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The Role of Interoceptive Awareness in an Eating Disorders Prevention Program

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The Role of Interoceptive Awareness in an Eating Disorders Prevention Program

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An abstract of
a thesis submitted to the Faculty of the
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Abstract

The Role of Interoceptive Awareness in an Eating Disorders Prevention Program
By Amanda Joelle Brown

Interoceptive awareness (IA), defined as sensitivity to stimuli originating within the body, is a construct that has been implicated in the development and maintenance of disordered eating behaviors. IA encompasses recognition and accurate identification of both appetite signals and emotional cues, but no study to date has examined the individual contributions of these two aspects of IA. The purpose of the current study is to evaluate appetite awareness (AA) and emotional awareness (EA) as potential mediators of outcome in the Support for Healthy Eating and Exercise program (SHEE; Smith, 2007), a five-week intervention for at-risk college women. SHEE was designed to teach women to use internal appetite signals to guide eating as a way to decrease disordered eating behaviors and prevent weight gain. Following the model proposed by Baron and Kenny (Baron & Kenny, 1986), a series of regression analyses was carried out to test the mediator effects of AA and EA. Results indicated that AA fully mediated improvements in binge eating symptoms as well as eating- and weight-control self-efficacy, whereas EA did not. These results support the utility of directly targeting AA in a brief eating disorders prevention program.

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Background and Significance

Disordered eating is prevalent among American undergraduates; in a recent study (Keel, Heatherton, Dorer, Joiner, & Zalta, 2006), nearly 15% of college-aged women endorsed binge eating, 11.1% admitted that they attempt to control their weight by fasting, and 4.3% reported that they rely on some method of purging for weight control. Results from the 1995 National College Health Risk Behavior Survey (Douglas et al., 1997) indicated that 30.8% of undergraduates had dieted in the thirty days prior to the survey, 2.6% had vomited or used laxatives, and 4.3% had taken diet pills. Furthermore, the majority of American college women are dissatisfied with their bodies, and as many as 81% of them endorse a desire to lose weight (Aruguete, Yates, & Edman, 2006; Cooley & Toray, 2001; Vohs, Heatherton, & Herrin, 2001). While these alarmingly high rates of body image disturbance and eating pathology are certainly troubling on their own, an added concern is that body dissatisfaction, dietary restraint, and a history of dieting increase the risk for developing a diagnosable eating disorder (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004; Stice, 2002).

Given the high rate of disordered eating behaviors and attitudes among American college students, the development of effective interventions to prevent the onset of eating disorders by reducing pre-existing risk factors is a high priority. Stice and colleagues have recently made significant contributions to the field of eating disorders prevention research with the development of two effective prevention programs, a cognitive dissonance-based program and a nutrition-focused healthy weight program (Stice, Chase, Stormer, & Appel, 2001; Stice, Presnell, Gau, & Shaw, 2007; Stice, Shaw,

Burton, & Wade, 2006; Stice, Trost, & Chase, 2003). Participation in these interventions has been associated with decreases in thin-ideal internalization, negative affect, and bulimic symptoms relative to a waitlist control condition (Stice et al., 2003) and an expressive writing condition (Stice et al., 2006). However, much remains to be learned about the mechanisms by which these and other successful interventions effect change (Fingeret, Warren, Cepeda-Benito, & Gleaves, 2006; Stice & Shaw, 2004).

In order to address this question, investigators have become increasingly interested in understanding the role of mediating variables (Baron & Kenny, 1986) in eating disorders prevention and treatment research (Bearman, Stice, & Chase, 2003; Kraemer, Wilson, Fairburn, & Agras, 2002; Stice, Marti, Shaw, & O'Neil, 2008; Stice, Presnell et al., 2007; Stice & Shaw, 2004; Stice, Shaw, & Marti, 2007). If statistical mediation is found, it indicates that the effect of the dependent variable (e.g. treatment group) on the independent variable (e.g. outcome) can be accounted for by the impact of the mediator.

