



## The Development of the Pathogenic Weight-Control Behavior and Attitude Scale for Male Athletes

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### Abstract

*Due to the unique nature of male weight-controlling behaviors, it is essential to develop a measure that assesses the pathogenic weight-controlling behaviors of male athletes, in order to prevent physical and psychological impairment. The purpose of the current study was to create a psychometrically reliable and valid measure to assess pathogenic weight-control behaviors and attitudes in the male athlete population. The Pathogenic Weight Control Behavior and Attitude Scale (WCBAS) was developed and administered to undergraduate male students ( $N = 50$ ). The study examined convergent, divergent, and concurrent validity in addition to group differences. Results indicated that the WCBAS produced high reliability and validity. The WCBAS had a significant positive correlation with the Questionnaire for Eating Disorder Diagnosis ( $r = .51, p < .001$ ), providing convergent validity, and no correlation with the Flight Anxiety Modality Questionnaire ( $r = .08, p = .57$ ), showing divergent validity. Furthermore, the WCBAS provided evidence that males who were more dissatisfied with their bodies engaged in more pathogenic weight-control behaviors and attitudes ( $M = 3.17, SD = .55$ ) compared to males who were less dissatisfied with their bodies [ $M = 2.50, SD = .53; t(34) = -3.67, p < .001$ ]. Results failed to support concurrent validity in relation to quality of life ( $r = -.06, p = .70$ ). The high reliability, significant construct validity, and significant group differences show that the WCBAS has promise. Recommendations for future scale development are discussed.*

*Keywords:* eating disorders, male athletes, exercise, eating, substance use

Male athletes face numerous pressures in their sport environments to achieve optimal performance by controlling their weight and body composition through diet and exercise, and all sports, regardless of category, normalize disordered eating behaviors (Eichstadt et al., 2020; Petrie et al., 2008). Aesthetic, endurance, and weight-based sports focus on distinct bodily characteristics, such as leanness for speed, muscularity for force, or a combination of leanness and tone for visual appeal, therefore reinforcing various forms of weight-controlling behaviors (Eichstadt et al., 2020; Gorrell et al., 2021). Factors including sport weight criteria, team weigh-ins, performance demands, judging criteria, and peer pressure contribute to increased body dissatisfaction, eating disorders, and unhealthy weight-controlling behaviors in the male-athlete population (Galli et al., 2014; Petrie and Greenleaf et al., 2008).

In addition to the standards within sport environments, male athletes also face society's standards of the male body which emphasize leanness and muscularity (Forrest et al., 2019; Murray, 2020). In fact, studies show that 60 to 80% of college-aged males report weight dissatisfaction which is related to greater levels of psychological distress, muscle dysmorphia, and disordered eating (Dakanalis et al., 2015; Griffiths et al., 2016; Klimek et al., 2018; Petrie and Greenleaf et al., 2008). Many men report feeling "too small" and "not muscular enough" and turn to weight-controlling behaviors such as excessive exercise, diets, and supplements to manipulate their bodies (Murray, 2020; Raudenbush and Meyer, 2003).

The amalgamation of sport and societal pressures encourages male athletes to engage in excessive weight-controlling behaviors which can be detrimental to their mental and physical health. Past research suggests that inadequate caloric intake and low energy availability increase the risk for what has been called the "athlete triad," and lead to decreased performance and impaired cardiovascular, endocrine, reproductive, gastrointestinal, renal, and central nervous system health (Mountjoy et al., 2014; Nattiv et al., 2007). According to Nattiv et al. (2021), the male athlete triad is defined as "the combination of energy deficiency/low energy availability with or without disordered eating/eating disorders, functional hypogonadotropic hypogonadism, and osteoporosis or low bone mineral density." In addition, the male drive to achieve the ideal physique has been associated with higher levels of depression compared to control groups (Petrie and Greenleaf et al., 2008). Therefore, while many male athletes do not meet the criteria for formal eating disorder diagnoses, it is important for coaches and other related personnel to be able to assess their athletes' weight-controlling and shape-controlling behaviors on a spectrum to evaluate their physical and psychological well-being (Petrie and Greenleaf et al., 2008).

The eating disorder behaviors and attitudes among the male athlete population differ from those of female athletes. The male population's drive for muscularity is a driving factor for behaviors that differ from those of females; for example, in using methods to gain mass rather than lose. Male athletes often do

not meet the criteria for the current conceptualization of eating disorders (Petrie and Greenleaf et al., 2008). However, they exhibit symptoms such as obsessive exercising with an emphasis on body building, body dissatisfaction regarding not being large or muscular enough, and substance use to change their bodies (Galli et al., 2015). These behaviors represent health risks yet do not fit into diagnostic categories. Due to the unique nature of male weight-controlling behaviors, it is essential to develop a measure that assesses the pathogenic weight-controlling behaviors of male athletes in order to prevent their physical and psychological impairment.

