Food Cravings in a College Population

HARVEY P. WEINGARTEN and DAWN ELSTON
Department of Psychology, McMaster University

A questionnaire was administered to over 1000 male and female college undergraduates to collect self-reports regarding food cravings (defined as an intense desire to eat a specific food). Ninety-seven per cent of women and 68 per cent of men reported experiencing food cravings. Chocolate was the most frequently reported food craved, especially among women. The majority of subjects reported that they indulged their food cravings at least half the time. Females tended to respond with more negative affect to indulging their cravings than men. Only 32 per cent of women perceived that their cravings were linked to menstrual cycles. There was no tendency for an increase in food cravings with dietary restraint. The data provided a detailed description of perceptions regarding food cravings among college-age adults, but also underscored some of the limitations of self-report measures of food craving. In spite of these limitations, however, the results challenge several assumptions regarding food craving and highlight some promising avenues for future investigation.

INTRODUCTION

Although many investigators acknowledge the paucity of scientific analysis of cravings (Kozlowski & Wilkinson, 1987; Marlatt, 1978; Weingarten & Elston, 1991), the phenomenon is referred to repeatedly among those concerned with the control of normal or disordered eating. The ubiquity of the craving concept stems partially from innumerable and memorable anecdotes suggesting that cravings represent frequent and intense experiences regarding food. The eating disorder literature also highlights interest about cravings as these experiences are presented as important in the understanding and treatment of disordered eating. For example, it is reported that about 50 per cent of overweight women indicate carbohydrate cravings as a precipitant of unwanted eating and a major impediment to weight loss (Bjorvell et al. 1985). Also, over 70 per cent of bulimic women attribute their binge eating to food cravings (Mitchell, et al., 1985).

Our current understanding of the phenomenon of food cravings emanates largely from three specific lines of investigation: the relationship between the menstrual cycle and cravings (Cohen et al., 1987; Metcalf et al., 1988; Smith & Sauder 1969), pregnancy and cravings (Dickens & Trethowan 1971; Harries & Hughes 1958; Hook 1978), and depression and cravings (Wurtman 1985, 1988). In addition, several general features of food craving have been inferred from the considerable literature on
salt appetite and salt cravings (Denton, 1984). Because these questions have driven the majority of studies of food craving, there are several important aspects of the craving literature. First, the literature is based almost exclusively on females; we have almost no information regarding food cravings among males. It is difficult to assess whether particular issues or concerns regarding eating are unique to women (e.g., Rodin et al., 1985) unless there is a corresponding data base for men. Second, much of what we know about food craving derives from special populations, such as women who are either pregnant or who suffer from premenstrual syndrome or, more generally, populations with pathologies such as Addison’s disease. We have considerably less information about cravings in the general population. Development of specific hypotheses regarding craving, or at least formulation of potentially productive lines of inquiry, may be greatly assisted by a more complete description of the nature of the craving phenomenon in the general, non-clinical population.

The current study examines the phenomenology of food cravings in a large sample of male and female college undergraduates. The perspective motivating the study, consistent with the view of Kozlowski & Wilkinson (1987), is that advances in the understanding of the nature, role, and treatment of cravings will derive from careful descriptions of the phenomenology of the craving state. This study is an initial step towards this description.

**METHODS**

*Subject population*

A craving questionnaire (see Appendix 1) was administered to 380 male and 758 female undergraduates at McMaster University. The majority of these students (n = 868) were registered in the introductory psychology class. The remainder were from second year psychology courses. Students were informed that they were under no obligation to complete the craving questionnaire. However, over 90 per cent of students volunteered to participate.

*Analysis*

Data were analyzed using chi-square ($\chi^2$) tests of independence. Subjects did not necessarily answer all the questions on the questionnaire. The actual number of responses analyzed is indicated in the relevant tables.