To date, only two published studies have investigated the role of mediating variables in eating disorders prevention research. Bearman et al. (2003) reported that changes in body dissatisfaction partially mediated the effects of a body acceptance prevention program, as these changes were associated with decreases in bulimic and depressive symptoms. Stice and colleagues (2007) found that thin-ideal internalization partially mediated the effects of a cognitive dissonance eating disorder prevention program on body dissatisfaction, negative affect, bulimic symptoms, and dieting. The current study aims to augment this growing body of literature by examining two

potential mediators of a recently developed eating disorders prevention program, Support for Healthy Eating and Exercise (SHEE; Smith, 2007).

The SHEE intervention was designed to prevent or halt the development of eating disorder symptoms in college women who felt at risk for weight gain (Smith, 2007). The program consisted of five weekly group sessions designed to teach the principles of Appetite Awareness Training (AAT; Craighead, 2006)). Participants learned appetite monitoring techniques that helped them reconnect with their internal hunger and satiety signals, which were used, in turn, as the basis for making healthy eating decisions. Additional elements of the intervention were designed to promote moderate physical activity and to increase peer social support for healthy eating and weight control behaviors.

AAT is based on the premise that chronic overeating, often coupled with periods of severe restriction, may blunt internal appetitive signals that would normally help a person make adaptive decisions about when to eat and when to stop eating. Eating disorders and/or weight gain may result when this disconnection from hunger and fullness sensations becomes so profound that eating decisions become primarily based on external cues such as taste or food availability, on emotional cues such as anger or loneliness, or on dieting rules. AAT has been successfully used to treat clients with binge eating disorder (Allen & Craighead, 1999; Craighead, Elder, Niemeier, & Pung, 2002) and bulimia nervosa (Dicker & Craighead, 2004).

The SHEE program was the first effort to evaluate the effectiveness of AAT as part of a brief group prevention intervention. In post-treatment assessments, SHEE

participants reported higher levels of self-efficacy surrounding weight and eating; reduced behaviors, thoughts, and feelings associated with binge eating; and improved attitudes about eating and weight compared with a waitlist control group (Smith, 2007). Furthermore, and important to the current investigation, the intervention group reported significant improvement on a measure of interoceptive awareness (IA), the central construct underlying the AAT techniques used to address eating pathology in the SHEE intervention.

The concept of IA in the context of disordered eating behaviors has historically encompassed the recognition and accurate identification of both internal hunger and satiety signals and emotional states, and it also relates to the tendency of people with eating concerns to confuse bodily sensations with emotions. One of the most widely used global eating pathology self-report scales, the Eating Disorder Inventory (EDI; Garner, Olmsted, & Polivy, 1983) contains an IA subscale that assesses both awareness of appetite sensations (e.g. “I get confused as to whether or not I am hungry”) and awareness of emotions (e.g. "When I am upset, I don't know if I am sad, frightened, or angry").

A substantial body of research suggests that IA is dysfunctional in people with significant eating pathology ranging from severe restriction to uncontrollable overeating (Engler, Crowther, Dalton, & Sanftner, 2006; Franko & Omori, 1999; Garner, Olmsted, Polivy, & Garfinkel, 1984; Heilbrun & Worobow, 1991; Peck & Lightsey, 2008). The combined results of these investigations indicate that there is an association between eating disorder symptoms and a diminished ability to recognize and accurately

distinguish between appetite signals and emotional cues. Deficiencies in IA have also been identified as a risk factor for the development of eating disorders (Jacobi et al., 2004; Killen et al., 1996; Leon, Fulkerson, Perry, & Cudeck, 1993; Leon, Fulkerson, Perry, & Early-Zald, 1995).

