



The relationship between basic need satisfaction and emotional eating in obesity

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Abstract

Emotional eating has been identified as a factor that promotes the development and maintenance of obesity and hinders its treatment. This study investigated the relationship between unsatisfied basic needs and emotional eating, including the mediating factors of self-esteem and coping strategies. The results from a survey of 136 obese individuals indicated support for a significant relationship between basic need satisfaction and emotional eating, with a mediating effect of negative coping strategies. These findings extend previous research and provide guidance on how to help individuals who engage in emotional eating by focusing on developing more adaptive coping strategies.

Key words: clinical/counselling psychology, emotion | mood, health attitudes and behavior, health psychology

As the impact of obesity on both individuals and society receives increasing recognition, it is apparent that not only have efforts to reduce the problem been unsuccessful (Brownell & Wadden, 1992; Herpertz, Kielmann, Wolf, Hebebrand, & Senf, 2004), but, even more disturbingly, they have also failed to curb its growing prevalence (Cameron et al., 2003). This lack of success points to the need for further research to better understand what promotes obesity and how it can be treated.

One factor that appears to be a powerful promoter of obesity is emotional eating (e.g., Ganley, 1989; Grant & Boersma, 2005). This appears to be a complex behaviour associated with multiple issues, including self-esteem (Isnard et al., 2003), social support (2006), coping strategies (Laitinen, Ek, & Sovio, 2002), and satisfaction of basic needs (Timmerman & Acton, 2001). Understanding these complexities may be important in the development of more effective methods of helping obese individuals who engage in emotional eating.

Timmerman and Acton (2001) examined the link between emotional eating and basic need satisfaction by hypothesising that individuals with higher satisfaction in basic needs

would be less likely to engage in emotional eating in response to stress. They found a significant negative relationship between basic need satisfaction and emotional eating. This indicated that lower basic need satisfaction was associated with a greater tendency to use emotional eating as a coping strategy. An additional finding was that self-esteem was the one factor that significantly predicted emotional eating, supporting previous findings of the negative association between self-esteem and emotional eating (Isnard et al., 2003; Kugu, Akyuz, Dogan, Ersan, & Izgic, 2006).

Timmerman and Acton (2001) acknowledged that the sample used in their study was a healthy one (i.e. not specifically chosen for being overweight or obese). As emotional eating is a particularly prevalent problem in obese individuals (Ganley, 1989; Grant & Boersma, 2005), and has been documented as a contributing factor to higher BMIs and thus obesity (Grant & Boersma, 2005; Grilo, Shiffman, & Wing, 1989; Sarlio-Lahteenkorva, 1998), the current study extended the research of Timmerman and Acton by performing a similar study with an obese sample.

The primary aim was to examine the inverse relationship between basic need satisfaction and emotional eating in an obese sample. In addition, potential mediators that have been linked with emotional eating were included in the design in order to examine their effect on the relationship. The selected mediators were self-esteem (Isnard et al., 2003; Kugu et al., 2006; Timmerman & Acton, 2001) and coping (Kayman, Bruvold, & Stern, 1990; Laitinen et al., 2002). Two hypotheses were developed:

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Hypothesis 1: There will be an inverse relationship between basic need satisfaction and emotional eating in an obese sample, which will be mediated by self-esteem and coping strategies.

Hypothesis 2: Individuals with morbid obesity (BMI ≥ 40) will differ significantly on the variables of basic need satisfaction, emotional eating, self-esteem, and coping strategies from overweight and less severely obese individuals (BMI < 40).

METHOD

Participants

Five hundred treatment-seeking obese individuals at the Royal Brisbane and Women's Hospital (RBWH) in Brisbane, Australia, were approached to take part. These consisted of two groups: individuals (130) who had attended a nutrition education programme, and individuals (370) on a waiting list for bariatric surgery, including laparoscopic adjustable gastric band (LAGB) and sleeve gastrectomy. These individuals were selected, as they were predominantly of a BMI that classified them as either obese (30.0–39.9), or morbidly obese (≥ 40). Five participants were in the overweight BMI range (25.0–29.9) and their inclusion was considered valuable since it would allow the establishment of effects across a wider BMI range.