Many existing eating disorder measures have been validated among the general population and select athlete populations, including the Eating Disorder Inventory (EDI; Garner et al., 1983); the Bulimia Test-Revised (BULIT-R; Thelen et al., 1991); the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994); the Questionnaire for Eating Disorder Diagnosis (QEDD; Mintz et al., 1997); the Brief Eating Disorders in Athletes Questionnaire (AQ; Martinsen et al., 2014); the Eating Disorders Screen for Athletes (ESDA; Hazzard et al., 2020); and the Eating Disorder Assessment for Men (EDAM; Stanford & Lemberg, 2012). However, no measure has been developed to assess the specific pathogenic weight-controlling behaviors and shape-controlling behaviors, such as the desire to gain muscle mass, of male athletes (Petrie and Greenleaf et al., 2008). In addition, most existing measures have been validated in non-athlete populations with samples of women, and only select studies have found validity evidence for the EAT, EDI, BULIT-R, Q-EDD, and EDE-Q in the athlete population (Pope et al., 2015). Existing measures do not address the specific forms of exercise in which the athletes engaged (focusing instead simply on the amount of time the athletes spent exercising to control their weight), the motivation for exercising (i.e., weight loss vs. muscularity), or their use of other health risk behaviors such as nutritional supplements or steroids (DeFeciani, 2016; Eichstadt et al., 2020; Galli et al., 2015).

Therefore, the main purpose of this study was to develop a psychometrically reliable and valid questionnaire to assess the pathogenic weight- and shape-controlling behaviors and attitudes of male athletes to prevent physical and psychological harm. To be precise, this study addressed male-specific behaviors and attitudes related to unhealthy and obsessive eating, exercise, and weight-related substance use. This measure can be beneficial for coaches, trainers, athletic dietitians, and sport psychologists, enabling them to assess the physical and mental health of their players.

This study tested five hypotheses. First, with respect to concurrent validity, it was anticipated that the scores of the Pathogenic Weight Control Behavior and Attitude Scale (WCBAS) would negatively correlate with males' quality of life. Second, regarding convergent validity, it was predicted that there would be a positive correlation between WCBAS scores and the Questionnaire for Eating Disorder Diagnosis (Mintz et al., 1997). Third, with

respect to divergent validity, it was hypothesized that WCBAS scores would not significantly correlate to flight anxiety. Fourth, it was predicted that males with high body dissatisfaction would have higher scores on the WCBAS compared to males with low body dissatisfaction. Lastly, it was anticipated that male athletes would score higher on the current measure compared to male non-athletes.

## Method

### Participants

The participants were 50 males from a small, Christian liberal arts college in the Midwest United States. Participants were between 18 and 22 years old ( $M= 20$ ;  $SD= 1.16$ ) and the majority identified as white (86%). The following ethnicities were also represented: Latino (6%), African American (2%), and Hawaiian/Pacific Islander (2%). Of the 50 males in the sample, 40 identified as athletes who participate in intramural or organized college sports.

### Construction of the Male Weight Control Behavior and Attitude Scale

The development of the WCBAS items was theoretical. The researcher created 47 items to reflect the three key dimensions of weight-control behaviors and attitudes among male athletes: exercise, eating, and substance use. Nineteen items assessed exercise behaviors and attitudes, 17 items assessed eating behaviors and attitudes, and 11 items assessed substance use behaviors. Example items include: “I worry that my weight will change if I cannot exercise” (exercise behaviors and attitudes); “I try to avoid certain food groups to influence my weight” (eating behaviors and attitudes); and “I use anabolic steroids to promote muscle gain” (substance use behaviors).<sup>1</sup> The WCBAS items were constructed to be rated along a five-point scale (*never* [1], *rarely* [2], *sometimes* [3], *often* [4], *always* [5]). Item number 20 states: “I have had injuries due to overexercising”; it is rated along a two-point scale (*no* [1], *yes* [2]). Forty-six items (with item number 12 unscored) can be averaged to obtain an overall score, and the subscale items (exercise, eating, and substance use) items can be averaged to obtain subscale scores. A rough draft of the scale was piloted using as reviewers undergraduates enrolled in a psychological testing course. Based on the feedback, items were reworded. Possible mean scores can range from 1.00 to 4.90. The mean score range is attenuated by item number 20, which is scored on a two-point scale. Higher scores reflect more weight-control behaviors and attitudes.