To date, the distinct influences of the two components of IA, appetite awareness (AA) and emotional awareness (EA), on eating pathology have not been extensively explored, but the results of a few relevant studies are quite provocative (e.g. Heatherton, Polivy, & Herman, 1989; Heilbrun & Worobow, 1991; Herman & Polivy, 1984; Lowe, 1993). Heatherton and colleagues (1989) found that restrained eaters ate less when given a pill described as "fullness-inducing" and more when told that the pill induced hunger, whereas unrestrained eaters ate similar amounts in each condition. This study supports the hypothesis that dietary restraint is associated with decreased attention to internal signals and overreliance on external cues to determine how much to eat. Additionally, clinical research has identified disruptions in appetite among women with bulimia nervosa (Kissileff et al., 1996) and binge eating disorder (Sysko, Devlin, Walsh, Zimmerli, & Kissileff, 2007), which supports the notion that chronic overeating might blunt appetite signals. Deficits in EA, the ability to experience and express emotions and to discriminate between emotional states and bodily sensations, also appear across the diagnostic spectrum of eating disorders (Cochrane, Brewerton, Wilson, & Hodges, 1993; Corcos et al., 2000; de Zwaan et al., 1995; Jimerson, Wolfe, Franko, Covino, & Sifneos, 1994; Schmidt, Jiwany, & Treasure, 1993). Together, the results of these studies suggest that AA and EA may play somewhat

separate but equally important roles in the development and maintenance of disordered eating behaviors ranging from caloric restriction to chronic overeating.

In the current study, AA and EA were separately evaluated as potential mediators of the effects of the SHEE prevention program on the main outcomes reported by Smith (2007). No study to date has specifically examined the potential mediating role of AA and EA in an eating disorders prevention trial. Since the primary focus of the SHEE intervention was to improve awareness of appetite sensations, we hypothesized that AA would mediate the observed improvements in binge eating, dietary restraint, and self-efficacy surrounding eating and weight control. As a secondary aim of the intervention was to help participants distinguish appetite sensations from emotional feelings, identify emotional triggers for eating, describe emotional reactions to eating, and reduce eating for emotional reasons, we also hypothesized that EA would mediate the effects of SHEE, though perhaps to a lesser degree than AA due to the greater focus on increasing AA in the SHEE intervention.

Research Design and Method

The data used in this investigation were collected from a larger parent study (N = 90) designed to evaluate the SHEE program, a five-week intervention designed to prevent eating disorders and weight gain in a population of university women (Smith, 2007). The participants, procedures, and methods applicable to the current study are described below.

Participants

Participants included 90 female undergraduate and graduate students at a large public university who volunteered to participate in the SHEE program evaluation study after learning about it through email announcements and fliers posted on campus. Participants were screened for eligibility via email, and potentially eligible individuals were scheduled for a pre-intervention assessment. Inclusion criteria for the study were: female, between 18 and 30 years of age, self-identified as at-risk for weight gain, physically capable of engaging in moderate physical activity, amenable to random assignment, and able to access email. Interested individuals who were pregnant or planning to become pregnant were excluded from participation.

Procedure

Interested and eligible participants attended a 1.5 hour pre-intervention assessment session, during which they signed informed consent, completed self-report questionnaires (see Measures below for detailed descriptions of relevant questionnaires) and the Eating Disorders module of the Structured Clinical Interview for DSM-IV, and allowed themselves to be measured and weighed by an investigator.

Participants' weights were not reported to them in order to decrease the risk of upsetting those participants who were sensitive about their weight. At the end of the initial assessment, participants were randomly assigned to either the experimental (Treatment) or waitlist control (Waitlist) condition. Members of the control group were told that they would be re-contacted after a few weeks and excused. Participants in the experimental condition remained in the clinic to discuss scheduling and other logistical aspects of the intervention.

Participants in the experimental group then attended five weekly SHEE group sessions, each lasting 1.5 hours. The goals of the intervention were to encourage healthy eating, increase physical activity, and bolster social support for healthy behaviors. The cornerstone of the intervention was the self-monitoring of hunger and fullness sensations (Craighead, 2006), which began in the first week. Participants also rated the degree to which they felt positively or negatively after each eating episode as a way to help them distinguish between appetite sensations and emotions. Week four of the intervention was devoted to identifying specific emotions triggering urges to eat and developing alternate ways to handle those emotions. Ways to develop peer social support for healthy eating and moderate exercise were also discussed, and participants were encouraged to meet together outside of the group meetings to offer each other support and encouragement.