**RESULTS**

*Frequency of food cravings*

Sixty-eight per cent of men, but 97 per cent of women, report having experienced food cravings (Table 1). This difference is significant, [$\chi^2(1) = 194.1, p < 0.001$]. Among those reporting the experience of craving, there was no gender difference in
TABLE 1
Gender difference in response to question of whether food cravings had ever been experienced

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>“YES” cravings</td>
<td>261 (68%)</td>
<td>738 (97%)</td>
</tr>
<tr>
<td>“NO” cravings</td>
<td>119 (32%)</td>
<td>20 (3%)</td>
</tr>
</tbody>
</table>

frequency of cravings, \[ \chi^2(5) = 3.32, p > 0.05 \] (see Table 2). For both males and females, the modal craving frequency was 1–4 times per month, and the median number was in the range of 5–9 cravings per month.

What is craved?

Subjects identified the food they craved most intensely (Question 2). Table 3 shows that males and females demonstrated significant differences in what they craved, \[ \chi^2(6) = 58.4, p < 0.001 \]. Among females, chocolate was the most frequently craved item, its frequency far exceeding that of any other food. Chocolate was also craved often by men although the frequency of chocolate cravings was less than half that of females.

How often are cravings indulged and what is the affective response to indulging one’s food cravings?

A food is not necessarily eaten when it is craved. To obtain an estimate of the percentage of times cravings are actually indulged, subjects were asked to report how often they ate a food when it was craved. Subjects also reported their general affective

TABLE 2
Frequency of craving among men and women admitting to the experience of craving

<table>
<thead>
<tr>
<th>Number cravings/month</th>
<th>% Male (n=258)</th>
<th>% Female (n=734)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–4</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>5–9</td>
<td>22</td>
<td>26</td>
</tr>
<tr>
<td>10–14</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>15–19</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>20–24</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>&gt;25</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

1 When asked to indicate frequency of cravings, subjects are biased in their selection of numbers resulting in a preponderance of numbers surrounding five, or multiples thereof. Thus, all frequency data are presented in ranges of 1–4, 5–9, 10–14, 15–19, 20–25, or greater than 25.
response to indulging their cravings. These latter responses were classified as reflecting either negative, positive, or neutral affect. The results of these two analyses are presented in Table 4.

Subjects reported that they are likely to “give in” to their cravings. Eighty-five per cent of men, and 86 per cent of women, claim to indulge their cravings in the majority (i.e. > 50 per cent) of occasions. The overwhelming majority of men, 82 per cent, report a positive response to satisfying a craving. In contrast, only 57 per cent of women report a positive affect after indulging their craving. This is a significant gender difference, \(\chi^2(1) = 33.11, p < 0.0001\).

**Cravings and the menstrual cycle**

Only 32 per cent of women with food cravings perceive that their cravings are linked to the menstrual cycle. The frequency of food cravings in women who do, and

### Table 3

*What is craved? Foods identified by individuals as their most intensely craved item*

<table>
<thead>
<tr>
<th>Food</th>
<th>% Females</th>
<th>% Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chocolate</td>
<td>39</td>
<td>14</td>
</tr>
<tr>
<td>Pizza</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Salty foods(^a)</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Ice cream</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Sweets &amp; desserts(^b)</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Meat &amp; chicken</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Bread &amp; pasta</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

\(^a\) Includes chips, popcorn, pretzels & salt.
\(^b\) Excludes ice cream.

### Table 4

*Frequency of indulgence of craving and affective response to it*

<table>
<thead>
<tr>
<th>Response to indulgence</th>
<th>Males ((n = 205))</th>
<th>Females ((n = 616))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of indulgence</td>
<td>Positive (%)</td>
<td>Negative (%)</td>
</tr>
<tr>
<td>0–24</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>25–49</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>50–74</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td>75–100</td>
<td>40</td>
<td>4</td>
</tr>
</tbody>
</table>
who do not, indicate an association between menstruation and cravings was not different, \( \chi^2(5) = 22.66, p > 0.05 \), (see Table 5). There was a marginal tendency for women who report menstrual-related cravings to be more likely to have chocolate as their strongest craving, \( \chi^2(1) = 3.42, \, 0 = 0.06 \). Specifically, 45 per cent of women attributing a correlation between menstruation and craving identified chocolate as their most intensely craved item. In contrast, only 38 per cent of women perceiving no association between menstruation and food craving identified chocolate as their most intense craving.

