

Sweets, Chocolate, and Atypical Depressive Traits

MARJORIE SCHUMAN, Ph.D.,¹ MICHAEL J. GITLIN, M.D.,² AND LYNN FAIRBANKS, Ph.D.²

An original questionnaire, the Foods and Moods Inventory (FMI) was used to investigate appetite for sweets and chocolate and its relationship to dysphoric mood. The FMI was administered to a group of subjects with an identified interest in chocolate (chocolate group, $N = 73$), a comparison sample (comparison group, $N = 172$), and a sample of former alcoholics ($N = 22$). Those who reported "self-medicating" with sweets or chocolate were more likely to have personality traits associated with hysteroid dysphoria, an atypical depressive syndrome. In addition, the tendency to eat compulsively, in general, and appetite for sweets and chocolate, in particular, were significantly greater among women.

Informal observation suggests that cravings for sweets and/or chocolate are commonplace phenomena. At least one component of this appetite for sweets may be mood related; people apparently eat sweets and chocolate specifically in response to dysphoric mood states. A link between cravings for sweets and atypical depression has been suggested (Liebowitz and Klein, 1979). Moreover, it has been suggested that, beyond the desire for psychological gratification, cravings for sweets associated with depression may have a biological basis (Liebowitz and Klein, 1979; Wurtman *et al.*, 1981).

Our first purpose in the present study was the development of a self-report questionnaire, the Foods and Moods Inventory (FMI), to assess appetite for sweets and chocolate in a normal population. Subjects were asked about their pattern of ingestion of, and cravings for, sweets and chocolate; about their cravings for other foods and their tendencies to eat foods other than sweets compulsively; and about their frequency of use of cigarettes, caffeinated beverages, and alcohol. Thus, the FMI was designed to assess appetite for sweets and chocolate and its relationship to other behaviors of interest.

The second purpose in the present study was to use the FMI to explore the possible relationship between appetite for sweets and/or chocolate and personality traits associated with hysteroid dysphoria, an atypical depressive syndrome. According to Klein and Davis (1969), who first described this disorder, hysteroid dysphoria is characterized by repeated episodes of depressed mood in response to feeling rejected. Individuals with this disorder, who are usually but not exclusively women, spend much of their time seeking romantic attention, approval, and praise. The hall-

mark of this disorder is intolerance of personal rejection and a particular vulnerability to loss of romantic attachment. Episodes of depression are marked by atypical depressive symptoms including overeating and/or craving for sweets, oversleeping, and spending more time in bed. Liebowitz and Klein (1979) suggest that craving for chocolate, specifically, may be linked to the hysteroid dysphoric syndrome. Thus, the present study was intended to test the hypothesis that appetite for sweets in general and chocolate in particular is associated with hysteroid dysphoric traits.

Methods

Questionnaire Construction

The FMI consisted of a total of 67 items. These included, in addition to demographic information, questions about frequency of ingestion of sweets and chocolate as well as frequency of use of cigarettes, caffeinated beverages, and alcohol. Forty-two items comprised four *a priori* scales: appetite for sweets (Sweets Scale), appetite for chocolate (Chocolate Scale), compulsive eating tendencies (other than sweets or chocolate) (Eating Scale), and personality traits associated with hysteroid dysphoria (Hys Dys Scale).

A pool of items for the Sweets, Chocolate, and Eating Scales were pretested on a sample of normal subjects and self-described "chocoholics" and then revised. The Sweets Scale included items describing craving for sweets other than chocolate, compulsion to eat sweets, and inability to regulate intake of sweets. The Chocolate Scale included items similar to those on the Sweets Scale but limited to appetite for chocolate in particular. The Eating Scale included items reflecting preoccupation with food, compulsive eating, and cravings for foods other than sweets and chocolate. Hys Dys items were derived from Klein and Davis' 1969 text which first delineated criteria for hysteroid dysphoria and included normally flamboy-

¹ California School of Professional Psychology, 2235 Beverly Boulevard, Los Angeles, California 90057. Send reprint requests to Dr. Schuman.

² Department of Psychiatry and Biobehavioral Sciences, UCLA. The authors gratefully acknowledge the assistance of Linda Yniguez, M.A., for help in data collection.

ant and dramatic personality, a tendency to labile mood, a tendency to fall in love easily and to feel devastated by romantic rejection, vulnerability to the approval (or lack of approval) of others, and atypical depressive responses when depressed. As a control for Hys Dys traits, items representing endogenous depressive symptoms (such as early morning awakening and loss of appetite) were also included.

