

Body-Weight Self-Schema: Determinant of Mood and Behavior in Women With an Eating Disorder¹

COLLEEN CORTE² AND KAREN FARCHAUS STEIN

*School of Nursing
University of Michigan, Ann Arbor*

The schema approach to self-concept was used to investigate the association between body-weight self-conception and self-esteem, negative affect states, and disordered eating behavior in women with anorexia nervosa ($n = 26$) or bulimia nervosa ($n = 53$) using experience sampling methodology. We predicted that self-esteem would be lower and unpleasant affect and disordered eating behaviors would be higher when the body-weight self-schema was activated in working memory compared to when non-weight-related self-schemas were activated. Participants recorded the currently activated self-schema, self-esteem, affect, and behavior in response to an alarm-watch signal 5 times daily for 5 days. Activation of the body-weight self-schema was associated with lower self-esteem and higher negative affect, but not higher levels of disordered eating behavior. Low self-esteem and negative affect, however, were associated with disordered eating behavior. Findings have important implications for treatment of eating disorders.

Body-weight self-conceptions are widely viewed as the cognitive foundation that gives rise to the emotional and behavioral symptoms of anorexia nervosa (AN) and bulimia nervosa (BN). More than two decades ago, Bruch (1981) argued that an unshakable conviction that oneself is too fat is an important precursor in the development of AN. While she posited that deficits in overall identity development are the core source of pathology underlying the disorder (Bruch, 1982), the belief that the self is too fat was viewed as the proximal source of food restricting and disordered eating behaviors.

Since Bruch's (1981) original formulation, other investigators from diverse theoretical orientations have suggested similarly that a body-weight self-conception is a core cognitive component underlying both AN and BN (Garner & Garfinkel, 1982; Horne, Van Vactor, & Emerson, 1991; Stein, 1996). Vitousek and her colleagues (Garner, Vitousek, & Pike, 1997; Vitousek & Ewald, 1993; Vitousek & Hollon, 1990) have argued that in women with eating disorders,

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²Correspondence concerning this manuscript should be addressed to Colleen Corte, who is now at College of Nursing, University of Illinois at Chicago, 845 S. Damen (m/c 802), Chicago, IL 60612. E-mail: ccorte@uic.edu

conceptions of the self as fat provide both a focus and a framework for understanding feelings of inadequacy, confusion, and dissatisfaction. From this perspective, the body-weight self-conception provides an organizing framework for evaluating the self, which in turn profoundly influences both emotional experience and behavior (Garner et al., 1997; Vitousek & Ewald, 1993; Vitousek & Hollon, 1990).

Other investigators have suggested that a stable and enduring conception of the self as fat plays a central role in the enactment of disordered eating behaviors (Stein, 1996; Striegel-Moore, McAvay, & Rodin, 1986). While many eating disorder theorists have focused explicitly on the role of the fat self-conception in eating disorders, others have focused more broadly on the negative consequences of self-conceptions related to body weight without specific reference to the content as fat or thin (Kearney-Cook & Striegel-Moore, 1997).

The prevailing view is that negative affect states mediate the influence of the body-weight self-conception on behaviors that characterize eating disorders. Activation of the body-weight self-conception in working memory is believed to cause low self-esteem and negative affect (e.g., anxiety, depression) and body dissatisfaction, which in turn trigger disordered eating behaviors (Garner et al., 1997; Kearney-Cook & Striegel-Moore, 1997; Stice & Agras, 1998; Stice, Shaw, & Nemeroff, 1998; Vitousek & Hollon, 1990). This hypothesis is so widely accepted that one of the essential criteria specified in the 4th-edition text revision of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR; American Psychiatric Association, 2000) for the diagnoses of both AN and BN is that self-evaluation and mood are unduly influenced by conceptions of the self in terms of body weight and shape. Furthermore, current cognitive-behavioral approaches to eating disorder treatment are based on the hypothesized link between the body-weight self-conception and negative self-evaluations and mood (Garner et al., 1997) and focus on modification of weight-related self-conceptions as an important means to effect behavioral change and recovery (Garner et al., 1997; Kearney-Cook & Striegel-Moore, 1997; Vitousek & Ewald, 1993; Wilson, Fairburn, & Agras, 1997).

An alternative view derived from schema theory (Markus, 1977) suggests that there is a direct link between the body-weight self-conception, negative affect, and disordered eating behavior. From this theoretical perspective, an elaborated conception of the self in terms of body weight, referred to as a *body-weight self-schema*, powerfully influences both affect and behavior. *Self-schemas* are complex, domain-specific memory structures that include procedural knowledge; that is, specific behavioral strategies and routines to facilitate enactment of behavior in the domain (Greenwald & Pratkanis, 1984; Kendzierski, 1988, 1990; Kendzierski & Whitaker, 1997).

