



Disordered eating links to body-relevant and body-irrelevant influences on self-evaluation



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ABSTRACT

We investigated eating- and weight-related correlates of self-evaluation influences (SEIs) and examined the extent to which such SEIs can be both over- and undervalued and the extent to which measurement strategy affects SEIs. A female undergraduate sample ($n = 549$) completed 3 measures of SEI importance and questionnaires assessing disordered eating (DE), body mass index (BMI), and depression. SEI measures included Likert scale, rank ordering, and pairwise forced choice; a subset ($n = 62$) also completed the Shape- and Weight-Based Self-Esteem Scale (SAWBS). Only rank ordering, forced choice, and SAWBS constrain choices among SEIs, such that prioritizing one SEI necessarily deprioritizes another, which reflects real-world restrictions on individuals' allotment of time and energy (e.g., spending hours exercising daily necessarily reduces time available for other activities). By any measure, women with DE overvalue body shape and weight. The constraining measures reveal systematic undervaluation of intelligence and achievement among women with DE and an enhanced effect of DE on the overvaluation of weight and on the undervaluation of being a good person among those with higher BMI. Depressed women's self-evaluations overemphasize appearance and underemphasize interpersonal relationships. Self-evaluations of women with DE are marked by both over- and undervaluation of relevant SEIs; the overvaluation of shape and weight in DE may be associated with costs. Future use of constraining measures, such as forced choice or rank ordering, may enhance our understanding of both over- and underemphasized SEIs among women with DE.

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1. Introduction

The overvaluation of shape and weight (OWS) is an important facet of disordered eating (DE) symptomatology (American Psychiatric Association & DSM-5 Task Force, 2013). If those who struggle with DE overvalue certain self-evaluation influences (SEIs), perhaps they also undervalue other SEIs, as real-world contingencies require that hours spent pursuing one SEI are unavailable for pursuing another. Little is known about what may be normatively underprioritized when OWS occurs, although determining individual SEI profiles may inform case conceptualization and treatment planning.

Self-reported OWS is typically assessed using two items from the Eating Disorders Examination Questionnaire (EDE-Q; Fairburn & Bèglin, 1994), but this method does not assess SEIs beyond shape and weight and cannot determine whether other SEIs are over- or undervalued. The Shape- and Weight-Based Self-Esteem Inventory (SAWBS) requires participants to divide a pie chart into up to nine pieces (Geller, Johnston, & Madsen, 1997), reflecting the contribution of an SEI to self-esteem; e.g., the “body weight and shape” pie-piece reflects shape- and weight-based self-esteem. SAWBS links to DE among adolescent girls

and young adult women (Geller, Srikameswaran, Cockell, & Zaitsoff, 2000; Geller et al., 1997). However, shape and weight may have differential effects (Masheb & Grilo, 2003), and SEIs other than shape and weight may be overvalued (e.g., intimate relationships; Geller, Zaitsoff, & Srikameswaran, 2002).

The EDE-Q's OWS Likert-scale approach could be generalized to allow respondents to rate many potential SEIs, although this would allow respondents to indicate that all SEIs are highly influential. The SAWBS, in contrast, assesses other SEIs and constrains participants' choices, such that not all SEIs can be rated markedly important. Similarly, rank ordering SEIs would require participants to elevate some SEIs above others, providing ordinal-scale data. Alternatively, respondents might select the more important SEI in each of all possible pairs of SEIs, providing ratio-scale data. Such constraining measures allow us to determine if DE-symptomatic women will systematically undervalue the same SEIs.

The present study extends measurement of SEIs and examines DE-related correlates of self-evaluation in a large sample of undergraduate women. We ask what is over- and underprioritized in whose self-evaluations and whether constraining SEI choice improves assessment of over- and undervaluation. To this end, we administer three measures of SEIs, two of which are constraining. A subset of participants also completes the SAWBS. We examine body mass index (BMI), DE, and

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Table 1
Descriptive statistics for the four self-evaluation measures.