Subjects

The FMI was administered to three samples of subjects (total $N = 267$). The three groups consisted of the following subjects: 1) a sample of subjects who had paid to attend a weekend "chocolate convention" (a commercial enterprise independent of the present study) (chocolate group, $N = 73$); 2) a sample of subjects with no identified interest in chocolate (comparison group, $N = 172$), who were approached in shopping malls and movie lines in a variety of neighborhoods in order to approximate the apparent ethnic and socioeconomic composition of the chocolate group; and 3) a small sample of former alcoholics (alcoholic group, $N = 22$). This group was included because of our clinical observation that former alcoholics ingest a lot of sweets. The three groups were comparable in age, marital status, and gender. The mean age of the sample was 31.5 years (range, 19 to 73 years). Approximately two thirds of each group were women.

Results

Validity and Reliability of the FMI

All four scales (Sweets, Chocolate, Eating, and Hys Dys) were found to be highly internally consistent (Cronbach's $\alpha = .92, .93, .78, \text{ and } .72$, respectively). In general, item-total correlations were quite high (range, $.36$ to $.72$) and homogeneous. Responses on all of the items on the Sweets and Chocolate Scales discriminated between the chocolate and comparison groups at the $.01$ level of confidence or better, thus establishing discriminant validity for these items.

There was considerable overlap between the Sweets and Chocolate Scales, with a scale total correlation of $.75$ ($p < .0001$). A decision to retain these as separate scales was based on a somewhat different pattern of responses in the chocolate group that suggested that appetites for sweets and chocolate were partially distinct. For example, specific items reflecting craving for sweets and chocolate correlated only $r = .18$ in the chocolate group but $r = .53$ in the comparison group, a significant difference.

Chocolate Group vs. Comparison and Alcoholic Groups

FMI responses in the chocolate group confirmed that these subjects were indeed interested in chocolate.

For example, subjects endorsed items indicating that they loved chocolate, strongly preferred chocolate-flavored foods, fantasized about chocolate, and were particular about the kind of chocolate that they ate. More than half (56.2%) considered themselves "addicted" to chocolate.

Most items pertaining to a desire for sweets and especially chocolate were endorsed significantly more often by subjects in the chocolate group than in the comparison group. This was reflected in significantly higher mean scores on the Sweets and Chocolate Scales of the FMI (Table 1) as well as by significant group differences on specific items relating to appetite for sweets. Specifically, subjects in the chocolate group ate sweets and chocolate more frequently, craved sweets and chocolate more, were more likely to eat sweets instead of meals, more often considered themselves addicted to sweets and/or chocolate, and were more likely to "self-medicate" dysphoric moods with sweets and chocolate than were subjects in the comparison group. The compulsive aspect of appetite for sweets and chocolate was reflected in subjects' self-attributed addiction as well as by their cravings for these substances and the reported inability to regulate their intake.

Craving for both sweets and chocolate was found to be quite common even in the comparison group. Specifically, 42.7% and 54.7% of this group reported that they often craved chocolate and sweets, respectively, and 18.9% considered themselves to be addicted to sweets. Chocolate and sweets appetite in the alcoholic group fell midway between the chocolate and comparison groups (Table 1).

Cravings for both sweets and chocolate were moderately but significantly correlated with cravings for "carbohydrates such as bread and potatoes" ($r = .30$, $p < .01$), but were not correlated with cravings for "salty," "spicy," or "fatty or fried" foods ($p = \text{NS}$). Subjects in the chocolate group tended to be compulsive in their eating of foods other than sweets and chocolate as reflected by their significantly higher scores on the Eating Scale of the FMI. Incidence of reported cravings for carbohydrates other than sweets and for salty and fatty foods was highest in the alcoholic group (reflected also in a high mean score on the Eating Scale).

There were no significant differences between the chocolate and comparison groups in frequency of use of cigarettes, intake of caffeinated beverages, or alcohol use.