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1 See the scale in Appendix 1.

## Measures

### *Demographic Questionnaire*

Participants were asked to complete a demographic questionnaire. The questionnaire addressed each participant's age, ethnicity, athletic status, and sport.

### *Quality of Life*

Quality of life was measured using the Athlete Quality of Life Scale (AQLS; Gentner et al., 2011a). Participants rated their satisfaction in 15 areas of their lives on a scale from 1 (very dissatisfied) to 7 (very satisfied). Questions include, for example, "the amount of free/recovery time you have away from exercise" and "your own physical health." Certain items were changed or removed to apply to the entire male population. Specifically, the item, "Your role on your team," was removed. "The amount of free/recovery time you have away from your sport" was changed to "The amount of free/recovery time you have *away from exercise*." In addition, "Your relationships with your coaches" was changed to "Your relationships with your *coaches/trainers*." Lastly, "Your relationships with your teammates" was changed to "Your relationships with your *teammates/workout companions*." The option "not applicable" was also added to five items to apply to males who do not exercise. Mean total scores could range from 1.00 to 7.00, with higher scores indicating greater quality of life. The AQLS has high reliability with a Cronbach's alpha of 0.83 (Gentner et al., 2011b). For the current sample, the internal consistency reliability (Cronbach's alpha) was 0.85.

### *Body Dissatisfaction*

Body dissatisfaction was assessed using the Male Body Attitudes Scale (MBAS; Tylka et al., 2005b). Participants rated how often they feel dissatisfaction with specific areas of their bodies on a scale from 1 (never) to 7 (always). Items of the MBAS include: "I think I have too little muscle on my body," and "I think my body should be leaner." Four items are reverse scored. Scores were averaged, and could range from 1.00 to 7.00, with high scores indicating greater body dissatisfaction. Three studies report high internal consistency reliabilities for the total score (Cronbach's  $\alpha = .91$ ) and subscale scores (Cronbach's  $\alpha = .81$  to  $.94$ ) of the MBAS (Tylka et al., 2005a). In the current sample, one item was removed to improve the internal reliability ( $\alpha = .90$ ).

### *Flight Anxiety*

Flight anxiety was used to assess discriminant validity and was measured with the Flight Anxiety Modality Questionnaire (FAMQ; Van Gerwen et al., 1999a). Participants rated the intensity of what they think their reactions would be during a flight on a Likert scale from 1 (no reaction) to 4 (very intense).

reaction). Items on the scale include “I have a fear of dying,” and “I think the particular plane I am on will crash.” Mean scores range from 1.00 to 4.00 with higher scores indicating greater flight anxiety. The internal consistency and test-retest reliability have been found to be acceptable (Cronbach’s  $\alpha = .88$  to  $.97$ ,  $r = .79$  to  $.92$ ) (Van Gerwen et al., 1999b). Its internal consistency reliability was  $.96$  for the current sample.

### ***Eating Disorder Diagnosis***

The Questionnaire for Eating Disorder Diagnosis (Q-EDD) was used to assess eating disorder behaviors and attitudes (Mintz et al., 1997). The Q-EDD differentiates among individuals with eating disorders (including anorexia, bulimia, and EDNOS), individuals who are symptomatic, and individuals who are asymptomatic. The Q-EDD is still used to distinguish between clinical and non-clinical eating disorders today. The original questionnaire is 50 items. However, for the purpose of this study, specific items, including the frequency and duration items, were removed. Therefore, the total mean score had a possible range from 1.00 to 2.26, with higher scores indicating more eating disorder symptoms. The mean score range is attenuated by the averaging of two-point items and multiple-point items. Research has supported the full Q-EDD as a valid and reliable measure, with a test-retest reliability kappa value of 0.94 for both eating disorder and non-eating disorder groups (Mintz et al., 1997; Sanford-Martens et al., 2005; Tylka and Subich, 2002). For the current sample, the internal consistency reliability was  $.78$ .

### **Procedure**

Approval for the study was granted by the Wisconsin Lutheran College Institutional Review Board. All student participants were recruited through an undergraduate psychology department-sponsored research activity. Communication, psychology, neuroscience, sport and exercise, and physical education students were offered extra credit to participate. Participants were provided with a web link that directed them to the survey, which was hosted on SurveyMonkey. After clicking on the link, individuals provided informed consent that outlined information about the purpose of the study, rights of the participant, and confidentiality. Participants subsequently completed the following: a demographic questionnaire, the Pathogenic Weight-Control Behavior and Attitude Survey, the Athlete Quality of Life Questionnaire, the Male Body Attitudes Survey, the Flight Anxiety Modality Questionnaire, and the Questionnaire for Eating Disorder Diagnosis. After completing the surveys, participants were thanked for their participation and given extra credit.