Materials

Participants completed the Basic Need Satisfaction Inventory (BNSI; Leidy, 1994), with 27 items on a 7-point Likert scale, and Emotional Eating Scale (EES; Arnow, Kenardy, & Agras, 1995), with 25 items on a five point Likert scale. Both of these were used in Timmerman and Acton (2001). A third measure, self-esteem, was obtained using the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1989), which has 10 items and uses a 4-point scale, with five items worded positively and five items worded negatively, the latter requiring reversal for scoring. A fourth scale, the Brief COPE (Carver, 1997), incorporates 28 items with a 4-point Likert scale, and was used to enable an examination of the use of alternative coping strategies. Two open-ended questions were administered to gain qualitative information about participants' personal experiences of emotional eating. Basic demographic information was also requested, including height and weight to determine BMI.

Procedure

Potential participants received a package in the mail that included a brief description of the study aims and a consent

form to read and sign, questions regarding demographics, and copies of the four scales and two open-ended questions regarding their experience with emotional eating. Participants were informed it was estimated the survey would take 20–30 min to complete. They were asked to return the information (a stamped and addressed envelope was provided) within 2 weeks of their receipt of the package. An offer was included for psychological services at the RBWH if they had a high score on emotional eating.

Sample characteristics

Within 2 weeks from the last mailing, 136 completed survey packages were returned. Of those who identified themselves, 29 were nutrition programme attendees, and 105 were on the waiting list for bariatric surgery. An independent samples *t*-test revealed that there was a significant difference in BMI between the groups, with the nutrition programme attendees having significantly lower BMIs ($M = 37.14$, standard deviation (SD) = 7.07) than the bariatric surgery patients ($M = 49.48$, $SD = 8.86$) ($t_{(132)} = -6.91$, $p < .001$). The groups were pooled despite the difference in BMI, because the wider range of BMIs was considered valuable for assessing the relationship between basic need satisfaction and emotional eating. For the pooled sample of 136, age ranged from 19 to 77 years, with a mean of 49.45 ($SD = 11.77$). Almost three quarters of the sample were female (73.20%), and the majority of the sample was Caucasian (84.80%). Most of the sample had completed high school (89.90%), with nearly half of these having completed some level of higher education (43.50%). Average income was low, with both personal income (70.30%) and total household income (46.40%) falling predominantly in the \$10,000 to \$24,999 (Australian dollars) bracket or less, which indicates that the sample fell in the lower end of the socioeconomic spectrum. These patients on the waiting list for bariatric surgery were in the public (free) system rather than the private system, suggesting that they were unlikely to be able to afford elective surgery. Response options for describing health were poor, fair, good, or excellent, and the majority reported poor to fair health (81.90%). This finding is consonant with the average weight, with mean BMI for the sample being 46.78 ($SD = 9.77$), which is in the morbidly obese range.

Design

A cross-sectional survey design was used. The data gathered were both quantitative and qualitative. Quantitative data were gathered through a questionnaire that incorporated the four standardised scales, and qualitative data regarding experiences of emotional eating were gathered through two

open-ended questions: 'If you have ever eaten in response to stress, please describe a recent or typical episode (stressful events, feelings, etc.),' and, 'How confident do you feel to manage stress in your life without "emotional" eating now and in the future?'

As a duty of care, if participants were identified as having high levels of emotional eating, access to counselling in the hospital's psychology services was made available. To identify participants who should be offered psychology services for emotional eating, high scores on the EES were defined as a score on any of the subscales 1 *SD* or more above the mean of the group, representative of the general population, which was used in the development of the EES (Arnouk et al., 1995).