As such, persons with a self-schema in a behavioral domain are more likely to follow through on their behavioral intentions than those with equal level of

intention but no related self-schema (Estabrooks & Courneya, 1997; Kendzierski & Whitaker, 1997; Lips, 1995). Also, because affect is encoded as part of the self-schema, differences in activation of positive and negative self-schemas are associated with measurable changes in self-esteem and affect (Andersen & Cyranowski, 1994; Cross & Markus, 1994; Cyranowski & Andersen, 1998). From this perspective, then, activation of a body-weight self-schema in memory would lead to a decrease in self-esteem, an increase in negative affect, and enactment of disordered eating behavior.

According to schema theory, an individual's self-concept may include a wide array of self-schemas and other less well-developed conceptions of the self. However, only a subset of the total self-concept is activated in working memory at any given moment (Baumeister, 1997; Markus & Wurf, 1987). The particular self-schema that is activated shifts and changes in response to internal states and factors in the social environment (Bargh, Lombardi, & Higgins, 1988; Markus & Kunda, 1986).

Markus and colleagues (Markus, Hamill, & Sentis, 1987) have argued that while all persons have a general or universalistic conception of themselves relative to body weight and shape, only persons who conceive of the domain as important and centrally self-defining have a detailed, well-elaborated, and enduring schema of the self in the domain. If included in one's total self-concept, the body-weight self-schema may be activated by a diverse array of external and internal stimuli, including the presence of others who are overweight or underweight, the pinch of a waistband that has become snug, or a social context that makes body weight and shape salient, like trying on clothing, wearing a bathing suit, or standing in line to purchase an ice-cream cone. Once activated, measurable changes in information processing, behavioral patterns, self-esteem, and affect are likely to result.

Activation of the body-weight schema will simultaneously increase accessibility of linked visual images of the physical self (Markus et al., 1987; Smeets & Kosslyn, 2001), which in our contemporary society are likely to include conceptions of the self as heavier than desired (Rodin, Silberstein, & Striegel-Moore, 1984) and increased salience and conflicted thoughts about food (Markus et al., 1987). Simultaneously, procedural knowledge—plans, strategies, and routines encoded as a part of the body-weight schema to manage hunger, regulate food intake, and control or avoid weight gain—will be deployed. Furthermore, activation of behavioral strategies such as dieting and fasting designed to control hunger and the urge to eat may actually contribute to the escalation of disordered eating behaviors by increasing negative affect and the propensity to engage in out-of-control compensatory behaviors, such as binge eating (Polivy & Herman, 1999).

While all persons who place high importance on their body weight and have a self-schema in the domain are more likely to have related strategies and routines

(Froming, Nasby, & McManus, 1998; Sheeran & Orbell, 2000), the specific configuration of behaviors included in the self-schema, and hence enacted by the individual, most likely reflects individual differences in genetic and physical vulnerabilities (Strober, Freeman, Lampert, Diamond, & Kaye, 2000) and external factors such as exposure to social contexts and behavioral role models. For example, whether the individual engages in extreme food restriction, binge eating, excessive exercise, or purging behaviors (e.g., self-induced vomiting, laxative use, diuretic use) may be dependent on individual differences in temperament (Halmi et al., 2000), body-weight set point (Striegel-Moore, Silberstein, & Rodin, 1986), propensity to experience feelings of fatness and preoccupation with food, and social experiences such as pressure to lose weight (Pike & Rodin, 1991), exposure to teasing about body weight (Cash, 1995), and role modeling of disordered eating behaviors (Crandall, 1988).

In the present study, we investigate the link between body-weight self-schema, self-esteem, affect, and disordered eating behavior (including binge eating, self-induced vomiting, laxative use, and diuretic use) using experience sampling methodology. Women with a clinically diagnosed eating disorder were asked to record the currently activated self-conception, self-esteem, affect, and behavior in response to an alarm-watch signal five times daily for a period of 5 days. We predicted that in a sample of women with AN and BN, self-esteem scores would be lower and levels of unpleasant affect and disordered eating behaviors would be higher when the body-weight self-schema was activated in working memory compared to when non-weight-related self-schemas were activated in working memory.

Method

Participants

Participants were 79 women with a diagnosed eating disorder who participated in a larger study on self-conceptions in eating disorders (Stein & Corte, in press). Of the 79 women, 26 met either full *Diagnostic and Statistical Manual of Mental Disorders-III-R* (DSM-III-R; American Psychiatric Association, 1994)³ criteria for anorexia nervosa ($n = 12$) or had subthreshold levels of the disorder (i.e., met the attitudinal criteria and one of the biologic criteria, 85% of ideal body

³Participants were recruited for this study just prior to and immediately after publication of the 4th edition of the *Diagnostic and Statistical Manual* (DSM-IV; American Psychiatric Association, 1994). Because the Structured Clinical Interview (Spitzer et al., 1992) was only available in the DSM-III-R version at the time that data collection began, this version was used throughout. It should be noted, however, that symptom criteria to establish the BN diagnosis were elaborated in the DSM-IV edition but did not change substantially from the DSM-III-R criteria.

weight or amenorrhea; $n = 14$). Fifty-three women met either full DSM-III-R criteria for BN ($n = 29$) or had subthreshold levels of the disorder (i.e., bingeing/compensatory-behavior cycles either did not meet the intensity or duration criteria, or the woman engaged in purging behaviors in response to the ingestion of small to normal quantities of food; $n = 24$).