**Cravings and dieting**

Information regarding dieting and cravings was available from 694 women. Of the 694 females providing this information, 104 (15 per cent) indicated that they were actively dieting at the time of the questionnaire. Table 6, which shows the frequency

**TABLE 5**

*Frequency of food cravings (episodes/month) among women who do, and who do not, perceive their cravings linked to their menstrual cycle*

<table>
<thead>
<tr>
<th>Number cravings/month</th>
<th>Linked to menstrual cycle (%) ( (n = 224) )</th>
<th>Not linked to menstrual cycle (%) ( (n = 469) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–4</td>
<td>42</td>
<td>41</td>
</tr>
<tr>
<td>5–9</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>10–14</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>15–19</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>20–24</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>&gt; 25</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
of craving in dieters and non-dieters, indicates no difference in the frequency of craving between these two self-identified groups, \( \chi^2(5) = 7.4, p > 0.05 \).

*Other observations*

Review of the questionnaires indicated other prevalent themes and sentiments. These data are not easily quantifiable, but the frequency of their mention suggests that subsequent analyses of food cravings might wish to address these views more directly.

Among men and women who reported cravings, approximately 50 per cent indicated that there is another food which can substitute satisfactorily for the craved item. Since subjects also identified the substitute food, we reviewed these data in more detail. Two conclusions were apparent. First, substitutes for craved foods are often idiosyncratic. For example, many who indicated a craving for a salty food such as chips did not report other salty items, such as pretzels, as satisfactory substitutes. This suggests that the "dimensions" of craving may not follow the standard nutritional categories by which we classify foods (e.g., salty, sweet, etc.). Second, most chocolate cravers indicated no substitute other than some other form of chocolate (e.g., Hershey’s Kisses for a chocolate bar). Overall (77 per cent of women, and 75 per cent of men) chocolate cravers indicated that there is no substitute for their chocolate craving, or that the only substitute is chocolate in some other form.

Some laymen (at least undergraduate laymen) assume a homeostatic explanation for their cravings. Many individuals provided comments indicating their belief that cravings were elicited by a bodily need and that indulging the craving redressed the deficit. This was especially common among women linking their cravings to their menstrual cycles. Comments such as: "...I guess I’m low in magnesium", "Chocolate is high in magnesium, isn’t it?" were prevalent in this group. Another frequent attribution was the linking of food cravings to stress engendered by schoolwork.

Men and women may differ in their attributions of the origin of cravings. More men expressed the sentiment that cravings were brought on by hunger and suggested that the positive affect after indulging their craving resulted from the alleviation of hunger. In contrast, more women reported craving as a state distinct from hunger and were likely to identify specific triggers eliciting cravings, e.g., television commercials, boredom or stress.

**General Discussion**

Our questionnaire study underscores, for us, an important issue regarding the definition of food cravings which we raised in a recent review of the food craving literature (Weingarten & Elston, 1991). Almost all studies of food cravings, including the present one, rely upon self-report measures of craving. It is difficult to make conclusive statements when self-reports are the only data collected. For example, we find a substantial sex difference in response to the question of whether food cravings are experienced. Although this difference may reflect a true gender distinction in craving experience, the self-report nature of these data leave open the possibility that this difference reflects a sex difference in the interpretation of the term "craving", a reporting bias, or unwillingness to admit to feelings of craving. The difficulty in interpreting this finding is reinforced by the subsequent observation that, when we
consider only those males and females who report experiencing a craving, we find no gender difference in reported frequency. Our discomfort regarding sole reliance on self-report measures reinforces our belief that a more clear metric for measuring craving is necessary. The craving concept should be no more resistant to empirical investigation than other food-related concepts such as hunger, satiety, or palatability. Psychologists have been concerned with the quantification and measurement of subjective and affective states (Thurstone, 1959). The craving state is ripe for such analysis.