## Results

### Item Analysis

Items were removed from the WCBAS if they met one or more of the following criteria: 1) ceiling or floor effects ( $M < 2.00$  or  $M > 4.00$ ); 2) little variability ( $SD < .50$ ); and 3) insufficient correlations with other items (i.e., interitem correlations of  $r < .30$ ). Ceiling effects occur when most participants have high scores, and floor effects occur when most participants have low scores. Ceiling and floor effects indicate low variability, meaning that the measure does not differentiate between high and low scorers. Following these criteria, 20 items were removed. Final alphas were .90 for the total 27-item WCBAS scale, .86 for the 13-item exercise subscale, .89 for the 10-item eating subscale, and .72 for the 4-item substance use subscale. These values support the internal consistency reliability for the WCBAS total scale and subscales.

### Convergent and Discriminant Validity

Convergent validity assessed how closely the current measure correlates to an existing, validated measure that assesses a theoretically similar construct. To assess the convergent validity of the current measure, the researcher assessed the correlation between the WCBAS and the Questionnaire for Eating Disorder Diagnosis (Q-EDD), predicting a positive correlation. Results revealed a positive correlation between the WCBAS and the Q-EDD ( $r = .51, p < .001$ ). The WCBAS exercise and eating subscales were also significantly correlated with the Q-EDD with moderate to high strength ( $r = .53, p < .001$ ;  $r = .51, p < .001$ ). No significant correlation was found between the WCBAS substance use subscale and the Q-EDD ( $r = -.14, p = .36$ ). WCBAS Table 3 shows the correlations between the WCBAS total score and subscales and the Q-EDD.

The purpose of divergent validity was to compare the current measure to one that is unrelated to the current construct. The WCBAS demonstrated evidence for discriminant validity, showing little correlation to flight anxiety. The total WCBAS score and WCBAS subscale scores had small, insignificant correlations with the Flight Anxiety Modality Questionnaire (total WCBAS correlation of  $r = .08, p = .57$ ).

### Concurrent Validity

The purpose of assessing concurrent validity was to evaluate the current measure's ability to predict quality of life outcomes. Concurrent validity was analyzed by assessing the correlation between males' weight-control behaviors and attitudes and their quality of life. No significant correlation was found between the WCBAS and the AQLS ( $r = -.06, p = .70$ ).

## Group Differences

An independent-samples t-test was conducted to compare the Weight Control Behavior and Attitude scores for men with high and low body dissatisfaction. Results revealed that males who were more dissatisfied with their bodies ( $M = 3.17, SD = .55$ ) scored significantly higher on the WCBAS than males who were less dissatisfied with their bodies [ $M = 2.50, SD = .53; t(34) = -3.67, p < .001$ ]. The eta squared statistic (0.28) indicated a large effect.

## Discussion

The goal of the current study was to develop and test the psychometric properties of a comprehensive measure of pathogenic weight-control behaviors and attitudes of the male athlete population: The Pathogenic Weight Control Behavior and Attitude Scale (WCBAS). Specific disordered behaviors and attitudes of the male population differ from those of females, in that men are often more focused on gaining mass rather than losing mass. Male athletes engage in pathogenic behaviors, yet do not meet the criteria for the current conceptualization of eating disorders (Petrie and Greenleaf et al., 2008). The WCBAS was designed to assess weight- and shape-control behaviors and attitudes across the three dimensions: exercise, eating, and substance use. While there are several measures available that target eating disorders in the general population, no measures assess pathogenic weight-control behaviors and attitudes in the male athlete population. Existing measures do not address the specific forms of exercise in which the athletes engaged, their motivation for exercising, or their use of other health risk behaviors such as nutritional supplements or steroids (DeFeciani, 2016; Eichstadt et al., 2020; Galli et al., 2015). The WCBAS was designed to address this gap in the literature by targeting specific pathogenic weight-control behaviors and attitudes in male athletes.

The results suggest that the psychometric properties of the newly developed 27 items produce reliable subscales and valid measures of pathogenic weight-control behaviors and attitudes in males. More specifically, the three WCBAS subscale scores regarding exercise, eating, and substance use had high internal consistencies. Furthermore, the strong internal consistency of all 27 items provided preliminary evidence that the subscales can be combined to form a total score that measures the extent to which one engages in pathogenic weight-control behaviors and attitudes.

