer—consumed the snack between once to four times a week.
(3) The daily consumer—consumed the snack between once to four times per day.

Mental health

The following questionnaires were used to measure mental health:

Stress: Perceived Stress Scale (Cohen and Williamson, 1988)

Depression: The Hospital Anxiety and Depression Scale (Zigmond and Snaith, 1983)

Emotional Distress: Emotional distress scale of Profile of Fatigue Related States (Ray et al., 1992)

Anxiety: Spielberger Trait-State Anxiety Inventory (Spielberger et al., 1971)
Health-related behaviors (Cohen et al., 1991). Participants were asked about their dietary habits (for example how often they ate fried food), these were measured using a 5 point likert scale ranging from 0 (never) to 4 (everyday). Participants also recorded their consumption of a variety of food items (relating to both meal and snackfoods) using a 6 point likert scale (1 = never and 6 = more than once a day). Information was also collected about alcohol consumption, smoking and activities and exercise by questionnaire (based on that used by Cohen et al., 1991).

Health attitudes and beliefs. Participants beliefs about their health status was measured using the Health Orientation Scale (Snell et al, 1991). This is a validated questionnaire which provides information on a variety of health related beliefs.

Physical health. A single measure of physical health was used. This was the Cohen-Hoberman index of physical symptoms (Cohen and Hoberman, 1983). This is a validated measuring instrument of physical health.

Statistical analysis. Pearson's product moment correlation coefficient was used to assess any associations between snacking frequency and health beliefs, physical health and mental health. A one-way ANOVA and independent t-tests were used to assess any differences between snacking frequency and mental health measures.

RESULTS

Correlations between snacking frequency and mental health. Table 1 shows participants scores on the mental health measures based on their snacking habits.

<table>
<thead>
<tr>
<th>Snacking Frequency</th>
<th>Never/less than once a week</th>
<th>Once or twice a week</th>
<th>Most days</th>
<th>Everyday</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>15</td>
<td>26</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>Emotional Distress</td>
<td>Mean s.e</td>
<td>Mean s.e</td>
<td>Mean s.e</td>
<td>Mean s.e</td>
</tr>
<tr>
<td>26.73 (2.54)</td>
<td>31.35 (2.63)</td>
<td>33.6 (2.40)</td>
<td>31.36 (2.79)</td>
<td></td>
</tr>
<tr>
<td>State Anxiety</td>
<td>33.87 (2.51)</td>
<td>37.19 (1.49)</td>
<td>37.96 (1.32)</td>
<td>34.93 (1.86)</td>
</tr>
<tr>
<td>Perceived Stress</td>
<td>19.54 (1.80)</td>
<td>22.65 (1.55)</td>
<td>22.52 (1.11)</td>
<td>19.64 (1.38)</td>
</tr>
<tr>
<td>HAD-Depression</td>
<td>10.60 (0.79)</td>
<td>10.65 (0.54)</td>
<td>10.88 (0.42)</td>
<td>9.13 (0.28)</td>
</tr>
</tbody>
</table>

Two significant correlations were found between snacking frequency and measures of mental health. Increased snacking on a weekly basis was negatively associated with lower participants' scores on the depression component of the Hospital Anxiety and Depression Index (r = -.181, p<.05). A one way Analysis of Variance revealed a significant difference between snacking frequencies (F(3, 136) = 3.91, p = .01). A significant difference was found between participants who snacked most days and participants who snacked everyday (t(93) = 3.35, p = .001); participants who snacked once to twice per week and participants who snacked everyday (t(69) = 2.74, p<.01) and participants who snacked never/less than once a week and participants who snacked everyday (t(58) = 2.21, p<.05). The participants who snacked everyday were less likely to feel depressed.

Greater frequency of biscuit consumption was negatively associated with scores on the State – Trait Anxiety Inventory (r = -.174, p<.05), with participants who frequently ate biscuits reporting lower levels of anxiety.

No significant correlations were found with respect to emotional distress and stress for snacking frequency or frequency of consumption of specific snacks. Although some significant correlations were found there are no more than would be expected by chance.

Correlations between snacking frequency and health related behaviors.