RESULTS

Brief COPE factor analysis

The developer of the Brief COPE (Carver, 1997) suggested exploring the data for each study for which the scale is used in order to derive factors. In this study, factor analysis was used to undertake the suggested exploration. It is acknowl-

edged that the sample was of marginal size, given that it was only five times the number of variables. Nevertheless, the solution was internally consistent and provided interpretable factors. A factor analysis of the Brief COPE resulted in four factors that were named 'proactive coping', 'intra and inter personal coping', 'negative coping', and 'substance use'. Table 1 presents the loadings for each item in the varimax-rotated component matrix that captured the four factors after deleting Item 1. These results indicated that coping is not a unitary phenomenon. The factor labeled 'substance use' contained items with negative loadings, with items relating to religion having the negative loadings. This indicates that turning to religion is an antithesis to substance use, and individuals who use one coping strategy are unlikely to use the other.

Hypothesis testing

Hypothesis 1 was tested using hierarchical multiple regression controlling for age, gender, and health entered at Step 1. Table 2 presents the results of these analyses. Support for Hypothesis 1 was found with a significant inverse relationship between basic need satisfaction and emotional eating,

Table 1 Four factor solution^a from the varimax rotated component matrix for the Brief COPE 27 item set after deletion of one unhelpful item^b

Item	Component			
	Proactive coping	Inter- and intrapersonal coping	Negative coping	Substance use
Coping Q12—positive reframing A	0.68			
Coping Q14—planning A	0.64			
Coping Q17—positive reframing B	0.64			
Coping Q24—acceptance B	0.63			
Coping Q2—active coping A	0.61			
Coping Q7—active coping B	0.59			
Coping Q18—humour A	0.58			
Coping Q25—planning B	0.57			
Coping Q28—humour B	0.55			
Coping Q20—acceptance A	0.52			
Coping Q10—use of instrumental support A		0.78		
Coping Q23—use of instrumental support B		0.75		
Coping Q15—use of emotional support B		0.71		
Coping Q5—use of emotional support A		0.61		
Coping Q21—venting B		0.57		
Coping Q22—religion A		0.49		
Coping Q19—self-distraction B		0.44		
Coping Q9—venting A		0.40		
Coping Q6—behavioural disengagement A			0.74	
Coping Q13—self-blame A			0.73	
Coping Q16—behavioural disengagement B			0.72	
Coping Q26—self-blame B			0.68	
Coping Q8—denial B			0.59	
Coping Q3—denial A			0.56	
Coping Q4—substance use A				0.83
Coping Q11—substance use B				0.80
Coping Q27—religion B		0.45		-0.47

^aLoadings below 0.4 have been omitted for clarity. ^bDeleted item Q 1—self-distraction A.

Table 2 Hierarchical multiple regression results for test of the relationships between basic need satisfaction and emotional eating, controlled for age, gender, and health, and mediating effects of self-esteem and coping strategies

	B	SE B	β
Step 1 ($R^2 = 0.06$)			
Constant	73.52	14.03	
Age	-0.29	0.18	-0.14
Gender	7.37	4.67	0.14
Health	-3.88	2.74	-0.12
Step 2 ($R^2 = 0.17$)			
Constant	94.75	14.20	
Age	-0.25	0.17	-0.12
Gender	6.82	4.41	0.13
Health	0.37	2.78	0.01
Basic needs	-0.28	0.07	-0.36*
Step 3 ($R^2 = 0.29$)			
Constant	36.54	25.17	
Age	-0.14	0.17	-0.07
Gender	4.98	4.41	0.09
Health	3.18	2.73	0.10
Basic needs	-0.13	0.09	-0.17
Self-esteem	0.15	0.47	0.04
Proactive coping	-3.47	3.22	-0.10
Inter- and intrapersonal coping	7.43	3.09	0.22*
Negative coping	8.16	3.31	0.26*
Substance use	4.62	2.17	0.17*

* $p < .05$.

with 17% of the variance in emotional eating being explained by basic need satisfaction. Support for predictions of mediation was also revealed, with 29% of the variance accounted for when adding self-esteem and the four coping factors to the regression. This constituted a 12% increase in R^2 , rendering basic need satisfaction insignificant. Self-esteem was not a significant predictor, but three of the coping factors (inter- and intrapersonal coping, negative coping, and substance use) were statistically significant predictors, providing support for the hypothesis that coping was a mediator, but not for self-esteem. There was no apparent relationship between standardised residuals for the dependent variable emotional eating, indicating that the independence assumption for the regression model was justified.