The WCBAS total score evidenced high correlations with the (Q-EDD). The WCBAS eating and exercise subscales also evidenced significant correlations with the Q-EDD, but the substance use subscale was not significantly correlated. Given that the Q-EDD only assesses laxative and diuretic use, which are not frequently used in the male athlete population, it makes sense that the substance use subscale did not show a significant correlation. With respect to discriminant



validity, the WCBAS subscales and total score were not found to correlate significantly with flight anxiety. Together, the convergent and discriminant validity findings suggest that the WCBAS total score and subscales are valid measures of the construct of interest.

To demonstrate criterion validity, it was predicted that the WCBAS would negatively correlate with males' reported quality of life. However, results revealed that the WCBAS total score did not significantly correlate, meaning that more weight-control behaviors do not necessarily indicate a lower quality of life. It is possible that males can engage in weight-control behaviors and remain satisfied with their relationships, social lives, physical health, emotional health, and spiritual health. Furthermore, the line between physical activity and pathology may be more nuanced than originally thought. There are likely many men who exercise to build muscle and endurance as a healthy form of movement, which does not impact their quality of life.

The results provided evidence that the WCBAS can differentiate between males who are dissatisfied with their bodies and males who are less dissatisfied with their bodies. Males who reported high levels of body dissatisfaction also reported more weight-control behaviors and eating attitudes compared to males who reported low levels of body dissatisfaction. Furthermore, it was found that body dissatisfaction predicted disordered eating and exercise attitudes but not substance use. This finding means that pre- and post-workout supplement, stimulant, and performance enhancing drug use is not influenced by body dissatisfaction. Therefore, it is reasonable to conclude that body dissatisfaction predicts pathogenic eating and exercise behaviors and attitudes, but other factors, such as social pressure, may drive substance use behaviors.

The WCBAS shows potential for being a measure that clinicians and coaches can use to assess the behaviors and attitudes of male athletes. Coaches can implement the measure to prevent negative physical and mental health consequences and screen for disordered eating and exercise behaviors. This measure can also inform athletic trainers about the mindset of their athletes and guide the creation of workout plans. Furthermore, sport dietitians and psychologists can use this measure to inform dietary interventions and treatment plans.

The present study provided evidence that the WCBAS is a psychometrically reliable and valid measure; however, it contains limitations. Perhaps the greatest limitation to this study was the small sample size and a non-normative sample. Only 50 males participated in the study, and the vast majority identified as white. Additionally, the sample was drawn from a small religious liberal arts college, which does not adequately represent the college male population. It is possible that religion influences men's body satisfaction and weight-control behaviors.

Future research is needed to replicate the results in this study with a larger, more representative sample of the male athlete population. In addition, work is needed to determine the cutoff scores to assist coaches and clinicians in assessing disordered weight-control behaviors and attitudes. A cutoff score would indicate a need for professional help, and it would prompt further screening for eating disorders.

Furthermore, the study was limited by the lack of significant findings with respect to concurrent validity. The present study did not support the measure's concurrent validity as it related to quality of life. Therefore, further research is needed to assess the concurrent validity of the WCBAS. It is possible that, for example, GPA and measures of depression may evidence stronger correlations to weight-control behaviors. Perhaps if males spend more time and energy controlling their bodies, they will spend less time on academics. Future research needs to reassess the construct used for concurrent validity, identify a cutoff score, and test the measure with a larger, more representative population.

Pathogenic weight-control behaviors are a growing problem in the male athlete population. The cultural normalization of these behaviors and attitudes is concerning to clinicians of the disordered eating community. Therefore, a measurement that specifically targets their behaviors and attitudes is essential. This study concludes that the WCBAS evidenced potential in being a valid and reliable assessment that can help clinicians and coaches measure the health of their athletes. With further research, the WCBAS can be an instrumental tool to provide evidence of disordered patterns and allow coaches, trainers, athletic dieticians, and sport psychologists to prevent mental and physical harm.