Attribute ("SAWBS Label")	Likert scales	Rank ordering	Forced choice	SAWBS
	Average Likert-scale rating (SD)	Average inverse rank ordering ^a (SD)	Average number of times selected (SD)	Average segment angle in degrees (SD)
Weight ("body shape and weight")	4.58 (1.56)	3.39 (3.00)	2.49 (2.69)	40.51 (40.00)
Shape	4.94 (1.44)	4.63 (2.80)	3.62 (2.50)	–
Facial attractiveness ("face")	4.83 (1.26)	4.06 (2.38)	3.33 (2.39)	24.01 (21.13)
Put together	4.74 (1.37)	3.78 (2.16)	3.50 (2.29)	–
Friendships ("friendships")	5.50 (1.10)	7.41 (2.35)	5.79 (2.07)	53.02 (32.64)
Family relationships	5.57 (1.41)	8.51 (2.97)	6.88 (2.92)	–
Romantic relationships ("intimate relationships")	4.68 (1.50)	5.23 (2.88)	4.55 (2.05)	39.06 (30.11)
Good person	5.78 (1.21)	7.95 (2.84)	7.14 (2.63)	–
Personality ("personality")	5.65 (1.03)	7.32 (2.39)	6.25 (2.19)	53.63 (31.99)
Intelligence	5.59 (1.08)	6.59 (2.51)	5.84 (2.42)	–
School or work performance ("competence at school or work")	5.58 (1.12)	7.13 (2.61)	5.78 (2.20)	48.29 (32.14)
("Competence at activities other than school or work")	–	–	–	22.54 (18.09)
("Personal development")	–	–	–	48.07 (31.75)
("Other")	–	–	–	28.98 (47.40)

SD = standard deviation. SAWBS = Shape- and Weight-Based Self-Esteem Inventory. Dashes indicate that the analysis was not conducted.

^a Rank orderings were recoded such that the most important attribute received the highest value (i.e., 11) to facilitate comparison across measurement methods.

depression as correlates of SEIs. We expect that DE-symptomatic women will overvalue shape and weight. We do not anticipate a main effect of BMI on SEIs (e.g., Geller et al., 1997; Hrabosky, Masheb, White, & Grilo, 2007; Wilfley, Schwartz, Spurrell, & Fairburn, 2000). The BMI by DE interaction will indicate whether weight is linked to self-evaluation in the context of DE. We include depression as a covariate, given its links to OWS, DE, and self-esteem (Courtney, Gamboz, & Johnson, 2008; Green, Scott, Cross, Liao, Hallengren, Davids, et al., 2009). We hypothesize that depressed women will overvalue interpersonal characteristics (e.g., Cambron, Acitelli, & Pettit, 2008).

2. Methods

2.1. Participants

Data from 549 female undergraduate students were pooled from two studies examining women's cognitive processing of food. Thirty-two participants were dropped from analyses due to invalid height and weight values. The final sample ($n = 517$) was on average 19.21 ($SD = 1.63$) years old; 80.7% were White/Caucasian, 10.3% Asian American/Asian, and 10.1% other ethnicities.

2.2. Measures

2.2.1. Measures of self-evaluation

The three primary measures assess 11 potential SEIs: friendship, school performance, personality, weight, shape, romantic relationships, family relationships, facial attractiveness, intelligence, being a good person, and appearing put together.¹ Participants first chose which SEI in each of 55 possible pairs was more important (pairwise forced choice), rated the importance of each of the 11 SEIs on a series of 7-point Likert scales, then ranked the 11 SEIs from 1 = most to 11 = least important (rank ordering). A subset ($n = 62$) completed the SAWBS (Geller et al., 1997), which assesses the importance of 9 SEIs: friendship, personality, performance at school or work, face, intimate

¹ These SEIs were selected on the basis of previous research. For instance, friendship, school performance, and personality were drawn verbatim from the SAWBS of Geller et al. (1997). Shape and weight replaced the SAWBS's "body weight and shape" attribute as separate potential SEIs, as undergraduate women with DE may differentially prioritize shape and weight when making self-evaluations. Similarly, romantic relationships and family relationships replaced and expanded upon the SAWBS's "intimate relationships" category, while facial attractiveness replaced the SAWBS's "face" attribute. Pilot work with undergraduate women indicated that intelligence, being a good person, and appearing put together were additional SEIs for young women, and so these were also included among the primary measures' items.

relationships, personal development, competence at activities other than school or work, and other. Participants divided a circle into up to 9 pie pieces, with each angle corresponding to the importance of an SEI.