The Structured Clinical Interview for DSM-III-R (SCID; Spitzer, Williams, Gibbon, & First, 1992) was used to establish the eating disorder diagnoses. All interviews were completed by a psychiatric clinician with extensive training and experience in administration of the SCID. Interrater reliability was established by having 10% of the audiotaped interviews coded independently by a clinical psychologist who was considered an expert in administration of the SCID. Interrater reliability for eating disorder diagnoses was high ($\kappa = .90$).

Participants were recruited from local eating disorder treatment programs, private psychotherapists, and through community-based advertisements. Mean age was 21.7 years ($SD = 3.5$) for the AN group and 22.6 years ($SD = 4.1$) for the BN group, $t(76) = -0.94$, *ns*. The sample was primarily White (AN = 96%; BN = 83%), $\chi^2(2, N = 78) = 2.40$, *ns*. Most of the women had at least some college experience (AN = 81%; BN = 77%), $\chi^2(3, N = 78) = 2.32$, *ns*; and the majority were in current treatment for their eating disorder (AN = 68%; BN = 57%), $\chi^2(1, N = 76) = 0.88$, *ns*. Eating disorder behavioral frequencies for ANs and BNs, respectively, were as follows: bingeing (4.2 vs. 16.2 episodes per month), vomiting (7.0 vs. 28.7 episodes per month), laxative use (0.5 vs. 4.6 occasions per month), diuretic use (0.0 vs. 3.0 per month), and exercise (22.0 vs. 22.5 hr per month). No differences in ED behavioral frequencies were found between those women who were and those who were not in current treatment.

Measures

Experience-sampling methodology (Csikszentmihalyi & Larson, 1987; Hormuth, 1986) was used to obtain multiple measures of the currently activated self-schema, self-esteem, affect, and behavior during the woman's everyday activities. Participants were asked to wear an alarm watch for a period of 5 days. The watch was set to signal the participant five times daily at approximately 3-hr intervals during the participant's waking hours for a total of 25 signals.

During the experience-sampling period, participants were asked to carry a small notebook of diaries with them. At each signal, participants were instructed to immediately complete a one-page diary-type questionnaire that included questions about (a) what they were thinking about themselves (i.e., the content of the currently activated self-conception); (b) how they were feeling (i.e., state self-esteem and affect); and (c) what they were doing (i.e., behavior at the time of the signal). Response rates for the diaries were 96% for the AN group ($M = 24.0$,

$SD = 1.6$, Range = 19 to 25) and 91% for the BN group ($M = 22.8$, $SD = 3.1$, Range = 11 to 25).

Content of the Currently Activated Self-Schema

A single open-ended question in the daily diary was used to measure the content of the currently activated self-schema; that is, what the individual was thinking about herself at the time of the signal. Participants were instructed to think about the moment just prior to the alarm signal and then describe themselves by answering the question "Who am I right now?"

The scheme used to content-code the self-descriptors was a modified version of one developed by Markus and colleagues (Markus, Curhan, Ryff, & Palmersheim, 2004) in a multistage stratified area probability sample of 1,500 adults. The code is organized in a hierarchical format with six broad categories at the highest level. These broad categories include (a) psychological traits, (b) activities, (c) social relations, (d) health, (e) attitudes and philosophies, and (f) demographics. Each of these six broad categories is further subdivided into nested levels of subcategories. For example, the psychological traits category is subdivided into divisions that reflect the Big Five personality traits (e.g., McCrae & Costa, 1987) including (a) agreeableness, (b) extraversion, (c) conscientiousness, (d) emotional stability, and (e) openness to experience. The activities category is subdivided into school, sports (i.e., mention of specific activity), leisure activities, work, keeping busy, volunteer activities, religious activities, and routine tasks. The social relations category is subdivided into family, friends and other peers, and pets. The attitudes and philosophies category is subdivided into general outlook, political orientation, and preferences. The demographics category includes gender, race/ethnic group, age, residence, educational level, financial status, and law abiding. The health category includes athleticism/exercise, health and appearance (non-weight-related), and body weight/shape.

Our coding system used only the broad categories, with one exception. Because of the nature of the sample and the focus of this study, we retained the three key subcategories within the broader category of health and added a separate category for mention of an eating disorder. Consequently, our coding scheme includes a total of nine categories.

Responses were independently content-coded by two research assistants. Discrepancies were discussed and resolved by consultation with the principal investigator. Interrater reliability was established by comparing the independent content-code ratings of the two research assistants for all diaries of all participants and was high (90% agreement).

The attitudes category was not used in self-descriptions in this sample, and the demographics category was used infrequently (1.0%). Consequently, both categories were dropped from the analyses. The remaining seven categories

of self-definition are listed (with examples provided in parentheses): (a) social relationships (“friend,” “daughter,” “girlfriend”); (b) work and activities (“student,” “basketball fan,” “salesperson”); (c) psychological traits (“angry,” “caring,” “I am a creative person”); (d) health and (non-weight-related) appearance (“smoker,” “insomniac,” “woman with nice hair”); (e) athleticism/exercise (“athlete,” “exerciser,” “fit”); (f) mention of an eating disorder (“bulimic,” “recovering anorexic,” “girl struggling to overcome an eating disorder”); and (g) body weight/shape (“fat and defective,” “overweight,” “too chubby,” “balloon filled with lard,” “the Goodyear blimp”).