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## Tables

Table 1

*Psychometric Properties of the Major Study Variables*

Variable	N	M	SD	$\alpha$	Range		Skew
					Potential Min–Max	Actual Min–Max	
Total WBAS	50	2.80	.611	.898	1.00–4.90	1.63–4.07	.173
Exercise	50	2.92	.684	.859	1.00–4.69	1.69–4.31	.128
Eating	50	2.91	.850	.888	1.00–5.00	1.00–4.70	-.078
Substance Use	50	2.14	.934	.715	1.00–5.00	1.00–4.75	.571
AQLS	48	5.26	.874	.846	1.00–7.00	3.21–6.71	-.252
MBAS	48	2.93	.788	.902	1.00–5.00	1.43–4.91	.376
FMLQ	47	1.79	.799	.958	1.00–4.00	1.00–3.67	.838
QEDD	46	1.49	.342	.783	1.00–2.26	1.00–2.21	.691

Table 2

*Descriptive Statistics for the Male Weight-Control Behavior and Attitude Scale*

	N	M	SD	Range	
				Minimum	Maximum
Gross 1*	42	2.98	1.220	1.00	5.00
Gross 2*	42	3.48	1.129	1.00	5.00
Gross 3*	42	3.58	1.032	1.00	5.00
Gross 4	42	3.70	.909	1.00	5.00
Gross 5*	42	2.88	1.023	1.00	5.00
Gross 6	42	2.52	.974	1.00	5.00
Gross 7	42	2.30	1.055	1.00	5.00
Gross 8*	42	2.50	1.111	1.00	5.00
Gross 9*	42	2.61	1.227	1.00	5.00
Gross 10*	42	2.82	1.207	1.00	5.00
Gross 11	42	1.84	.370	1.00	2.00
Gross 12	8	3.13	1.356	2.00	5.00
Gross 13*	42	3.36	1.206	1.00	5.00
Gross 14*	42	2.86	1.161	1.00	5.00

Gross 15*	42	2.28	1.107	1.00	5.00
Gross 16*	42	2.40	1.400	1.00	5.00
Gross 17*	42	3.62	.830	2.00	5.00
Gross 18	42	3.58	1.090	1.00	5.00
Gross 19	42	1.42	.499	1.00	2.00
Gross 20*	42	2.68	1.220	1.00	5.00
Gross 21*	42	2.58	1.180	1.00	5.00
Gross 22*	42	2.80	1.161	1.00	5.00
Gross 23*	42	3.36	1.191	1.00	5.00
Gross 24*	42	3.36	1.174	1.00	5.00
Gross 25*	42	3.38	1.141	1.00	5.00
Gross 26*	42	2.58	1.295	1.00	5.00
Gross 27*	42	2.46	1.249	1.00	5.00
Gross 28*	42	2.50	1.249	1.00	5.00
Gross 29*	42	3.24	1.170	1.00	5.00
Gross 30*	42	2.86	1.212	1.00	5.00
Gross 31	42	2.38	.987	1.00	5.00
Gross 32	42	1.06	.314	1.00	3.00
Gross 33	42	1.62	.878	1.00	4.00
Gross 34	42	2.56	1.264	1.00	5.00
Gross 35	42	1.46	.838	1.00	4.00
Gross 36	42	1.62	1.008	1.00	5.00
Gross 37	42	1.08	.340	1.00	3.00
Gross 38	42	1.04	.283	1.00	3.00
Gross 39	42	1.10	.505	1.00	4.00
Gross 40	42	1.04	.283	1.00	3.00
Gross 41	42	1.06	.314	1.00	3.00
Gross 42	42	1.08	.396	1.00	3.00
Gross 43	42	1.06	.314	1.00	3.00
Gross 44*	42	2.18	1.453	1.00	5.00
Gross 45*	42	2.18	1.410	1.00	5.00
Gross 46*	42	3.02	1.378	1.00	5.00
Gross 47*	42	1.18	.691	1.00	5.00

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Note: \* Items included in the final scale.



Table 3

*Summary of Intercorrelations, Means, and Standard Deviations for Scores on the WCBAS-EX, WCBAS-EAT, WCBAS-S, total WCBAS, AQLS, MBAS, FAMQ, and QEDD*

Measure	1	2	3	4	5	6	7	8
1. WCBAS-EX	-----	.545**	.175	.857**	.003	.471**	.046	.526**
2. WCBAS-EAT	.545**	-----	.202	.856**	-.231	.575**	.152	.505**
3. WCBAS-S	.175	.202	-----	.426**	.261	-.066	-.078	-.139
4. Total WCBAS	.857**	.856**	.426**	-----	-.057	.532**	.084	.512**
5. AQLS	.003	-.231	.261	-.057	-----	-.483**	-.338*	-.433**
6. MBAS	.471**	.575**	-.066	.532**	-.483**	-----	.188	.635**
7. FAMQ	.046	.152	-.078	.084	-.338*	.188	-----	.577**
8. QEDD	.526**	.505**	-.139	.512**	-.433**	.635**	.577**	-----

*Note.* WCBAS-EX = Weight Control Behavior and Attitude Exercise Subscale; WCBAS-EAT = Weight Control Behavior and Attitude Eating Subscale; WCBAS-S = Weight Control Behavior and Attitude Substance Use Subscale; Total WCBAS = Total Weight Control Behavior and Attitude Scale; AQLS = Athlete Quality of Life Scale; MBAS = Male Body Attitudes Scale; FAMQ = Flight Anxiety Modality Questionnaire; QEDD = Questionnaire for Eating Disorder Diagnosis.