2.2.2. Individual differences measures

The EDE-Q has participants rate items on a 7-point Likert-type scale; global scores provide an index of the general severity of DE symptoms (Fairburn & Bèglin, 1994). A global score excluding two OWS items was used for subsequent analyses. BMI was computed from participants' self-reported height and weight. Participants completed the Beck Depression Inventory, 2nd Edition (BDI-2; Brown, Beck, & Steer, 1996).

2.3. Procedure

Participants provided informed consent and were seated at a computer. Presentation of the 3 primary tasks and of the SAWBS was counterbalanced for those 62 participants who completed all four. Finally, participants completed the questionnaires and were debriefed.

2.4. Analytic approach

We performed separate repeated-measures multivariate models examining prediction of the 11 SEIs on the 4 tasks. Predictors in each model included BMI, DE, the BMI by DE interaction, and depression. Predictors were log-transformed and centered. Univariate analyses relying on a conservative alpha value of 0.01 followed significant omnibus multivariate effects.

3. Results

3.1. Sample characteristics

3.1.1. Individual differences descriptives

Average self-reported BMI was 23.07 ($SD = 4.32$). Average DE and depressive symptoms were 1.97 ($SD = 1.30$) and 10.91 ($SD = 8.49$), respectively.

3.1.2. Self-evaluation task descriptives

Average Likert-scale ratings indicate that participants tended to rate every SEI as at least somewhat important (see Table 1). However, on the rank ordering and forced-choice tasks, participants emphasized those SEIs pertaining to intrapersonal characteristics and interpersonal characteristics. On average, participants' SAWBS pie-charts also emphasized intrapersonal characteristics and friendships.

Table 2
Reliable univariate predictors for the four self-evaluation measures.

Attribute ("SAWBS label")		Likert scale			Inverted rank order ^a			Forced choice			SAWBS		
		t	p	η^2	t	p	η^2	t	p	η^2	t	p	η^2
Weight ("body weight and shape")	EDE	16.257	<0.001	0.341	8.766	<0.001	0.131	10.717	<0.001	0.184	5.54	<0.001	0.228
	BDI				3.492	<0.001	0.024	2.608	<0.001	0.013			
	BMI×EDE							4.038	<0.001	0.031	2.88	0.005	0.074
Shape	EDE	12.592	<0.001	0.237	7.067	<0.001	0.089	8.243	<0.001	0.118	–	–	–
	BDI				3.967	<0.001	0.031	2.804	0.005	0.015	–	–	–
Facial attractiveness ("face")	EDE	3.023	0.003	0.018									
	BDI	3.710	<0.001	0.026	5.460	<0.001	0.056	5.206	<0.001	0.050			
Put together	EDE	3.987	<0.001	0.030							–	–	–
	BDI							3.374	0.001	0.022	–	–	–
Friendships ("friendships")	BDI	–2.792	0.005	0.015	–3.939	<0.001	0.031	–3.683	<0.001	0.026	–3.68	<0.001	0.115
Family relationships	BDI	–3.423	0.001	0.022	–4.917	<0.001	0.046	–3.824	<0.001	0.028	–	–	–
Romantic relationships ("intimate relationships")													
Good person	BDI	–4.001	<0.001	0.030	–3.364	0.001	0.022	–5.610	<0.001	0.058	–	–	–
	BMI×EDE							–2.688	0.007	0.014	–	–	–
Personality ("personality")	EDE							–3.500	0.001	0.023			
Intelligence	EDE				–3.569	<0.001	0.024	–3.632	<0.001	0.025	–	–	–
School performance ("competence at school")	EDE				–3.403	0.001	0.023	–3.478	0.001	0.023			
("Competence at activities other than school or work")		–	–	–	–	–	–	–	–	–			
("Personal development")		–	–	–	–	–	–	–	–	–			
("Other")		–	–	–	–	–	–	–	–	–			