State Self-Esteem

Rosenberg’s (1965) Self-Esteem Scale, as modified by Kernis (Kernis, Granemann, & Mathis, 1991), was used to measure state self-esteem. In the modified version of this widely used 10-item questionnaire, two changes were made: (a) Participants responded to the items in terms of how they were feeling at the moment they were signaled (as opposed to general feelings about the self), and (b) responses were scored on a 10-point Likert scale (as opposed to the original 4-point scale). The mean of responses to the 10 items was used to compute the state self-esteem score. Questionnaires with fewer than nine items completed (2.3% of the total) were deleted from the analyses.

Negative Affect States

The Self-Report Affect Circumplex Scale (Larsen & Diener, 1992) was used to measure negative affect states. This measure is based on the circumplex model of affect in which it is posited that two main dimensions underlie the majority of affect states: hedonic valence (pleasant and unpleasant dimension) and activation (high- and low-energy dimension; Watson, Wiese, Vaidya, & Tellegen, 1999). Four additional dimensions of affect reflect combinations of the two main dimensions: activated pleasant affect, unactivated pleasant affect, activated unpleasant affect, and unactivated unpleasant affect.

Participants were asked to rate each of 48 mood adjectives on a 5-point scale ranging from 1 (*very slightly/not at all*) to 5 (*extremely*) according to how they were feeling at the moment they were signaled. Eight 6-item affect scales are included in the measure. For the present study, we focused on the three negative affect scales: activated unpleasant, unpleasant, and unactivated unpleasant. For each of the three negative affect scales, the participant’s mean across all six items in the scale was computed and used as an index of the specific type of negative affect (e.g., high activation, low activation). Scales with fewer than four items completed were deleted from the analyses (activated unpleasant = 5.5%; unpleasant = 5.9%; unactivated unpleasant = 6.3%). Cronbach’s alpha coefficients for the three negative affect scales ranged from .84 to .92.

Eating Disorder Behaviors

A single open-ended question in the daily diary was used to measure behavior at the time of the signal. The question asked the participant to "Describe the main thing you were doing at the moment you were signaled." Responses were independently content-coded by two research assistants using a 12-category scheme (school/studying, job/work, errands/housework, personal care, in transit, meals, socializing, leisure activities, sleeping, exercising/physical activity, disordered eating behaviors, and other behavior) that was developed for this study. Because some categories were infrequently used, the 12 categories were collapsed into 7 behavioral categories as follows.

The categories of school/studying and job/work were combined into *working/studying* (22.9% of the total 1,591 responses). Similarly, the categories of errands/housework, personal care, and in transit were combined into a *self-care* category (25.2%). *Exercise* (3.8%), *disordered eating behaviors* (0.7%), *meals* (11.7%), *socializing* (8.2%), and *leisure activities* (16.7%), were retained as separate categories. The sleeping (5.9%) and other behavior (1.1%) categories were dropped from the analyses.

An additional 3.8% of all responses had missing data on the behavioral variable. The working/studying category included any mention of work- or school-related activities, such as "studying for a test." The self-care activities category included personal activities including hygiene, such as "doing my laundry." The meals category included eating meals and meal-preparation activities, such as "having a pizza." The socializing category included any response specifically focused on interactions with others, such as "talking with friends," whereas the leisure activities category focused explicitly on a recreational activity that did not include a focus on socializing with others, such as "watching TV." The exercise/physical activity category included responses such as "exercising," "working out," and "running." The ED behavior category included responses such as "bingeing," "purging," and "eating then throwing up." Although our coding scheme was developed for this study, it closely matches schemes used in other studies of daily activities and time used in adolescent and young adult populations (Larson, Richards, & Perry-Jenkins, 1994). Interrater reliability was high (96% agreement).

Procedure

All participants completed written informed consent before participating in the study. Approximately 1 week after completing the SCID, participants met individually with a research assistant. After other measures not reported here were administered, participants were oriented to the experience-sampling procedure and the diary. Upon completion of the 5-day experience-sampling period,

participants returned the completed diaries and then other measures not reported in this paper were administered. Participants were paid a total of \$115 for participation in the study.

Results

Preliminary Analyses

We began our analyses by testing for group differences, including differences between women with subthreshold and threshold levels of the disorders and between women in the AN and BN groups in the independent and dependent variables. First, we constructed a variable that reflects the frequency of activation of self-schemas in each of the main content categories across the 5-day experience-sampling period. For each participant, the total number of self-descriptors in a content category was divided by the total number of self-descriptors generated. The individual proportion was then used to compute a mean proportion for the group in each category. The distribution of self-schemas activated in working memory was not different between groups.