Appetite for Chocolate and Atypical Depressive Traits

Contrary to prediction, there were no significant differences between the chocolate and comparison groups in any depressive trait or symptom, either

TABLE 1
Group Differences in FMI Scales

| FMI Scale | Scale Scores ^a | | | F-Ratio | df | p | Statistically Significant Group Comparisons | p |
|-----------|---------------------------|----------------------------|--------------------------|---------|-------|-------|--|----------------|
| | Chocolate group (N = 73) | Comparison group (N = 172) | Alcoholic group (N = 22) | | | | | |
| Chocolate | 31.2 ± 7.5 | 21.0 ± 6.9 | 23.7 ± 8.9 | 48.3 | 2,245 | .0001 | Chocolate > Comparison Chocolate > Alcoholic | <.001 <.001 |
| Sweets | 23.0 ± 6.1 | 17.4 ± 6.3 | 20.6 ± 8.4 | 19.3 | 2,251 | .0001 | Chocolate > Comparison Alcoholic > Comparison | <.001 <.05 |
| Eating | 23.2 ± 5.0 | 19.9 ± 5.2 | 23.7 ± 6.2 | 12.5 | 2,256 | .0001 | Chocolate > Comparison Alcoholic > Comparison | <.001 <.01 |
| Hys Dys | 22.8 ± 5.2 | 21.9 ± 5.2 | 27.2 ± 7.7 | 7.3 | 2,243 | .0001 | Alcoholic > Chocolate Alcoholic > Comparison | <.01 <.01 |

^a $\bar{X} \pm SD$.

TABLE 2
FMI Scales in Self-Medicators

| FMI Scale | Self-Medicators ^a (N = 50) | Others ^a (N = 222) | t-Ratio ^b | df | p |
|-----------|---------------------------------------|-------------------------------|----------------------|-----|-------|
| Chocolate | 34.9 ± 7.4 | 21.6 ± 6.6 | -12.0 | 246 | <.001 |
| Sweets | 27.8 ± 5.4 | 17.2 ± 5.4 | -12.2 | 252 | <.001 |
| Eating | 25.5 ± 5.0 | 20.1 ± 5.1 | -6.8 | 257 | <.001 |
| Hys Dys | 26.1 ± 6.1 | 21.7 ± 5.1 | -5.1 | 244 | <.001 |

^a $\bar{X} \pm SD$.

^b Two-tailed t-test.

atypical depressive traits (such as excessive appetite and sleep) or those associated with endogenous depression (such as appetite loss and early morning awakening). Specifically, hysteroid dysphoric traits were *not* significantly greater in the chocolate group; neither the Hys Dys Scale of the FMI nor any of the individual hysteroid dysphoria items differed significantly between the chocolate and comparison groups. The alcoholic group, however, scored significantly higher on Hys Dys than either of the other groups (Table 1).

Although appetite for chocolate per se was not related to atypical depressive traits, a *post hoc* analysis revealed an association between the behavior of self-medicating dysphoric mood with sweets or chocolate and hysteroid dysphoric traits. Self-medication was assessed by a series of eight FMI items that described ingestion of sweets or chocolate in response to anxiety, depression, tension/irritability, or anger (for example, "when I'm depressed, I eat chocolate to feel better"). Criteria for inclusion in the self-mediator group included strong agreement with any of these items and/or a score above average on all of these items combined.

Using these criteria, a self-mediator group was defined and compared with all other subjects (Table 2). As might be expected, self-medicators were found to have higher mean scores on the Sweets and Chocolate Scales of the FMI; because positive responses to selected items from these scales were used to define group inclusion, there was a built-in bias toward

higher scores on these scales. Particularly interesting, however, was the finding that self-medicators had significantly higher scores on the Eating and Hys Dys Scales of the FMI, suggesting a relationship between self-medication with sweets and hysteroid dysphoric traits. The Hys Dys scale total as well as 10 of the 11 Hys Dys scale items were significantly higher in the self-mediator than the non-self-mediator group. Thus, self-medication with sweets, but not appetite for chocolate or sweets in of itself, was found to be related to atypical depressive traits. Although symptoms typical of endogenous depression were not systematically assessed, those items included for comparison with atypical depressive traits (early morning awakening, loss of appetite, and mood autonomy) were found to be unrelated to self-medication behavior.

A significantly higher percentage of the chocolate group (32%) than the comparison group (13%) were self-medicators, with the alcoholic group in between (23.0%) ($\chi^2 = 12.05$, $df = 2$, $p = .002$); Surprisingly, however, chocolate did not seem to be greatly preferred for self-medication over other (nonchocolate) sweets; items describing self-medication with chocolate were not endorsed significantly more often than items describing self-medication with other sweets by self-medicators in either the chocolate group or the comparison group. Self-medication occurred most commonly in response to depression and tension/irritability, less often in response to anxiety, and least often in response to anger.

