

Chocolate craving when depressed: a personality marker

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Summary We examined links between chocolate craving in people who are depressed and both personality style and atypical depressive symptoms, with a web-based questionnaire completed by nearly 3000 individuals reporting clinical depression. Chocolate was craved by half of the respondents (more so by women), judged as beneficial for depression, anxiety and irritability, and associated specifically with personality facets encompassed by the higher-order construct of neuroticism. The simple question of depression-associated chocolate craving appeared an efficient discriminator of DSM-IV atypical depression symptoms.

Declaration of interest None. Funding from the Australian National Health and Medical Research Council (Program Grant 222708) and a grant-in-aid from Pfizer International.

Hyperphagia is commonly reported by depressed patients and is a specific DSM-IV criterion (American Psychiatric Association, 1994) for defining ‘atypical depression’, a depressive syndrome combining symptom and personality criteria. Our earlier review (Parker *et al*, 2002) of atypical depression weighted the primacy of a personality style of rejection sensitivity, with several symptoms (including food cravings) more reflecting self-consolatory and possibly homeostatic strategies. In another review (Parker *et al*, 2006a) we over-viewed studies considering mood state effects of chocolate consumption. In this study we investigate self-reported benefits of chocolate during a depressive episode and examine for any specificity of personality style to such chocolate craving.

METHOD

People accessing – for whatever reason – our mood disorder consumer information website (<http://www.blackdoginstitute.org.au>) were invited to participate in an online survey of lifetime treatments for a depressive episode (and without any reference to the survey involving questions on chocolate consumption). Participants provided demographic data, reported symptoms and treatments of depressive episodes, and rated any increase in 35 symptoms or coping responses, degree of increased food cravings and importance of chocolate when depressed. All completed the tiered Temperament and Personality questionnaire (Parker *et al*, 2006b), assessing personality constructs disposing to depression from higher-order constructs (e.g. ‘neuroticism’ and ‘extraversion’) to eight lower-order facets. As participants were recruited anonymously, no data validity check was possible.

Sample

Analyses were limited to 2692 of the 3486 respondents who were 18 years or older, living in Australia, initial survey completers, and reported depressive episodes lasting 2 weeks or longer. Their mean age was 40.0 years (range 18–77) and 70.8% were female; 73.6% had previously received an antidepressant medication and 78.3% had received counselling or psychotherapy for depressive episodes.

RESULTS

When depressed, 1465 (54.4%) reported food cravings, with 1210 (44.9%) specifically being chocolate cravers (50.7% of the women and 30.9% of the men; $\chi^2=88.3$, $P<0.001$). Only 9.5% acknowledged alternative craved foods. Of the chocolate craver group, the 736 (60.8%) who rated chocolate’s capacity to improve their depressed mood as moderately to very important were more likely to rate it as making them feel significantly ($P<0.001$) less anxious ($\chi^2=366.7$) and less irritated ($\chi^2=337.1$).

Temperament and Personality questionnaire scores quantified the chocolate cravers group as having significantly ($P<0.001$) higher mean scores on the irritability ($t=6.3$), rejection sensitivity ($t=5.6$), anxious worrying ($t=5.5$), self-criticism ($t=5.2$) and self-focused ($t=4.5$) scales, all derived from the higher-order neuroticism construct. Differences were not evident on scales originating from the higher-order introversion construct, i.e. personal reserve ($t=1.8$), social avoidance ($t=1.1$) and perfectionism ($t=0.5$). This differential finding was confirmed by this group scoring higher on the consolidated tier 2 higher-order neuroticism scale (16.8 *v.* 15.4, $t=6.5$, $P<0.001$) but not on the tier 2 introversion scale (12.3 *v.* 11.8, $t=0.8$, $P=0.075$). A logistic regression (entering all eight personality constructs as predictors of chocolate craving status) identified irritability along with rejection sensitivity as the only two significant predictors.

Examined against DSM-IV criterion B atypical depression accessory symptoms, those identified as chocolate cravers returned higher ($P<0.01$) scores for appetite increase ($t=21.8$), weight gain ($t=18.8$), sensitivity to rejection ($t=7.3$), hypersomnia ($t=5.7$) and limbs feeling ‘heavy like lead’ ($t=5.4$).

We explored the hypothesis that atypical depression symptoms have a self-comforting

Table 1 Mean ratings of ‘self-soothing’ tendencies among those endorsing differing numbers of atypical symptoms when depressed

| | Number of atypical symptoms: mean (s.d.) | | | | | F | P |
|---|--|-----------|-----------|-----------|-----------|-----------|--------------|
| | 0 (n=217) | 1 (n=563) | 2 (n=658) | 3 (n=607) | 4 (n=647) | | |
| Cravings for ‘comfort’ food, e.g. chocolate, cake | 1.5 (0.8) | 1.7 (0.9) | 1.9 (1.0) | 2.5 (1.1) | 3.1 (1.0) | 3.5 (0.8) | 211.4 <0.001 |
| ‘Warming up’ behaviours e.g. hot baths | 1.5 (0.8) | 1.7 (0.9) | 1.9 (1.1) | 2.0 (1.1) | 2.2 (1.2) | 2.4 (1.2) | 24.4 <0.001 |

role. Scores on two self-comforting items (craving 'comfort' foods, and 'warming up' behaviours such as having a hot bath) increased significantly (Table 1) and linearly ($F=999.2$ and $F=119.7$ respectively; $P<0.001$) with increasing number of DSM-IV accessory atypical depressive symptoms, suggesting that chocolate craving might predict atypical depression status. We therefore examined the sensitivity, specificity and overall classification rate of chocolate craving predicting numbers of atypical symptoms. Sensitivity was highest (at 76.4%) for those reporting five symptoms of atypical depression, but specificity was only 57.7%. The overall classification rates were 49.2% (for a cut-off of one or more symptoms) and 57.7% (for two or more symptoms), 65.5% (for three or more symptoms), 65.0% (for four or more symptoms) and 59.2% for all five symptoms. Thus, for three or more and four or more symptoms, the probe question successfully allocated two-thirds of all participants.