Next, a mean self-esteem score was computed for each diary, and the individual diary scores were then used to compute an overall average self-esteem score for the individual. The same procedure was used to compute the three unpleasant affect scale scores. Again, no differences between groups were found.

Finally, we examined group differences in response to the question "Describe the main thing you were doing at the moment you were signaled." For each individual, the number of times a participant responded that they were involved in a behavioral domain was divided by the total number of behavioral responses, and these proportions were used to compute group means. Again, no differences between groups were found. Consequently, the groups were combined for all subsequent analyses.

Influence of Self-Schema Activation on Self-Esteem and Affect

To test the hypothesis that self-esteem scores would be lower at times when the body-weight self-schema was activated, compared to when other self-schemas were activated, paired *t* tests were completed using a modified Bonferroni procedure for multiple tests (Jaccard & Wan, 1996). For these analyses, diaries were grouped according to the content category of the self-descriptor; that is, what the person was thinking about herself at the moment of the signal. Therefore, seven groups of diaries, each representing a different category of self-description, were formed for each individual, and a mean self-esteem score for each group of diaries was computed. For example, for each individual, all diaries with a self-descriptor related to body weight were grouped, and an average self-esteem score for this group of diaries was computed. The same procedure was used for the

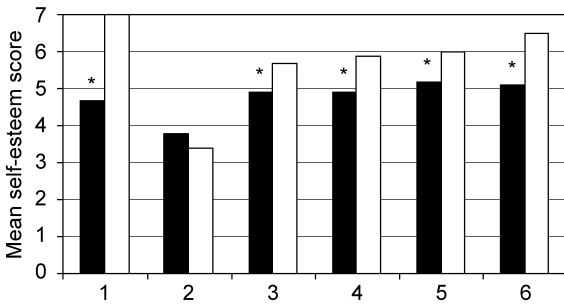


Figure 1. Paired t tests with modified Bonferroni corrections comparing mean self-esteem score when body weight was activated with mean self-esteem score when other categories of self-description were activated for total sample. 1 = body-weight schema vs. exercise schema ($n = 6$); 2 = body-weight schema vs. ED schema ($n = 2$); 3 = body-weight schema vs. health/appearance (non-weight-related) schema ($n = 20$); 4 = body-weight schema vs. psychological traits schema ($n = 34$); 5 = body-weight schema vs. social schema ($n = 13$); 6 = body-weight schema vs. work/activities schema ($n = 21$). *All $p_s \leq .001$.

other six categories of self-description. Then, the mean self-esteem score when body weight was activated was compared to mean self-esteem scores when the other six categories of self-description were activated.

As predicted, the mean level of self-esteem was lower when body weight/shape was activated in memory compared to when health and (non-weight-related) appearance, psychological traits, work and activities, exercise/athleticism, or social relationships self-schemas were activated in working memory: health and appearance, paired $t(19) = 4.54, p < .001$; psychological traits, paired $t(33) = -4.33, p < .001$; work and activities, paired $t(20) = -5.08, p < .001$; exercise/athleticism, paired $t(5) = 2.89, p < .03$; and social relationships, paired $t(12) = -2.26, p = .04$, respectively. For example, one participant's self-esteem was 3.90 when she described herself as *very fat*; but was up to 6.80 when she described herself as *pretty*; 6.60 when she described herself as *anxious*; 6.80 when she described herself as a *workaholic*; 9.90 when she described herself as an *athlete*; 6.20 when she described herself as a *daughter*; and 6.50 when she described herself as a *recovering anorexic*.

Because only 2 participants generated both a body-weight self-schema and an ED self-schema, self-esteem could not be compared for these two categories of self-description. An additional analysis after combining the ED and exercise/athleticism self-descriptive categories reveals that mean self-esteem was marginally significantly lower when body weight was activated, compared to when ED/exercise/athleticism was activated (4.51 vs. 6.14), paired $t(7) = 2.13, p = .07$. Figure 1 shows mean self-esteem scores when body weight was activated, compared to each of the other self-schema categories.

Similarly, paired t tests using the same modified Bonferroni procedure were also used to test the hypothesis that unpleasant affect would be higher when the body-weight self-schema was activated, compared to when other self-schemas were activated. The same procedure used for self-esteem was used to construct unpleasant affect scale scores for each group of diaries. Therefore, diaries were again grouped according to the content category of the self-descriptor, and a mean affect score for each of the three types of negative affect (activated, unpleasant, and unactivated) for each group of diaries was computed.

Figure 2 shows mean affect scores for the three types of negative affect when body weight was activated, compared to each of the other self-schema categories. Activated unpleasant (e.g., nervous, jittery) affect was higher when body weight/shape was activated, compared to when health and non-weight-related appearance, work and activities, or psychological traits self-schemas were activated: health and appearance, paired $t(19) = -5.58, p < .001$; work and activities, paired $t(19) = 3.79, p = .001$; and psychological traits, paired $t(32) = 3.35, p = .002$, respectively. No differences were found for exercise/athleticism or social self-schemas.