Gender and Appetite for Sweets/Chocolate

A relationship between gender and craving for sweets and/or chocolate was shown in the finding that 92% of the self-medicators were women. Although 65.2% of the entire sample were women, this was still a highly significant gender-related difference ($\chi^2 = 17.5$, $df = 1$, $p < .0001$). Moreover, in all subjects combined, women were found to have significantly higher scores than men on the Sweets, Chocolate, and

TABLE 3
Sex differences in FMI Scales

| FMI Scale | Men ^a (N = 92) | Women ^a (N = 172) | t-Ratio ^b | df | p |
|-----------|------------------------------|---------------------------------|----------------------|-----|-------|
| Chocolate | 20.8 ± 7.0 | 25.8 ± 8.7 | -4.83 | 250 | <.001 |
| Sweets | 16.8 ± 5.5 | 20.5 ± 7.2 | -4.64 | 244 | <.001 |
| Eating | 19.3 ± 5.2 | 21.9 ± 5.4 | -3.77 | 255 | <.001 |
| Hys Dys | 21.5 ± 4.9 | 23.1 ± 5.8 | -2.24 | 242 | <.03 |

^a $\bar{X} \pm SD$.

^b Two-tailed *t*-test.

Eating Scales as well as marginally higher scores on the Hys Dys Scale (Table 3).

Using analyses of variance to further explore the relationship between gender, group, and the four FMI scales, a significant main effect for gender was confirmed for the Sweets, Chocolate, and Eating Scales but *not* the Hys Dys Scale. In this analysis, the main effect for gender on Hys Dys fell below the level of statistical significance and a significant group by gender interaction emerged, with women higher on Hys Dys in the comparison and alcoholic groups but *not* in the chocolate group. Although it is difficult to interpret this interaction, it would appear in any case that the higher Hys Dys scores of self-medicators probably cannot be attributed to the disproportionate number of women in this group. Indeed, an analysis among women alone confirmed that self-medicators had higher scores on Hys Dys as well as on the other FMI scales.

Discussion

The results of our study confirm our first hypothesis, that the FMI is reliable and valid. The FMI demonstrated both internal consistency for each of its four scales and discriminant validity between the chocolate and comparison groups on all relevant questionnaire items. Our second hypothesis, that chocolate lovers would have more hysteroid dysphoric traits than would a control population, was not confirmed. Neither the Hys Dys Scale total nor any individual item in the scale discriminated between the chocolate and comparison groups. However, a *post hoc* analysis demonstrated that subjects who self-medicate dysphoric moods with sweets (including chocolate) had higher scores on both the Hys Dys Scale total and 10 of the 11 individual Hys Dys items. Specifically, self-medicators in the present study endorsed items indicating that they saw themselves as dramatic and flamboyant, experienced frequent mood shifts, fell in love more easily than others, tended to be devastated by romantic rejection, and were especially vulnerable to the approval or disapproval of others. Of particular interest, self-medicators as a group not only had significantly greater appetite for sweets and chocolate but also tended to be compulsive eaters. It should be

emphasized that the data do *not* show that self-medicators comprise a group of subjects with atypical depression, hysteroid dysphoria, or any other clinical syndrome.

It is noteworthy that hysteroid dysphoric traits were highest in the alcoholic group, and that this group resembled the chocolate group more than the comparison group on its responses on the Sweets, Chocolate, and Eating Scales of the FMI (Table 1). Data from the alcoholic group are of particular interest with regard to a possible addictive component in appetite for sweets. However, these results must be interpreted with caution due to the size of this sample ($N = 22$).

There are several possible factors involved in the appetite for sweets. Sweets are highly palatable, and a preference for them appears to be present from birth (Desor *et al.*, 1977) and is widespread throughout the animal kingdom (Pfaffman, 1977). Moreover, it has been demonstrated that animals physically dependent on ethanol will choose sweet-tasting fluids over alcohol if the concentration is high enough; apparently, under some circumstances, ingestion of sweets may represent addictive behavior in its own right (Falk, 1977).

Along different lines, it has been established that nutrients play a role in the regulation of neurotransmitters. Specifically, an elegant series of studies by R. J. Wurtman and his colleagues has demonstrated that a high carbohydrate ratio of diet brings about a shift in uptake of tryptophan and brain levels of serotonin (5-HT) (Wurtman *et al.*, 1981; Wurtman and Wurtman, 1983). Wurtman's interpretation is that craving for carbohydrate may represent a behavioral mechanism for the homeostatic regulation of 5-HT. Inasmuch as sweets are a rich source of carbohydrate, self-medication with sweets may possibly be explained in terms of the effects of sweet foods on brain chemistry. Again, this theory would not account for any distinction between appetite for sweets or chocolate and other carbohydrates. Although the present data suggest that self-reported cravings for sweets and high-carbohydrate foods such as bread and potatoes are only modestly correlated ($r = .30$), in the absence of more extensive and systematic data on food choices this conclusion must be considered a very tentative one.