At the end of the five-week intervention period, participants in both the experimental and control conditions returned to the clinic to complete the post-intervention assessment measures.

Measures

Interoceptive awareness. The Interoceptive Awareness Questionnaire – Expanded (IAQ-E; Trenary, Craighead, & Hill, 2005) was completed at baseline and post-test. The IAQ-E is a 15-item self-report measure used to assess attentiveness to internal sensations on three subscales: Appetite (7 items), Emotion (5 items), and Restriction (3 items). These subscales were determined by exploratory and confirmatory factor analyses (Trenary et al., 2005). Scores on the Appetite and Emotion subscales of the IAQ-E were used in the current investigation to assess AA and EA, respectively.

The IAQ-E is an expanded version of the IA subscale of the Eating Disorders Inventory-2 (EDI-2; Garner, 1991), which serves as a general index of awareness of internal sensations, both physiological and emotional. Because the IA subscale of the EDI-2 contained only two items specifically addressing awareness of internal hunger and fullness signals, additional items were added to form the IAQ-E. The frequency with which a given cognition (e.g. "I get confused about what emotion I'm feeling") or behavior (e.g. "I continue to eat after I feel full") was experienced in the past month is rated on a Likert scale ranging from 1 ("never") to 6 ("always"). Total scores range from 15-90, with higher scores indicating poorer IA. The internal consistency of the measure is high (coefficient alpha = .90), and it has shown adequate discriminant and convergent validity (Trenary et al., 2005).

Binge eating. The Binge Eating Scale (BES; Gormally, Black, Daston, & Rardin, 1982) was administered at baseline and post-test to assess behavioral, emotional, and cognitive dimensions of binge eating. The BES is a 16-item self-report measure with

scores ranging from 0-46. Scores $\geq$ 27 typically indicate severe binge eating, while scores $\leq$ 17 indicate mild or no binge eating (Greeno, Marcus, & Wing, 1995). The BES has a good test-retest reliability (r=.87; Timmerman, 1999) and high internal consistency (coefficient alpha = .85; Gormally et al., 1982).

Weight- and eating-control self-efficacy. The Weight Efficacy Life-Style Questionnaire (WEL; Clark, Abrams, Niaura, Eaton, & Rossi, 1991) was used to assess feelings of self-efficacy surrounding control over eating and weight at baseline and post-test. The WEL is divided into five subscales, each of which assesses confidence in ability to resist eating in a particular situation (Negative Emotions, Availability, Social Pressure, Physical Discomfort, and Positive Activities). Each of the 20 items is rated on a 10-point scale, ranging from 0 (not confident) to 9 (very confident). Higher scores on the WEL reflect greater subjective self-efficacy. Internal consistency of the five subscales ranges from .70 to .90, and scores have been shown to change as a result of obesity treatment (Clark et al., 1991).

Eating disorder cognitions. The Mizes Anorectic Cognitions Scale (MAC; Mizes & Klesges, 1989) is a 33-item self-report measure designed to assess cognitions typically associated with anorexia and bulimia nervosa, particularly those related to dietary restraint and adherence to rigid food rules. An example of a typical item is, "I am proud of myself when I control my urge to eat." Each item is rated on a five-point Likert scale (Strongly Disagree, Disagree, Neither Agree Nor Disagree, Agree, and Strongly Agree). Total scores range from 33 to 165, with higher scores reflecting more pathological cognitions. The measure has three subscales: Weight Regulation, Approval, and Self-

Control. The MAC has been shown to correlate with the severity of eating disorder symptomatology, and is sensitive to subclinical differences in eating-related pathology (Mizes, 1990). In addition, it has adequate internal reliability (coefficient alpha ranging from .76 – .91), test-retest reliability (.78), criterion validity, and convergent and discriminant validity (Mizes, 1991). Participants completed the MAC at baseline and post-test.