Using the same example cited earlier, the participant's activated unpleasant affect was 3.50 when she described herself as *very fat*; but was only 2.00 when she described herself as *pretty*; 3.30 when she described herself as *anxious*; 2.00 when she described herself as a *workaholic*; 1.33 when she described herself as an *athlete*; 1.83 when she described herself as a *daughter*; and 1.67 when she described herself as a *recovering anorexic*. Unpleasant affect (e.g., sad, blue) was significantly higher when body weight/shape was activated, compared to when work and activities, psychological traits, health and (non-weight-related) appearance, and exercise/athleticism related self-schemas were activated: work and activities, paired $t(19) = 4.16, p = .001$; psychological traits, paired $t(21) = 3.14, p = .004$; health and appearance, paired $t(19) = -3.09, p = .006$; and exercise/athleticism, paired $t(3) = -4.13, p < .02$, respectively. No difference was found for social self-schemas.

Finally, unactivated unpleasant (e.g., dull, bored) affect was significantly higher when body weight/shape was activated, compared to when psychological traits were activated, paired $t(31) = 3.10, p = .004$. No other differences were found for this type of negative affect. Again, no comparisons could be made with ED self-schemas because of the small sample size. Additional analyses after combining the ED and exercise/athleticism self-descriptive categories reveal no differences for any of the three types of negative affect when body weight was activated, compared to when ED/exercise/athleticism was activated.

Influence of Self-Schema Activation on Behavior

The second hypothesis motivating the present study is that disordered eating behaviors would be more frequent when body-weight self-schema was activated,

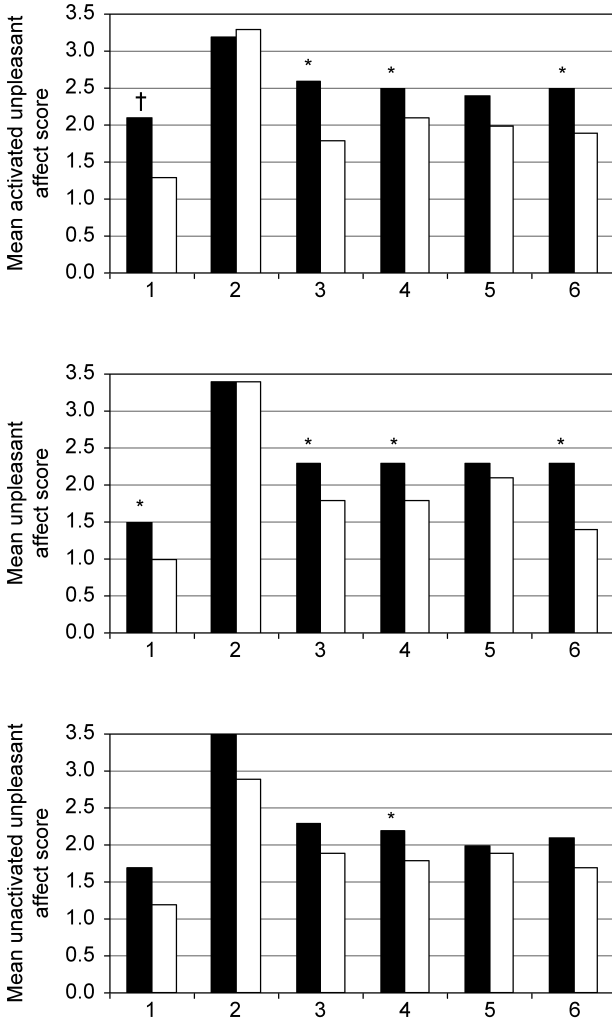


Figure 2. Paired *t* tests with modified Bonferroni corrections comparing the three unpleasant-affect scale scores when body weight was activated with the three unpleasant-affect scale scores when the other categories of self-description were activated for sample. 1 = body-weight schema vs. exercise schema (*n* = 6); 2 = body-weight schema vs. ED schema (*n* = 2); 3 = body-weight schema vs. health/appearance (non-weight-related) schema (*n* = 20); 4 = body-weight schema vs. psychological traits schema (*n* = 33); 5 = body-weight schema vs. social schema (*n* = 13); 6 = body-weight schema vs. work/activities schema (*n* = 20). †*p* < .06. *Adjusted *ps* ≤ .05.

compared to when other self-schemas were activated. Because so few ED behavioral instances were captured ($n = 12$) across the 5-day experience-sampling period, within-subject comparisons across different domains of self-definition were not possible. Therefore, we approached this analysis descriptively; that is, we looked at what self-schemas were activated when participants reported engaging in ED behavior.

Contrary to our hypothesis, the body-weight self-schema was activated only 1 time (8.3%) out of the 12 ED behavioral instances. The ED self-schema was activated 2 times (16.7%) out of the 12 ED behavioral instances. The most frequent category of self-description when participants were engaged in ED behavior was psychological traits, which were activated in 8 out of the 12 instances (66.7%). All of these were negative traits, such as “disgusting and hopeless,” “I’m a failure,” “pessimistic,” and “frustrated and mad at myself.” Finally, the work/activities self-description category was activated 1 time (8.3%) out of the 12 ED behavioral instances (“I am a research participant”).