Hypothesis 2 was tested using a multiple analysis of variance. The two groups were formed by dividing the participants into those with BMIs below 40 ($n = 37$) and BMIs 40 and over ($n = 98$). Box's test of equality of covariance was not significant, indicating that the unequal numbers in the two groups was not problematic, as variability was similar in the groups. Assumptions of homogeneity of variance were met since Levene's test of equality of error variances was not significant for each of the three continuous scales, BNSI, EES, and RSE, and the four coping factors. A significant difference (significance determined as $p < .05$ throughout all analyses) between the two BMI groups was found, $F_{7, 127} = 2.12$, with a sufficiently high observed power of 0.79, with 0.80 being suggested as a large effect size criterion by

Table 3 Means (and standard deviations) for significantly different scores of low^a and high^b BMI groups on three coping scales

Variable	BMI group		$F_{(1, 133)}$	p
	Low (<40)	High (≥ 40)		
Emotional eating	55.68 (23.32)	68.29 (23.01)	8.02	<.01
Self-esteem	22.30 (6.62)	25.91 (6.38)	8.44	<.01
Negative coping	1.91 (0.78)	2.24 (0.74)	5.17	<.05

^aBMI <40. ^bBMI ≥ 40 .

Cohen (1988). The groups differed significantly on three of the variables: emotional eating ($F_{1, 133} = 8.02$), self-esteem ($F_{1, 133} = 8.44$), and one of the coping factors, 'negative coping' ($F_{1, 133} = 5.17$). Mean scores for all three of these variables were higher for the BMI ≥ 40 group. Table 3 presents the mean scores for both groups on each of the three variables, showing a significant difference. These results indicate that the BMI ≥ 40 group is higher in emotional eating, lower in self-esteem (higher scores represent lower self-esteem), and higher in 'negative coping'. A significant difference was not found for basic need satisfaction or the three other coping factors (proactive coping, inter and intra personal coping, and substance use). Thus, partial support for Hypothesis 2 was provided, with differences identified between individuals of BMIs <40 and ≥ 40 on emotional eating, self-esteem, and the coping factor 'negative coping'.

Qualitative analyses

Responses to the two open-ended questions regarding emotional eating were analysed using a thematic analysis as recommended by Fischer (2006) by marking the data according to themes, then breaking these themes down further into subthemes. All of the initial 138 cases were considered for the qualitative analyses. Approximately 75% of the participants responded to one or both of the open-ended questions.

The first question, 'If you have ever eaten in response to stress, please describe a recent or typical episode', yielded responses that fell into two broad categories of participants who reported not using emotional eating and participants who did. Sixteen participants fell into the first category, and 67 into the second. A theme that emerged for the respondents who reported not using emotional eating in response to stress was the opposite reaction of no desire to eat:

I'd rather not eat if I feel upset or stressed.

Another theme of the non-emotional eaters was that they responded to stress with a reaction other than eating:

Acute stress takes my appetite away and gives me nervous energy so I clean, like after an argument.

Table 4 Common triggers of emotional eating

Trigger	Number of times reported
Family problems	10
Pain and health issues	8
Financial problems	7
General stress	5
Loneliness	5
Relationship problems	5
Weight status	5
Esteem problems	4
Grieving	4
Negative feelings	4
Boredom	3
Depression	3
Trauma or abuse	3
Conflict	2
Demands as a carer	2
Giving up smoking	2
Means as pleasure	2
Other triggers	14

Participants who reported engaging in emotional eating described situations that grouped into a number of themes of triggers. Table 4 presents these triggers and the number of times they were reported. Among the triggers that emerged was weight status, which suggested evidence of a vicious cycle of eating in response to unpleasant feelings related to being obese for some individuals. The following is a comment that was representative of this cycle:

The only thing that allows me any pleasure is sleeping to not know or eating, which works only while I'm doing it as it makes me fat, which makes me worse.