Although the accuracy of self-report data must always be questioned, studies of the type reported here provide a detailed description of people’s perceptions about their food craving experiences and, as some have argued (Kozlowski & Wilkinson, 1987), this step is preliminary to more focussed scientific analysis of cravings. Our study leads to several conclusions. First, in the general population, food cravings are not an unusual experience. In fact, it is the great majority of individuals who report desires for specific foods. Thus, it would be incorrect to infer that food cravings are atypical experiences and restricted to only certain populations under particular circumstances (e.g., pregnancy). Rather, food cravings are normative experiences and, apparently, as common as the experiences of hunger and satiety.

Second, there appear to be genuine gender differences in what food items are craved and how individuals feel when they indulge their cravings. Consistent with previous reports (Rozin et al., 1991; Schuman et al., 1987), we find that chocolate is a frequent food craving among women. Females also attach a somewhat more negative valence to indulging their craving than men. We are unsure whether these observations extend to females not represented in the current sample, which is limited to undergraduates in the 18–24 year age range. However, the observation that women respond more negatively than men to indulging their cravings is consistent with the view that concerns about dieting and weight represent a “normative discontent” among females (Rodin et al., 1986). As a minimum, given its high frequency among women, the present data suggest that analysis of chocolate craving among females may provide an efficient strategy for gaining insight into the phenomenon of cravings. To this end, we and others (Michener & Rozin, Note 1) are currently engaged in a detailed investigation of the determinants of chocolate cravings in “chocaholics”.

Third, the present data mitigate the importance of a link between cravings and eating disorder. The eating disorder literature (e.g., Mitchell et al., 1985) is often impressed by a causal link between cravings and binging because a high percentage of bulimics attribute their binges to antecedent cravings. However, the present data suggest that a strong link exists between cravings and eating even in non-clinical populations. As well, we do not find that women who are actively dieting report any more cravings than non-dieting women. This finding, which is consistent with previous reports (Cohen et al., 1989; Lappalainen et al., 1990), suggests that the commonly held assumption that dietary restraint induces craving may need to be reassessed.

Finally, we must acknowledge that no matter how detailed our description of food cravings, we have little empirical data identifying the origin of cravings. The food cravings literature has typically presented the view that cravings signal, and originate in, specific bodily needs (Weingarten & Elston, 1991). This sentiment was expressed often in our survey, especially by women attributing their cravings to the menstrual cycle. We are impressed, however, that few individuals report substitutes for their cravings which should also, presumably, correct their need state. For example, few
individuals report other salty items as satisfactory substitutes for a potato chip craving. Similarly, almost no chocolate cravers identify other foods high in caffeine, magnesium, or zanthines as satisfactory substitutes. It may be necessary to consider other explanations for the origin and function of food cravings, such as those identified in a previous review (Weingarten & Elston, 1991) and in other recent analyses of the properties of cravings (e.g., Rozin et al., 1991).

**APPENDIX A—THE CRAVING QUESTIONNAIRE**

Name: ______________________________ Estimated Height: ____ ft. ____ inches
Age: ______ Male Female
Estimated Weight: ______ lbs.
Are you currently on a diet? Yes No

Please answer the following questions to the best of your ability.

1. Have you ever experienced food cravings (i.e., an intense desire to eat a specific food)?
   Yes No

2. If you have experienced food cravings, we would like to know what it is that you crave. List below foods which you crave, starting with your strongest craving. Beside each, estimate how often you experienced that craving.

   **CRAVED FOOD**
   **FREQUENCY**
   strongest craving
   next
   strongest etc.
   _______________ times/month
   _______________ times/month
   _______________ times/month

3. The following questions refer only to the food which you indicated as your strongest craving (the food at the top of your craving list in Question 2).
   a) Describe in as much detail as you can the food you crave the most.
   b) When you are experiencing a craving for the food you crave the most, is there any other food which would satisfy that craving?
   c) When you are experiencing a craving for the food you crave the most, how often do you follow through and eat that food?
      __________ % of the time
   d) How do you feel when you’ve eaten the food you crave the most?
   e) (For women only). Do you feel that your cravings are related to your menstrual cycle?
      No
      Yes If yes, then how?

Is there anything about your cravings you would like to tell us that we forgot to ask?
FOOD CRAVINGS IN ADULTS

REFERENCE NOTE

Michener & Rozin. Personal communication.

REFERENCES


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