Because our hypothesis that the body-weight/shape self-schema would be associated with disordered eating behaviors was not supported, we explored what participants were doing when the body-weight/shape self-schema was activated (total of 80 instances). As indicated earlier, when the body-weight self-schema was activated, participants reportedly were engaging in ED behavior only 1% of the time (1 instance: “bingeing”). They reportedly were exercising 4% of the time (3 instances: “working out,” “doing aerobics,” and “finishing exercise program”). The most frequently reported behaviors were meals (18 instances, 22%; e.g., “eating,” “fixing dinner,” “ordering meal at restaurant”), self-care activities (19 instances, 23%; e.g., “trying on a formal dress,” “getting dressed,” “looking at self in mirror”), and working/studying (17 instances, 20%; e.g., “working with a client,” “waiting on a customer,” “going to a grad school open house”). The remaining 30% of the time that the body-weight/shape self-schema was activated, participants reportedly were socializing (4%; “talking to husband,” “talking with a friend”), engaged in leisure activity (16%; e.g., “reading a catalog,” “lying in the sun,” “reading a book about concentration camps”), engaged in “other behavior” (6%), or had missing data (4%).

Influence of Self-Esteem and Affect on Behavior

Because we did not find the expected direct relationship between the body-weight self-schema and ED behavior, we examined the relationship between affective outcomes (self-esteem and negative affect) and ED behavior to see if the results were more consistent with a mediational model; that is, that the body-weight self-schema leads to low self-esteem and negative affect states, which in turn motivate disordered eating behavior. Because there were few ED behavioral instances, we grouped the diaries for the entire sample according to the seven

behavioral categories; that is, what the person was doing at the time of the signal. Then, we compared mean self-esteem and affect scores when participants were engaged in ED behavior versus other behavioral categories using paired *t* tests and the same modified Bonferroni corrections used in earlier analyses.

Self-esteem was lower when participants were engaged in ED behavior ($M = 2.9$) compared to any of the other behavioral categories (M s across categories = 6.8 to 7.6), paired t s ≥ 5.91 , $ps < .001$. Activated unpleasant and unpleasant affect were higher when participants were engaged in ED behavior (activated unpleasant, $M = 3.5$; unpleasant, $M = 3.5$), compared to any of the other behavioral categories: activated unpleasant M s across categories = 1.6 to 1.8, paired t s ≤ -5.0 , $ps < .001$; and unpleasant M s across categories = 1.4 to 1.6, paired t s < -5.0 , $ps \leq .001$. No differences were found for unactivated unpleasant affect (ED behavior $M = 2.4$ vs. M s across all other categories = 1.4 to 1.8, paired t s ≤ 12.5 , $ps \leq .03$). These results are consistent with a mediational model in which low self-esteem and negative affect states lead to disordered eating behavior.

Discussion

The schema approach to the self-concept was used in this study to investigate the association between the body-weight self-schema and self-esteem, negative affect states, and disordered eating behavior in women with anorexia nervosa and bulimia nervosa. Although the body-weight self-conceptions were activated less frequently than expected, we found that when a weight-related self-conception was activated in working memory, self-esteem was lower and negative affect states were higher compared to when non-weight-related self-schemas were activated.

Results of this study provide empirical support for the assertion that self-evaluation and mood are inextricably linked to conceptions of the self that are related to body weight and shape. While overall our clinical samples had a lower average level of self-esteem than reported for normal young adult female samples (Kernis & Waschull, 1995), eating-disordered women reported evaluating themselves most negatively when body-weight self-conceptions were activated in working memory. It is interesting to note that while self-esteem level fluctuated approximately 1 point as various self-conceptions were activated, it was below the midpoint of the scale (4.7 on a 10-point scale) in the range of frank low self-esteem when body-weight self-conceptions were activated and above the midpoint and in the positive self-esteem range when other aspects of the self were activated, including non-weight-related physical appearance. Similarly, a diverse collection of negative affects, including agitated and non-agitated negative emotions, was the highest when thinking of oneself related to body weight and shape. These findings suggest that it is not general beliefs about one's physical appearance or weight-control behaviors (e.g., dieter, exerciser) that are associated with

distress in women with eating disorders, but much more specifically conceptions of the physical self related to weight that are the greatest source of emotional distress.

Several eating-disorder theorists have argued that body-weight self-conceptions are associated with negative affect states, which in turn motivate disordered eating behaviors. For example, Stice (1994; Stice et al., 1998) suggested that media portrayals of extremely thin body-weight ideals activate negative feelings toward oneself, which in turn precipitate bingeing and purging cycles. According to this view, the high salience of body weight and conflicts regarding food increase food-restricting behaviors (e.g., dieting), which in turn lead to out-of-control bingeing episodes and compensatory purging to avoid weight gain (Stice & Agras, 1998).