\* $p < .05$

\*\* $p < .01$

Table 4  
*Validity Correlations with the Male Weight Control Behavior and Attitude Scale.*

Scale of Comparison	Estimated Test Relationship	Estimated Validity Correlation	Real Validity Correlation
Athlete Quality of Life Scale	Males with more weight control behaviors and attitudes will have lower qualities of life. This will demonstrate concurrent validity.	Medium to high negative correlation	-.057
Male Body Attitudes Scale	Males who have greater body dissatisfaction will have more weight control behaviors and attitudes compared to males who have low body dissatisfaction.  This will demonstrate subgroup differences.	Medium to high positive correlation	.532**
Flight Anxiety Modality Questionnaire	Little to no relationship should exist because flight anxiety should have no impact on a male's weight control behaviors and attitudes.  This will demonstrate discriminant validity.	Low to no correlation	.084
Questionnaire for Eating Disorder Diagnosis	Males who score high on the Male Weight Control Behavior and Attitude Scale will also score high on the Questionnaire for Eating Disorder Diagnosis. This will demonstrate convergent validity.	Medium to high positive correlation	.512**
Note: ** $p < .01$			

## Appendix

**Note:** Questions that were not included in the final analysis were removed from the survey instrument below.

### Informed Consent

Welcome!

This research is being conducted as a requirement for Psychological Testing under the supervision of Dr. Wendy Close. The purpose of this study is to investigate the psychometric properties of a newly developed scale that assesses weight-control behaviors and attitudes in the male population.

This study involves completing surveys which will take approximately 15–20 minutes to complete.

The results of each survey will remain anonymous and confidential, and your name and identity will not be tied to your responses.

If at any time you no longer wish to partake in this study, you may withdraw. However, the researcher cannot guarantee that you will receive the extra credit.

The results of this project will be presented at the Wisconsin Lutheran College Poster Showcase on Friday, May 13th.

If you have any questions, please contact Hannah Gross or Wendy Close

Thank you for your participation!

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### Demographics

Age:

Please specify your ethnicity.

Are you currently engaged in a sport?

If so, what sport?

If you are not engaged in a sport, do you consider yourself to be athletic?

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## The Pathogenic Weight Control Behavior and Attitude Scale for Male Athletes (WCBAS)

Please read each question carefully and select the appropriate response. The questions refer to current attitudes and behaviors that reflect the past three months.

### Likert Scale:

1) Never, 2) Rarely, 3) Sometime, 4) Often, 5) Always

### Exercise

#### *Attitudes:*

1. I worry that my weight will change if I cannot exercise.
2. I worry that my body shape will change if I cannot exercise.
3. I worry that my body composition (proportion of fat to muscle mass) will change if I cannot exercise.
5. I prioritize exercise over my social life.
8. I exercise vigorously and for long periods of time to manipulate my body weight.
9. I exercise vigorously and for long periods of time to manipulate my body shape.
10. I exercise vigorously and for long periods of time to manipulate my body composition.
13. How much extra time do you spend exercising (in addition to your normal sport practice) per week?
  - a. Not applicable/none
  - b. 1 to 2 hours
  - c. 2 to 3 hours
  - d. 3 to 4 hours
  - e. 4 or more hours
14. I exercise despite injury and/or medical complications.
15. I exercise to compensate for eating.
16. I exercise to prevent weight gain.
17. I push myself to exercise even when I don't feel like exercising.
20. I have had injuries due to overexercising.

### Dietary Habits

21. I try to avoid certain food groups to influence my weight.
22. I try to avoid certain food groups to influence my body shape.
23. I try to avoid certain food groups to influence my body composition

(proportion of fat to muscle mass).

24. I attempt to eat certain food groups to influence my weight.
25. I attempt to eat certain food groups to influence my body shape.
26. I attempt to eat certain food groups to influence my body composition.
27. I worry about losing control over my eating because of how it may affect my weight.
28. I worry about losing control over my eating because of how it may affect my body shape.
29. I worry about losing control over my eating because of how it may affect my body composition.
30. I have “cheat” meals.