The basis of a specific appetite for chocolate is enigmatic. The most parsimonious explanation probably lies in the taste of chocolate itself. Human beings give the highest "hedonic ratings" to substances which are both sweet and high in fat content (Drewnowski and Greenwood, 1983) and by this standard chocolate is hedonically ideal. However, it has been suggested that chocolate has reinforcing psychopharmacological effects that derive from its caffeine (Weil and Rosen,

1983) or phenethylamine (PEA) content (Liebowitz and Klein, 1979).

Noting that PEA has stimulant properties and that chocolate contains relatively large amounts of this amine, Liebowitz and Klein (1979) speculated that craving for chocolate may represent an attempt to self-regulate brain PEA and mood. However, there are many other foods that contain high levels of PEA and do not enjoy the popularity that chocolate does (Hurst *et al.*, 1982). Moreover, ingestion of PEA in the diet does not necessarily imply entry into the systemic circulation, due to rapid metabolism in the body (Marley and Blackwell, 1970). Indeed, consumption of 200 grams of Cadbury milk chocolate (containing about 1 mg of PEA) has been found not to produce a measurable effect on urinary levels of PEA or its metabolites (Karoum *et al.*, 1979). Although the present study supports the notion that some people use chocolate as a drug in a behavioral sense, such self-medication was not shown to be specific to chocolate, and it is not known whether chocolate (or other sweets) actually alleviates dysphoric mood.

In summary, the present study suggests that there is a relationship between depressive traits and self-medication with sweets. It is not known whether craving for sweets and other carbohydrates represents a desire for gratification or, alternatively, whether self-medication is an attempt to regulate the chemistry of the brain. Additional clinical studies are planned to evaluate a sample of chocoholics in order to assess their depressive symptomatology and the effects of sweets ingestion on mood.

Conclusions

Appetite for sweets and chocolate can be reliably identified in a nonclinical population. Contrary to

hypothesis, it was found that this appetite is not, in and of itself, related to atypical depressive traits. However, a *post hoc* analysis revealed a relationship between self-medication with sweets in response to dysphoric mood and personality traits associated with hysteroid dysphoria, an atypical depressive syndrome.

References

- Desor JA, Maller O, Greene LS (1977) Preference for sweet in humans: Infants, children, and adults. In J Weiffenbach (Ed), *Taste and development: The genesis of sweet preference*. DHEW Publication No. NIH 77-1068. Washington, DC: U.S. Government Printing Office.
- Drewnowski A, Greenwood MR (1983) Cream and sugar: Human preferences for high-fat foods. *Physiol Behav* 30:629-633.
- Falk J (1977) Sweet abuse and the addiction model. In J Weiffenbach (Ed), *Taste and development: The genesis of sweet preference*. DHEW Publication No. NIH 77-1068, Washington, DC: U.S. Government Printing Office.
- Hurst WJ, Martin RA, Zoumas BL, *et al* (1982) Biogenic amines in chocolate—A review. *Nutr Rep Int* 26:1081-1086.
- Karoum F, Nasrallah H, Potkin S, *et al* (1979) Mass fragmentography of phenethylamine, *m*- and *p*-tyramine and related amines in plasma, cerebrospinal fluid, urine, and brain. *J Neurochem* 33:201-212.
- Klein DF, Davis JM (1969) *Diagnosis and drug treatment of psychiatric disorders*. Baltimore: Williams & Wilkins.
- Liebowitz MR, Klein D (1979) Hysteroid dysphoria. *Psychiatr Clin North Am* 2:555-575.
- Marley B, Blackwell B (1970) Interactions of monoamine oxidase inhibitors, amines, and foodstuffs. *Adv Pharmacol Chemother* 8:185-239.
- Pfaffman C (1977) Biological and behavioral substrates of the sweet tooth. In J Weiffenbach (Ed), *Taste and development: The genesis of sweet preference*. DHEW Publication No. NIH 77-1068, Washington, DC: U.S. Government Printing Office.
- Weil AJ, Rosen W (1983) *Chocolate to morphine*. New York: Houghton Mifflin.
- Wurtman RJ, Wurtman JJ (1983) Nutrients, neurotransmitters, and the control of food intake. *Psychiatr Ann* 13:854-857.
- Wurtman JJ, Wurtman RJ, Growdon JH, *et al* (1981) Carbohydrate craving in obese people: Suppression by treatment affecting serotonergic transmission. *Int J Eating Disord* 1:2-15.