The results of our study provide support for this contention. While activation of the body-weight self-schema was associated with low self-esteem and higher levels of negative affect, activation of the body-weight self-conception was not associated with higher levels of disordered eating behaviors. However, low self-esteem and negative affect states were associated with disordered eating behavior. This pattern of results is consistent with a mediational model in which activation of the body-weight self-conception leads to negative affect, which in turn leads to disordered eating behaviors. More specifically, we believe that negative affect states that stem from an elaborated body-weight self-schema, rather than negative affect states in general, lead to the enactment of disordered eating behaviors.

One unexpected finding was that less than half of the sample of eating-disordered women indicated that the body-weight schema was activated in working memory even once across the 5-day experience-sampling period. In addition, reports of disordered eating behaviors at the time of the signal were similarly and surprisingly infrequent. While inconsistent with clinical reports indicating that women with an eating disorder spend the majority of their time struggling with weight-related thoughts and behaviors, our findings are quite similar to those of a previous eating-disorder experience-sampling study completed by Johnson and Larson (1982). These investigators used a random signaling approach (signals approximately every 2 hr) over a 1-week period in a sample of women with bulimia nervosa. They found that bingeing was reported in only 17 (2.5%) of the 673 total behavioral self-reports, and that purging was reported in only 12 (1.8%), despite the fact that, on average, participants were bingeing 1.4 times per day and purging 1.3 times per day.

The low rates of body-weight-related thoughts and ED behaviors observed in these studies may reflect a reactivity effect to the experience-sampling methodology (Wilson, 1993). Although results have been conflicting (Sobell, Bogardis, Schuller, Leo, & Sobell, 1989), studies have shown that the process of recording thoughts and behaviors as they occur alters their frequency and pattern of

occurrence (Carney, Tennen, Afflect, Del Boca, & Kranzler, 1998; Kazdin, 1974; Willis & Nelson, 1982; for further discussion, see Fremouw & Brown, 1980). This effect, while often temporary, is the strongest in the earliest stages of the self-monitoring process. Given that the experience-sampling period for both studies was only 5 days, one plausible explanation for the low rate of thoughts and behaviors is that the measurement process itself disrupted the typical pattern of their occurrence, and insufficient time was allowed in the experience-sampling period for the thoughts and behaviors to return to baseline levels.

Another plausible explanation for the pattern of findings, however, is that the weight-related thoughts and behaviors actually occur much less frequently than is reported in the clinical literature. While clinical descriptions of the disorders suggest that thoughts and behaviors related to body weight and food preoccupation women with AN and BN and that disordered eating behaviors prevent involvement in other domains and interfere with activities of daily living (American Psychiatric Association, 2000; Bulik & Kendler, 2000), the average frequency of eating-disordered behaviors reported during the SCID diagnostic interview was less than one episode per day (bingeing, $M = 13.5$ episodes per month; vomiting, $M = 21.9$ episodes per month). These average rates are consistent with our experience-sampling findings, particularly when the probability of capturing a single brief episode of an ED behavior is taken into account.

These findings raise the interesting possibility that recollections of the amount of time involved in weight-related thoughts and ED behaviors may be exaggerated as a result of encoding and recall errors resulting from the intensity of negative affect or recency or primacy effects. For example, recall is enhanced for behavioral events that engender powerful affect states or those that occur first (primacy effect) or last (recency effect) among a variety of behavioral events (Zhang et al., 2003). Even during the acute phase of the illness, women with AN and BN appear to be engaged in and spend the majority of their time involved in non-weight-related activities and domains of self-definition. However, given the low self-esteem and negative affect associated with weight-related self-thoughts and severe physical and emotional consequences of the ED behaviors, the relatively low frequency of these thoughts and behaviors does not diminish their seriousness and importance. Rather, these results provide evidence to suggest that, at least in an ambulatory sample of women with an eating disorder, their normal daily life consists of some diversity in activation of domains of self-definition and behavioral involvement.

The cross-sectional nature of our data limits our ability to determine whether the activated self-schema led to behavior or whether behavior led to self-schema activation. For example, although we were surprised that the body-weight self-schema was associated with a variety of behaviors, it is certainly plausible that eating meals and engaging in self-care activities (e.g., getting dressed) actually might have activated the body-weight self-schema. Similarly, although we were

surprised that psychological traits were activated most frequently when participants were engaged in ED behavior, it is plausible that ED behaviors might have activated negative psychological traits. These hypotheses could not be tested with these data, however.

The pattern of findings from this study has important implications for the treatment of eating disorders. Given that body-weight/shape-related self-conceptions are associated with significant decreases in self-esteem and increases in negative mood states that may serve to precipitate episodes of disordered-eating and weight-control behaviors, an important goal of treatment for AN and BN may be to decrease the frequency of activation of these weight-related self-conceptions. Interventions that strive to modify the content of the body-weight self-conception actually may function to increase the activation of this self-schema in working memory (Wegner, 1994) and in doing so may serve to increase rather than decrease the symptoms. A viable alternative approach to treatment may be to focus on the development and elaboration of new domains of self-definition and the purposive creation of new positive self-schemas that reflect domains of personal importance, extensive experience, and competence. To the extent that new non-weight-related self-schemas are activated in working memory, negative affect may be lower, self-esteem may be higher, and the need to escape psychological distress through disordered eating behaviors may be reduced.

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