Statistical Analyses

Baron and Kenny's (1986) procedure for testing mediator effects was used to examine whether AA and EA as measured by the IAQ-E appetite and emotion subscales, respectively, mediated the outcome of SHEE intervention participants compared with the Waitlist control group. In this procedure, a series of regression analyses are used to determine the extent to which change in the potential mediator variable accounts for the relation between the independent variable and other dependent variables. Each regression analysis must meet four sequential criteria for mediation (Baron & Kenny, 1986): the independent variable must significantly affect both the mediator and the outcome variable, the mediator must significantly affect the outcome variable, and the effect of the independent variable on a given outcome variable must be attenuated or non-existent when controlling for the mediator. The Sobel test (Sobel, 1982) was conducted to test the significance of the mediator's impact on the relationship between the independent and dependent variable. An alpha level of p=.05 was used to determine statistical significance for all analyses.

Results

Descriptive Statistics

Ninety women completed the pretreatment assessment. The age of participants ranged from 18-29, with a mean age of 20.09 (SD = 2.44). The sample was 89% Caucasian, 3% Asian, and 8% multi-racial. In addition, 9% of the women identified themselves as Hispanic. The sample was comprised of 41% freshmen, 14% sophomores, 16% juniors, 18% seniors, and 11% graduate students. BMI estimates ranged from 18.1 to 44.1, with a sample mean of 25.0 (SD = 4.3). There were no significant differences between the groups on age, race, ethnicity, year in school, or BMI. Of the 90 women enrolled in the study, 68 completed both baseline and end-of-study assessments. Thirteen women in the intervention group and nine in the control group dropped out of the study prematurely. Only data from the 68 completers were included in the subsequent analyses, as the purpose was to evaluate mediation of treatment effects.

Mediator Analyses

The stepwise series of regression analyses recommended by Baron and Kenny (1986) were carried out to test the mediating role of AA and EA in effecting outcome on the BES, MAC, and WEL. Table 1 depicts the outcome of this series of statistical tests. To test the first criterion for mediation, that the independent variable affects the mediator, post-treatment AA and EA were separately regressed on group (Treatment or Waitlist). When controlling for baseline scores, post-treatment AA was significantly related to group assignment, but EA was not. Because group assignment did not significantly affect

EA, EA cannot be considered a mediator. Therefore, all subsequent steps in the Baron and Kenny (1986) procedure consider only AA.

To test the second criterion for mediation, that the independent variable affects the dependent variable, post-treatment BES, MAC, and WEL scores were regressed on group assignment. Pre-treatment scores on the outcome measure in question were entered into the first block of the regression equation to control for baseline values on each of the measures. All three outcome measures were significantly related to group membership (all $p<.05$). This finding corroborates Smith's (2007) report that post-treatment BES, MAC, and WEL scores were significantly different between the Treatment and Waitlist control groups.

The third criterion for mediation is that the mediator affects the dependent variable. To test this criterion, post-treatment BES, MAC, and WEL scores were each regressed on post-treatment AA scores. Baseline scores on both the IAQ-E appetite subscale and the outcome measure in question were entered as covariates. Results of Step 3 analyses indicated that AA significantly affected change in binge eating-related symptoms (BES scores) and eating self-efficacy (WEL scores), but did not relate to change in eating disorder cognitions (MAC scores).

In order to be considered a mediating variable according to Baron and Kenny's (1986) criteria, the effect of the independent variable on the dependent variable must be significantly less when controlling for the mediator than when the mediator is not controlled. To test this final criterion, post-treatment BES and WEL scores were regressed on group assignment, as in Step 2. Again, baseline scores on the outcome

measure were entered into block 1 of the regression equation, but in Step 4 the mediator, post-treatment AA score, is also entered into block 1 to control for its influence on the group – outcome relationship. The Sobel test was performed (http://www.people.ku.edu/~preacher/sobel/sobel.htm) to test the strength of the mediator. The results indicated that AA mediated both the relationship between group assignment and post-treatment binge eating symptomatology (BES scores; Sobel test statistic = -3.11, $p<.05$) and the relationship between group and eating- and weight-control self-efficacy (WEL scores; Sobel test statistic = 3.06, $p<.05$).