The themes that emerged, such as dissatisfaction with weight status and family problems, represented basic needs that were not being satisfied and triggered emotional eating. These findings support those of the quantitative analyses that basic need satisfaction has a significant inverse relationship with emotional eating in this sample of obese participants.

Several themes also emerged from responses to the second question posed: 'How confident do you feel to manage stress in your life without "emotional" eating now and in the future?'. Table 5 presents these themes and number of times reported. It is evident that the majority of the respondents did not feel confident in managing stress without engaging in emotional eating, with 52 participants stating this lack of confidence and 18 stating confidence. The remaining responses fell mostly into categories that indicated confidence conditional on other factors. One of these conditions was receiving bariatric surgery, which was not surprising given that the large proportion of the participants were on a waiting list for this procedure.

Table 5 Themes relating to confidence not to engage in emotional eating

Theme	Number of times reported
Not confident	52
Confident	18
Confident conditional on surgery	6
Confident with support	4
Confident with changes in life	2
Aware of problem and trying	2

The perception of impossibility of managing without engaging in emotional eating was evident in some participants' responses:

LOL. (laughing out loud)

If you take my food away from me, what will I have left?

A participant relying on surgery to manage their problem also expressed this sentiment:

Ha! That's why god invented lap banding—for the fat emotional cripples. And I will have to work out how to replace one emotional/obsessive response with another . . . maybe shopping this time.

It was also evident from the responses that some participants felt a strong sense of desperation in relation to their weight and ability to control emotional eating, as reflected in the following statement:

I start to feel sick, so I get in the car, go through the drive through and get three burgers, two large chips, large soft drink, seven nuggets and scoff them all down, then I feel fat and guilty and think how easy it would be to end it all by running into a tree at 140 km an hour. No one would miss me!!

This comment was particularly concerning, and indicated the severity of the impact obesity can have on the individual, thus highlighting the need to address obesity and the reliance on emotional eating many obese individuals evidently experience.

DISCUSSION

Support for hypotheses

Timmerman and Acton's (2001) finding of a significant inverse relationship between basic need satisfaction and emotional eating ($r = -0.49$) was replicated in this study,

which used an obese sample and found a similarly strong negative relationship ($\beta = -0.36$). This indicates that the lower an individual's basic need satisfaction, the more likely they are to engage in emotional eating, which provides partial support for Hypothesis 1. Self-esteem was considered a mediator due to Timmerman and Acton's finding that self-esteem was the one subscale of the BNSI that significantly predicted emotional eating. The current study did not find that self-esteem explained the variance in the relationship between basic need satisfaction and emotional eating at a significant level. However, three of the coping subscales (inter- and intrapersonal coping, negative coping, and substance use) did explain this relationship, although the fourth coping subscale (proactive coping) did not. These findings provided partial support for Hypothesis 1 regarding mediating effects.

Partial support was also found for Hypothesis 2, with emotional eating and negative coping found to be significantly higher and self-esteem significantly lower in individuals with BMIs ≥ 40 as compared with individuals with BMIs < 40 . Basic need satisfaction and the remaining three coping subscales (proactive coping, inter and intra personal coping, and substance use) were not significantly different between the two BMI groups.

Implications for interventions

The findings of this study suggest possibilities for assisting obese individuals who emotionally eat with their weight loss efforts. As coping subscales were identified as mediators of the relationship between basic need satisfaction and emotional eating, counselling, and weight loss programs could be tailored to include greater emphasis on developing adaptive coping strategies. Intervention studies teaching adaptive coping for weight management may help establish the effectiveness of such an approach.