DISCUSSION

Although our data were derived from a web-based survey, respondents were required to have experienced depressive episodes lasting at least 2 weeks and requiring treatment. Chocolate craving was common (45%) – and more likely in women – and a preferential choice (with only 10% nominating any alternative craved food). 'Importance' ratings indicated that those classed as 'depressed cravers' viewed chocolate as settling anxiety and irritability. Our most intriguing finding was the specificity of the links between chocolate craving and personality styles. We anticipated that the 'depressed cravers' group would score preferentially on the rejection sensitivity scale in light of the DSM-IV definition of atypical depression. In fact they scored higher on all five lower-order scales emerging from a higher-order 'neuroticism' base, but on none of the three personality scales emerging from a higher-order 'introversion' base. Our logistic regression (entering all eight personality constructs) identified only irritability and rejection sensitivity as significant predictors of such craving, consistent with these individuals judging chocolate as reducing anxiety and irritability.

In states of emotional dysregulation, individuals may call on a range of perceived settling or soothing coping repertoires.

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(First received 22 November 2006, final revision 22 March 2007, accepted 2 April 2007)

Although depression-related chocolate craving is likely to reflect many factors, we suggest that such cravings may reflect biological processes with homeostatic potential to redress emotional dysregulation.

Eysenck (1967) argued for a two-factor (neuroticism *v.* introversion) model of personality, defining neuroticism in terms of limbic activation, with high scorers prone to intense autonomic discharges. Limbic structures such as the amygdala regulate emotion, with Canli *et al* (2001) demonstrating that higher neuroticism scores correlated with left temporal and frontal region activation following negative stimulus. Gender differences in brain activation have also been demonstrated, with George *et al* (1996) examining self-induced mood induction, and showing (using positron emission tomographic scanning) that women had differentially increased blood flow in limbic and paralimbic structures.

We have previously overviewed chocolate's mood state effects (Parker *et al*, 2006a), noting its many psychoactive ingredients, including several biogenic stimulant amines, two analogues of anandamine (producing effects akin to cannabinoid-inducing euphoria) and interactions with several neurotransmitter systems (e.g. dopamine, serotonin and endorphins). We noted studies suggesting that carbohydrate craving was more closely linked to the opioid rather than to the serotonergic system, with endorphins alleviating dysphoria – although Moller (1992) has argued the role of increased serotonergic activity. Thus, chocolate cravings may advance biological mechanisms potentially settling limbic cortex-mediated activation.

Atypical depression has been variably interpreted over time (Parker *et al*, 2002), and its key features (e.g. hyperphagia, hypersomnia) are not restricted to DSM-IV defined atypical depression and are quite common in type II bipolar disorder. To the extent that our methodology made our sample more likely to include those with an atypical depressive disorder (rather than atypical features), some observations are worth noting. We have previously argued

(Parker *et al*, 2002) for the primacy of personality style (as against the DSM-IV mandatory criterion A feature of 'mood reactivity' – defined as capacity to be cheered up by positive events), with current analyses arguing the relevance of neuroticism or emotional dysregulation as capturing the personality domain. Our chocolate cravers group scored higher on all DSM-IV criterion B accessory features and (most predictably), hyperphagia. Study analyses indicated that the simple question of whether chocolate is craved when depressed had high utility in classifying the likelihood of an atypical depressive syndrome.

Results suggest that personality style dictates the craving for chocolate in states of emotional dysregulation (i.e. anxious and irritable, and not only depressed). As individuals with certain personality styles find such comfort eating beneficial, such behaviours may reflect biological homeostatic mechanisms operating to promote soothing of their personality-based capacity to experience emotional dysregulation.

REFERENCES

- American Psychiatric Association (1994)** *Diagnostic and Statistical Manual of Mental Disorders* (4th edn) (DSM-IV). APA.
- Canli, T., Zhao, Z., Desmond, J. E., et al (2001)** An fMRI study of personality influences on brain reactivity to emotional stimuli. *Behavioural Neuroscience*, **115**, 33–42.
- Eysenck, H. J. (1967)** *The Biological Basis of Personality*. Charles C. Thomas.
- George, M. S., Ketter, T. A., Parekh, P. I., et al (1996)** Gender differences in regional cerebral blood flow during transient self-induced sadness or happiness. *Biological Psychiatry*, **40**, 859–871.
- Moller, S. E. (1992)** Serotonin, carbohydrates, and atypical depression. *Pharmacology and Toxicology*, **71** (suppl. 1), 61–71.
- Parker, G., Roy, K., Mitchell, P., et al (2002)** Atypical depression: a reappraisal. *American Journal of Psychiatry*, **159**, 1470–1479.
- Parker, G., Parker, I. & Brotchie, H. (2006a)** Mood state effects of chocolate. *Journal of Affective Disorders*, **92**, 149–159.
- Parker, G., Manicavasagar, V., Crawford, J., et al (2006b)** Assessing personality traits associated with depression: the utility of a tiered model. *Psychological Medicine*, **36**, 1131–1139.