Note: SAWBS = Shape- and Weight-Based Self-Esteem Inventory; EDE = Eating Disorder Examination Questionnaire; BMI × EDE = interaction between BMI and EDE; BDI = Beck Depression Inventory. Blank cells indicate that no significant effect emerged; dashes indicate that the analysis was not conducted.

^a Rank orderings were recoded such that the most important attribute received the highest value (i.e., 11) to facilitate comparison across measurement methods.

3.2. Likert-scale rating results

Two significant multivariate predictors of Likert ratings of the eleven SEIs emerged: DE ($F(10,502) = 23.30, p < 0.001, \eta_p^2 = 0.32$), and depression ($F(10,502) = 3.94, p < 0.001, \eta_p^2 = 0.07$). Follow-up univariate analyses (Table 2) demonstrated that DE positively predicted weight, shape, facial attractiveness, and appearing put together. Depression positively predicted the importance of facial attractiveness and negatively predicted being a good person, family relationships, and friendships.

3.3. Rank ordering results

DE ($F(10,502) = 12.64, p < 0.001, \eta_p^2 = 0.20$) and depression ($F(10,502) = 5.39, p < 0.001, \eta_p^2 = 0.10$) emerged as multivariate predictors. In follow-up analyses (Table 2), DE predicted higher rankings for weight and shape, as well as lower rankings for intelligence and school performance. Depression predicted higher rankings of weight, shape, and facial attractiveness, and lower rankings of family relationships, friendships, and being a good person.

3.4. Forced-choice task results

DE ($F(10,502) = 13.93, p < 0.001, \eta_p^2 = 0.22$), depression ($F(10,502) = 5.80, p < 0.001, \eta_p^2 = 0.10$), and the BMI by DE interaction ($F(10,502) = 5.39, p < 0.018, \eta_p^2 = 0.10$) showed reliable omnibus effects. Subsequently (Table 2), DE positively predicted weight and shape, and negatively predicted intelligence, school performance and personality. Moreover, the BMI×DE interaction positively predicted weight and negatively predicted being a good person. Simple effects analyses revealed that the effect of DE symptoms on the importance of weight to self-evaluations was more pronounced among those of higher BMI ($t(243) = 8.70, p < 0.001, \eta_p^2 = 0.23$) than among those with lower BMI ($t(249) = 5.90, p < 0.001, \eta_p^2 = 0.12$). Only higher BMI participants demonstrated a reliable effect of DE on the importance being a good person ($t(243) = -2.50, p = 0.013, \eta_p^2 = 0.02$). Depression positively predicted choice of weight, shape, facial attractiveness, and appearing

put together and negatively predicted choice of being a good person, family relationships, and friendships in SEIs forced choices.

3.5. SAWBS results

DE ($F(8,97) = 4.85, p < 0.001, \eta_p^2 = 0.29$), depression ($F(8,97) = 2.07, p = 0.046, \eta_p^2 = 0.15$), and the BMI × DE interaction ($F(8,97) = 2.72, p = 0.009, \eta_p^2 = 0.18$) emerged as multivariate predictors. DE and the BMI × DE interaction positively predicted body weight and shape. Simple main effects analyses revealed that the effect of DE on the importance of weight/shape was more pronounced among higher BMI women ($t(53) = 4.621, p < 0.001, \eta_p^2 = 0.26$) than among lower BMI women ($t(36) = 2.67, p = 0.012, \eta_p^2 = 0.14$). Finally, depression negatively predicted friendships.

4. Discussion

The present study examined whether SEIs can be systematically both over- and undervalued by DE-symptomatic women, as well as the extent to which measurement strategy affects SEIs.