### **Substance Use**

44. I consume a pre-workout supplement to promote muscle gain.
45. I consume stimulants (such as coffee, energy drinks, amphetamines, Ephedrine, Ritalin) prior to working out to increase performance.
46. I consume a post-workout protein supplement to promote muscle gain.
47. I consume other performance enhancing drugs to promote muscle gain.

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### **Athlete Quality of Life Scale (AQLS)**

The measure consists of 15 items and utilizes a seven-point rating system with the following anchor points: 1 = “very dissatisfied” to 7 = “very satisfied.”

1. Your own physical health
2. The amount of free/recovery time you have away from exercise
3. Your relationships with family members
4. Your relationships with friends
5. Your social life
6. Your relationships with your coaches
7. Your relationships with your teammates
8. Your level of physical conditioning
9. Your athletic performance
10. Your financial situation
11. Your spiritual health
12. Your mental health
13. Your relationship status
14. Your life as a whole

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### **Male Body Attitudes Scale (MBAS)**

Twenty-four items are rated along a six-point scale: never [0], rarely [1], sometimes [2], often [3], usually [4], always [5]

1. I think I have too little muscle on my body.
2. I think my body should be leaner.

3. (R). I wish my arms were stronger.
4. I feel satisfied with the definition in my abs (i.e., stomach muscles).
5. I think my legs are not muscular enough.
6. I think my chest should be broader.
7. I think my shoulders are too narrow.
8. I am concerned that my stomach is too flabby.
9. I think my arms should be larger (i.e., more muscular)
10. I feel dissatisfied with my overall body build.
11. I think my calves should be larger (i.e., more muscular).
12. I wish I were taller.
13. I think I have too much fat on my body.
14. I think my abs are not thin enough.
15. I think my back should be larger and more defined.
16. I think my chest should be larger and more defined.
17. (R). I feel satisfied with the definition in my arms.
18. (R). I feel satisfied with the size and shape of my body.
20. Has eating sweets, cakes, or other high calorie food made you feel fat or weak?
21. Have you felt excessively large and rounded (i.e., fat)?
22. Have you felt ashamed of your body size or shape?
23. Has seeing your reflection (e.g., in a mirror or window) made you feel badly about your size or shape?
24. Have you been so worried about your body size or shape that you have been feeling that you ought to diet?

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### **Flight Anxiety Modality Questionnaire (FAMQ)**

Circle the number which corresponds to the intensity of your reaction during a flight, or what you think the intensity of your reaction will be. The numbers range from 0 to 4, where 0 = no reaction, 1 = a little reaction, 2 = moderate reaction, 3 = intense reaction, and 4 = very intense reaction.

1. I notice numbness in my limbs.
2. I have a fear of dying.
3. I feel pain in the region of my chest.
4. I can't tell what is going to happen and that makes me feel very anxious.
5. I feel palpitations of the heart or a quicker heartbeat.
6. The idea that something will go wrong is constantly in my mind.
7. The tension makes me clumsy and things fall out of my hands.
8. I can't concentrate because I am preoccupied with thoughts about horrible flight situations.
9. I attend to every sound or movement of the plane and wonder whether everything is fine.

10. I continuously pay attention to the faces and behavior of the cabin crew.
11. I feel dizzy or I have the feeling that I'm going to faint.
12. My limbs are tense and cramped, so I feel the urge to move or walk.
13. I am short of breath.
14. I have the feeling that I am going to choke.
15. I have a dry mouth.
16. I think the particular plane I am on will crash.
17. I feel suddenly warm or cold.
18. I think that I will faint from fear.

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### **Questionnaire for Eating Disorder Diagnosis (QEDD)**

**Please complete the following questions as honestly as possible. The questions refer to current behaviors and beliefs, meaning those that have occurred in the past 3 months.**

1. Do you make yourself vomit to prevent weight gain?
2. Do you take appetite control pills to prevent weight gain?
3. Do you diet strictly to prevent weight gain?
4. Do you eat dietary supplements to control your weight?
5. Do you eat a low-fat diet to control your weight?
6. Do you eat a high protein/low carbohydrate diet to control your weight?
7. My exercise sometimes significantly interferes with important activities.
8. My primary reason for exercising is to counteract the effects of binges or to prevent weight gain.

**For the following questions, identify the response that best reflects your answer on a scale from 1 to 5 (Not at all, a little, a moderate amount, very much, extremely or completely)**

9. Does your weight and/or body shape influence how you feel about yourself?
10. How afraid are you of becoming fat?
11. How afraid are you of gaining weight?
12. Certain parts of my body (e.g., my abdomen, buttocks, thighs) are too fat.  
YES                      NO
13. I feel fat all over.                      YES                      NO