Discussion

This study was the first effort to investigate potential mechanisms of change through which a brief eating disorders prevention program lowered participants' risk status relative to a Waitlist control group on the dimensions of binge eating, eating- and weight-control self-efficacy, and dietary restraint. It was also the first study to investigate the role of awareness of appetite sensations separately from awareness of internal emotional feelings in relation to eating disorder symptomatology. Long considered a unitary construct, the appetite and emotion aspects of IA appear to have independent spheres of influence, as indicated by the fact that they had different effects on outcome in the SHEE intervention.

Results of the current study indicate that improvements in AA significantly accounted for the changes in attitudes and behaviors related to binge eating (as assessed by the BES) and eating-related self-efficacy (assessed by the WEL) that were reported by the participants in Smith's (2007) SHEE eating disorders prevention program. Although significant pre-to-post-intervention change was also observed on a measure tapping belief in and adherence to rigid food rules (MAC), AA did not mediate this change. Because the key construct tapped by the MAC is characterized by dichotomous thinking (e.g. "good foods" versus "bad foods"), the cognitive restructuring techniques introduced in the SHEE intervention, not increases in AA, likely affected improvements in this area. Notably, on the EA scale, participants in the SHEE intervention did not show significant improvement relative to the control condition, so EA could not be evaluated as a potential mediator in this study. These results offer substantial support for the conclusion that the principal mechanism of change within the SHEE program is improved AA. These data also demonstrate that improvement in one area of IA (that measured by the AA subscale) can lead to substantial global change in eating pathology even in the absence of improvement in the other area (EA).

There are a number of plausible explanations for why improvements in AA but not EA accounted for SHEE's effects on participants' binge eating attitudes and behaviors and self-efficacy concerning eating and weight. From day one, the SHEE program focused on teaching participants to be aware of internal appetite cues. While training in the discrimination between appetite cues and other feelings was introduced early on (e.g. participants were initially instructed to rate their feelings as positive, neutral or negative after each eating episode), the identification of specific emotions that trigger urges to eat when not hungry and the development of alternative behaviors to respond more effectively to emotional cues to eat were not addressed until the fourth week of the program. Therefore, less time was allotted to discussion of those issues, and participants had fewer days in which to practice the EA techniques before the post-intervention assessment point. A greater focus on EA earlier in the intervention might have led to significant improvement in EA, as was found with AA.

Another possible explanation for the disparate effects of AA and EA on outcome in the SHEE intervention is that it might be easier or require less time to increase awareness of hunger and fullness than to improve differentiation among emotional signals. Hunger and fullness are two specific sensations that exist along the same continuum; anger, sadness, euphoria, boredom, frustration, and all other emotions not only exist on separate continua, but also interact with each other, change frequently and sometimes rapidly, and are largely dependent on situational factors. While the brief SHEE intervention was successful in improving recognition of appetite sensations, it may not have provided enough time to allow individuals to fully explore their "emotional landscape" and begin to better identify and respond differentially to their emotions and to their appetite signals.

Limitations

One limitation of the current study's design is that it relied on a Waitlist group to serve as the control condition for five weeks of active participation in the SHEE intervention. Because the Waitlist group only completed pre- and post-intervention assessments, it is not considered an active control condition. Thus it is possible that the improvements on measures of eating pathology that differentiated the SHEE participants from the Waitlist control group could be accounted for by nonspecific elements of program participation, such as investment in treatment, a sense of obligation towards study personnel, or feeling somehow "privileged" by being randomized to the Treatment condition. However, the fact that improvements were not observed on every construct, including a specific measure of exercise and a broad measure tapping social support (something that might be expected to change simply on account of being a part of an intervention group), suggests that the observed improvements were influenced by specific aspects of the SHEE intervention. Furthermore, the significant support for AA, but not EA, as a mediating variable suggests that the components of the program that specifically addressed AA likely had the most significant impact on the SHEE participants.