4.1. Eating- and weight-related correlates

As anticipated, DE-symptomatic women endorsed greater importance of shape and weight to their self-evaluations, regardless of measurement strategy. Likert-scale ratings (but not constraining measures) suggest that physical appearance matters more to DE-symptomatic women. When selection is constrained, however, only shape and weight emerge, consistent with the OWS literature. Constraining measures may improve the ecological validity of self-evaluation assessment, relative to Likert-scale ratings, as their constraints parallel real-world limitations on time and energy spent in pursuit of positive self-evaluation.

SEIs can be systematically undervalued as well as overvalued. For instance, two constraining measures reveal that intelligence and academic performance are significantly undervalued among DE-symptomatic women. Moreover, DE-symptomatic women undervalued their personalities on the forced-choice task. Prioritizing shape and weight appears to come at a cost for these women. The use of constraining measures might augment case conceptualization and treatment planning, perhaps by making the costs associated with shape and weight preoccupation

² Rank orderings were recoded, such that the most important attribute received the highest value (i.e., 11).

more salient and thereby increasing ambivalence about DE (Miller & Rollnick, 2013).

As expected, body size does not directly affect OWS, consistent with prior literature (e.g., Geller et al., 1997; Masheb & Grilo, 2003; Wilfley et al., 2000). However, the present study finds DE symptoms more powerfully influence women's self-evaluations in the context of higher BMI. It will be important to examine BMI and DE symptoms in concert when investigating self-evaluations and body image concerns.

4.2. Depression

Unexpectedly, depressed women undervalued being a good person and relationships with family and friends, despite prior work suggesting that depressed individuals' self-esteem may be more contingent upon academic achievement, romantic relationships, social approval, or friendships (e.g., Cambron et al., 2008; Crocker, Karpinski, Quinn, & Chase, 2003). Depressed women judged facial attractiveness to be more important to self-evaluations across all assessments except the SAWBS. In addition, constraining measures demonstrate that shape, weight, and (on the forced-choice task) appearing put together exert a greater influence on depressed women's self-evaluation. In short, depressed women seem to value their outward appearance to a greater extent, a finding which broadly conforms with the increased self-focused attention associated with depression (Mor & Winquist, 2002).

4.3. Measurement considerations

The method used to assess SEIs affects the results that emerge. As expected, the constraining measures force greater systematic variability in the differential value placed on the 11 SEIs (e.g., repeated-measures attribute factor $\eta^2 \geq 0.605$ for each of the three constraining measures; $\eta^2 = 0.492$ for Likert-scale measure). Also as expected, DE-symptomatic participants both over- and undervalued some SEIs only on constraining measures.

As on other constraining measures, the SEIs were more variably endorsed on the SAWBS than the Likert scales. OWS by DE-symptomatic participants was evident, but the underevaluation of other SEIs was not reliably observed. This may reflect our limited power to detect smaller-magnitude effects, as only a subset of our sample completed the SAWBS. The rank-ordering and forced-choice tasks extend the SAWBS's constraining approach by permitting respondents to place differential value on shape and weight. All three non-SAWBS methods highlight the utility of distinguishing shape and weight, as shape was on average more important to respondents' self-evaluation.

5. Conclusion

Overall, our findings suggest that OWS among DE-symptomatic women comes at a cost. The choices participants make when completing constraining measures likely reflect the choices they make about how to spend their finite time in pursuit of more positive self-evaluation. Future work should continue to examine both over- and underevaluation of body-relevant and -irrelevant SEIs, using more ecologically valid constraining measures (e.g., rank-ordering, pairwise forced-choice).

Moreover, constraining measures may augment case conceptualization and treatment planning, and enhance patients' motivation to reduce the priority of body-relevant SEIs.

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Contributors

Authors MTR, SSW, and TAT designed the study. Author MTR collected the data. Authors TAT and HEW planned and conducted the statistical analysis. Author HEW conducted literature searches and wrote the first draft of the manuscript. All authors have contributed to and approved the final manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest.

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