Increased snacking on a daily basis was positively correlated with crisp (r = .223, p<.01), sweet/ chocolate (r = .453, p<.001), biscuit (r = .377, p<.001), cake (r = .240, p = .005) and dairy based pudding consumption (r = .253, p<.005).

In addition snacking frequency on a daily basis was negatively associated with green vegetable consumption (r = -.187, p<.05). Increased snacking was negatively associated with how often participants consumed alcohol (r = -.209, p<.05).

Participants who ate fruit as a snack were more likely to eat yoghurt (r = .211, p<.05), breakfast cereal (r = .222, p = .01), salad/ raw vegetables (r = .342, p<.001) and cheese (r = .190, p<.05). The participants who ate cakes as a snack were more likely to eat crisps (r = .222, p = .01), biscuits (r = .312, p<.001), chocolate (r = .207, p<.05) and fried foods (r = .265, p<.01). The majority of this analysis involved correlating general snacking with specific snack types and this should be taken into consideration when considering the findings.

Correlations between snacking frequency and health behaviors.

No significant correlations were found between snacking frequency (both on a daily and weekly basis) and health beliefs.

Motivation to avoid unhealthiness (MUNH) and motivation for health (MH) were found to negatively correlate with the frequency of consumption of chips (MUNH r = -.276, p = .001; MH r = -.265; p = .002) and soft drinks (MUNH r = -.293, p = .001; MH r = -.269, p = .002). Health-esteem confidence (HEC)
was found to be negatively correlated with the frequency of chip 
(r = -.176, p < .05) consumption. Health anxiety (HAX) 
positively correlated with frequency of consumption of biscuits 
(r = .212, p < .02). Health expectations and optimism (HEO) 
was found to negatively correlate with frequency of eating 
chips (r = -.184, p < .05). In addition to this frequency of 
crisp consumption was also found to negatively correlate with 
health internal control (HILC) (r = -.199, p = .021) and health 
status (HS) (r = -.197, p = .023).

In contrast breakfast frequency was found to positively 
correlate with health-esteem confidence (HEC) (r = .271, p 
= .001), motivation to avoid unhealthiness (MUNH) (r = 
.216, p = .012) and motivation for health (MH) (r = .223, p 
< .01). Fruit frequency was found to positively correlate with 
motivation to avoid unhealthiness (MUNH) (r = .185, p < .05), 
motivation for health (MH) (r = .246, p < .01) and health 
expectations and optimism (HEO) (r = .206, p = .018).

**Snacking frequency and physical health.**

In contrast no significant differences were found between 
physical health and consumption of specific snack foods. 
Participants who snacked more frequently on foods which are 
traditionally viewed as being unhealthy held more negative 
beliefs about their health, however their health status was the 
same as participants who snacked on typically healthy foods.

**DISCUSSION**

Increased snacking was positively associated with greater 
consumption of chocolate, crisps and biscuits; however, 
snacking was negatively associated with drinking habits. This 
would appear to support the claims that snacking relates to 
unhealthy foods which provide empty calories (Booth, 1988). 
However those participants who reported eating fruit as snacks 
also ate more yoghurt, salads and raw vegetables. It would 
appear that there are two distinct groups of snackers: those 
that snack healthy and those that do not. This difference could 
be due to differences in definitions of snacking however it is 
more likely that these differences are the result of differing 
attitudes and beliefs about health status.

Snacking frequency per se was not found to correlate with 
any of the health attitudes and beliefs. Participants who 
snacked more frequently on “healthy” snack foods, for example 
breakfast cereal and fruit, had higher health-esteem 
certainty, motivation to avoid unhealthiness, motivation to 
remain healthy and higher health expectations and optimism 
for their future health status. Greater consumption of 
“unhealthy” snacks, for example crisps, biscuits, chips and soft 
drinks, was associated with negative feelings or worries about 
current and future health status. This would suggest that 
participants do not view frequent snacking as enough to cause 
worry about their health however the types of snacks which 
they eat can. Participants seem aware of the disadvantages of 
snacking on foods such as crisps and chocolate which are 
believed to be unhealthy and the advantages of snacking on

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