Another limitation concerns the IAQ-E measure itself. While the IAQ-E is based on a subscale of one of the most widely used and well-validated measures in eating disorders research, it is a recently developed measure with only preliminary validation. In addition, the IAQ-E subscales used to assess AA and EA consisted of only seven and five items, respectively. Thus, the failure to find significant results for the EA must be considered in this context, and a more robust index of EA may need to be developed to test EA adequately. Given the strong indication from the results of this study that AA and EA are distinct constructs, the field of eating disorders research could greatly benefit from further study of these constructs.

Conclusions and Future Directions

The two main conclusions that can be reached from the present study are that AA and EA are distinct aspects of IA that can be measured and manipulated independently, and that appetite awareness, but not emotional awareness, was shown to mediate important treatment outcomes among participants in Smith's (2007) SHEE intervention. These results have broad implications both for the way IA is understood theoretically and for the conceptualization and development of prevention or treatment programs that would specifically target one or both of these constructs. While the SHEE intervention successfully improved participants' ability to accurately identify and respond to internal hunger and fullness signals, there was not significant improvement in participants' ability to distinguish among emotions. This lack of improvement in EA may have negatively affected the outcome of some participants, for whom EA rather than AA was at the heart of their issues with eating and weight.

It cannot be known from this investigation whether AA is simply the more powerful component of IA and should consistently be prioritized in prevention or treatment programs, or if EA may be equally as or even more important than AA in lowering eating disorder symptoms. If the latter were the case, interventions that attend more to EA might prove to be even more effective than programs like SHEE that specifically target AA. In order to answer this question, future research could examine the potential mediating roles of AA and EA in an intervention that follows the same structure as the SHEE program but focuses on identifying and labeling emotions as well as appetite sensations from day one. In such an intervention, EA might also prove to be a significant mediator. This possibility does not, however, undermine the importance of the present results, which suggest that AA may be a particularly effective and efficient first target for eating disorders prevention programs.

Clinical observation suggests that some individuals' eating concerns result largely from disconnection from hunger and satiety signals, likely due to long periods of restriction and/or

overeating in the past, while other individuals' symptoms seem more strongly related to problems with emotion disregulation. Thus, prevention interventions that address both aspects of IA may ultimately be the most effective for the broadest range of individuals. Addressing difficulties with EA may also be more critical in treating clinically significant eating concerns than as a target in early intervention and prevention programs. The results of the current investigation clearly suggest that AA plays an important mediating role in an appetite-focused eating disorders prevention program designed for college-aged women with subthreshold eating concerns. Developers of future eating disorders prevention programs should strongly consider incorporating an AA focus in their interventions.

Appendix

Table 1: Mediator analysis outcomes

Step 1: Independent variable affects the mediator					
IV: Group	**R^2 Change**	**F Change**	**P value**	**β**	**Meets criteria?**
AA	.088	11.572	.001	-.306	Yes
EA	.001	.110	.742	-.031	No; stop here
Step 2: Independent variable affects the dependent variable					
IV: Group	**R^2 Change**	**F Change**	**P value**	**β**	**Meets criteria?**
BES	.087	11.977	.001	-.312	Yes
MAC	.057	8.959	.004	-.241	Yes
WEL	.148	20.860	.000	.403	Yes
Step 3: Mediator affects the dependent variable					
IV: AA	**R^2 Change**	**F Change**	**P value**	**β**	**Meets criteria?**
BES	.263	57.906	.000	.681	Yes
MAC	.017	2.338	.131	-.170	No; stop here
WEL	.262	48.302	.000	-.673	Yes
Step 4: IV affects the DV to a lesser degree when the mediator is controlled than when it is not					
IV: Group	**R^2 Change**	**F Change**	**P value**	**β**	**Meets criteria?**
BES	.007	1.500	.225	-.097*	Yes
WEL	.038	7.793	.007	.225*	Yes

* $p<.05$ compared with Step 2 value (Sobel test).

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