Support for interventions based on a coping style approach is apparent in The Solution Method, which was used as a successful intervention to help individuals improve health, including weight loss, by fostering adaptive skills for dealing with life stressors (Mellin, Croughan-Minihane, & Dickey, 1997). Further support for adaptive coping as a means to successful weight loss comes from the findings by Kayman *et al.* (1990) that individuals successful in weight loss maintenance experienced a similar frequency of stressful life events as individuals who were less successful, but had greater belief in their ability to cope. This suggests that fostering mastery experiences of coping with more adaptive strategies could be a focus for helping emotional eaters not only develop alternative coping mechanisms, but also a belief in their ability to use them.

The results of the current study indicate that negative coping, which was shown to be higher in individuals with

higher levels of emotional eating, should be replaced with more positive coping strategies. This might include strategies for replacing self-criticism with more positive self-talk. However, inter- and intrapersonal coping strategies (such as venting and seeking advice from others) were positively correlated with emotional eating, indicating that their use may not be helpful. It is less clear whether the other significant mediator, substance use, is helpful for managing stress without engaging in emotional eating, given that items relating to this strategy may have been misinterpreted by some participants as including prescribed medication.

Finally, although self-esteem was not found to mediate the relationship between basic need satisfaction and emotional eating, it was found to be lower in individuals with higher BMIs. A cause-and-effect relationship between weight and self-esteem was not indicated in this result, but previous research (Isnard *et al.*, 2003) suggests that high BMI individuals may benefit from addressing self-esteem issues for managing emotional eating.

The above findings have provided useful focal points for the treatment of obesity, which, together with the qualitative analyses, further highlight the need to eliminate the emotional eating. Responses to the open-ended questions showed that the large majority of participants engaged in emotional eating to deal with stress. Even more importantly, the responses of the obese individuals indicated their lack of confidence in managing stress without engaging in emotional eating, which underscores the limitations that other treatments of obesity, such as bariatric surgery, will have in long-term effectiveness. It seems clear that without addressing the psychological issues related to the maintenance of obesity, the problem will continue.

Limitations of the study and suggestions for future research

There are several limitations of this research that restrict confidence in the results. One limitation was the low response rate of participants ($136/500 = 27\%$), which may have provided a bias in results. An improved response rate might be gained through the cooperation of medical staff administering the questionnaire to obese patients in their care rather than conducting a mail-out.

Another limitation that could be improved upon by future research on the same question was the method for analysing the qualitative data, which was conducted by one of the main investigators. More reliability would be obtained by using several raters independent of the main investigator. In addition, the two questions asked provided only limited qualitative data, and could be expanded on.

Another suggestion for future replications of the study is to include participants that cover a range of BMI categories: healthy (BMI = 20–24.9), overweight (BMI = 25–29.9),

obese (BMI = 30–39.9), and morbidly obese (BMI = ≥ 40). As higher BMI is known to be associated with higher rates of emotional eating as a coping mechanism (e.g., Ganley, 1989; Grant & Boersma, 2005), a study that includes healthy BMI participants may provide more useful information on healthier alternative coping mechanisms. Further research on which coping styles are associated with lower levels of emotional eating will help identify those styles that should be encouraged in individuals attempting to eliminate their emotional eating. One way of achieving this could be to extend the current research by assessing the derived coping factors in intervention studies. In particular, as ‘negative coping’ was negatively correlated with emotional eating, the effects of promoting a more positive coping style could be evaluated for impact on emotional eating. For example, Laitinen et al. (2002) suggested the need for gender-specific counselling that promotes self-efficacy for men, and strategies for facilitating emotional support for women.

CONCLUSION

In summary, this study has supported the existence of a link between basic need satisfaction and emotional eating, which was mediated by coping strategies. The results indicate that support for obese individuals in managing their emotional eating should target their coping strategies, but does not need to focus on basic needs for the purpose of weight management. The severity of the problem has also been underscored by the findings that emotional eating is higher in individuals with higher BMIs, and that many obese individuals do not feel confident to manage stress without eating as a coping mechanism. While this study has helped identify some coping strategies that may be more or less helpful in managing emotional eating, future research may help to clarify the kinds of coping strategies that are most helpful and can be developed in obese individuals seeking to manage their emotional eating and achieve success in weight loss.

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