

January 2014

An Unhealthy Click: An Investigation Of Pro-Eating Disorder Website Visitation In A Community Sample

Andrea Alvarez Marin
Yale University, andre.alvarezm@gmail.com

Follow this and additional works at: <http://elischolar.library.yale.edu/ysphtdl>

Recommended Citation

Alvarez Marin, Andrea, "An Unhealthy Click: An Investigation Of Pro-Eating Disorder Website Visitation In A Community Sample" (2014). *Public Health Theses*. 1010.
<http://elischolar.library.yale.edu/ysphtdl/1010>

This Open Access Thesis is brought to you for free and open access by the School of Public Health at EliScholar – A Digital Platform for Scholarly Publishing at Yale. It has been accepted for inclusion in Public Health Theses by an authorized administrator of EliScholar – A Digital Platform for Scholarly Publishing at Yale. For more information, please contact elischolar@yale.edu.

**An unhealthy click:
An investigation of pro-eating disorder website visitation in a community sample**

by
Andrea Álvarez Marín

A thesis presented to the Yale School of Public Health faculty
in candidacy for the Master of Public Health

2014

Abstract

Objective: This study compared pro-eating disorder website visitors and non-visitors on demographic characteristics, weight and diet related variables, eating disorder psychopathology, overvaluation of thinness and attitudes towards these sites. A new measure, the Thin Commandments Scale (TCS), was developed and preliminarily validated.

Methods: The study employed a community sample of 420 adults who completed a battery of questionnaires, which also included the Eating Disorder Examination Questionnaire (EDE-Q), the Sociocultural Attitudes Toward Appearance Questionnaire (SATAQ-3)-Internalization Subscale, and the Beck Depression Inventory (BDI). Additionally, participants responded questions regarding the harmfulness and acceptability of these sites, as well as regarding visitors' health.

Results: Visitors and non-visitors did not differ on demographic or weight and diet related variables except for age and BMI. Visitors exhibited greater eating disorder psychopathology and overvaluation of thinness than non-visitors. Visitors were less likely to judge these websites as harmful and unacceptable, but both groups reported a negative evaluation of the sites. Factor analysis for the Thin Commandments Scale revealed the presence of a single factor, internal consistency analysis showed excellent reliability and support was found for the concurrent validity of the scale.

Conclusions: These findings provide further insight into the characteristics of pro-eating disorder website visitors and confirm previous studies that showed that visitors might not conform to the stereotype of the eating disorder population. The Thin Commandments Scale showed initial promise as a way to identify people at risk for developing eating disorders, but replication with other populations is needed to confirm these findings.

Acknowledgements

I am especially thankful to my thesis mentors: Marney White, Ph.D., M.S. and Joan Monin, Ph.D.

I am so grateful that Dr. White allowed me to develop my project under the framework of her study, *Investigation of latent constructs in binge eating disorder*. Because of her, I was able to focus my thesis on a topic that I was highly passionate about. I also appreciated her enthusiasm! Dr. White has a true love of numbers and statistics and she has the ability to explain these topics in an interesting and easy to understand way.

I really appreciated Dr. Monin's active participation during the entire thesis experience. Her class, Interdisciplinary Research Methods in SBS, was one of the most useful during my studies at YSPH and my thesis originated from a project that we developed during that course.

I would also like to thank Dr. Carlos Grilo, Director of the Yale Program for Obesity, Weight and Eating Research (POWER). He provided the necessary funding for participant recruitment and without his support this study would not have been possible.

Finally, my wholehearted thanks to my family: Antonio, Nuria, Adriana & Isabella.

Table of Contents

Abstract.....	2
Acknowledgements.....	3
List of Tables.....	5
List of Figures.....	6
Introduction.....	7
Methods.....	13
Results.....	20
Discussion.....	25
References.....	33
Tables and figures.....	37

List of Tables

Table 1. Thin Commandments Scale items.....	37
Table 2. Correlations between Thin Commandments Scale and other study measures.....	38
Table 3. Multiple linear regression analyses predicting disordered eating behaviors from BDI, SATAQ-3 and Thin Commandments Scale measures.....	39
Table 4. Participant Demographics.....	40
Table 5. Participant dieting status, actual and perceived weight status, and weight history.....	41
Table 6. Comparison of visitors and non-visitors on clinical features of eating disorders and on overvaluation of thinness.....	42
Table 7. Comparison of visitors and non-visitors on attitudes toward pro-eating disorder websites.....	43

List of Figures

Figure 1. Comparison of visitors' and non-visitors' mean scores regarding websites' harmfulness, websites' unacceptability and visitors' health.....	44
--	----

Introduction

Western society is fascinated with thinness and people who adopt this beauty standard as their own might seek to achieve it by engaging in unhealthy eating behaviors. Nowadays, many individuals do not meet the full diagnostic criteria for eating disorders, but still engage in unhealthy weight-loss methods. Disordered eating without the clinical features of eating disorders has been coined by Sharlene Hesse-Biber (1996, 2007) as “culturally induced eating disorders”. These behaviors occur across a continuum—women might move across this spectrum over time and can even meet the full diagnostic criteria at some point. Eating disorders have individual, biological, and socio-cultural components and peers, family and school environments foster the preoccupation with thinness (Hesse-Biber, 1996; Hesse-Biber, 2007).

This resonates with what has been referred to as the “tripartite influence model of body image and eating disturbances”. This model posits that an individual’s family, an individual’s peers and the media can affect both body image and eating behaviors. The model has also identified “thin-idealization internalization” as one of the mediators between societal influences and individual attitudes and behaviors (Thompson, Covert, & Stormer, 1999 as cited in Shroff & Thompson, 2006, pp. 17-18). Additionally, Thompson and Stice (2001) have resolved that thin-ideal internalization is a risk factor for both body dissatisfaction and disordered eating. Thin-idealization internalization involves not only adopting prevailing standards of beauty as one’s own standards, but also attempting to match these standards (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999, as cited in Thompson & Stice, 2001, p. 181). It should be noted that “thin-ideal internalization” actually corresponds to different types of “ideals” (e.g. thin, fit, or emaciated); not all are equally detrimental and not all appeal to everyone to the same extent (Homan, 2010; Smith, Joiner, & Dodd, 2013).

This study focused on the media component of the tripartite model, specifically the Internet and pro-eating disorder websites as a potential vehicle that reinforce the current thin ideal. These websites are called “pro-ana” or “pro-mia” depending on whether they refer to anorexia or bulimia. At any given moment there can be around 500 of such sites (Rouleau & von Ranson, 2011) and the pro-eating disorder presence has expanded to various types of platforms like Facebook and My Space (Juarascio, Shoaib, & Timko, 2010), You tube (Syed-Abdul et. al., 2013), and Flickr (Yom-Tov, Fernandez-Luque, Weber, & Crain, 2012). Additionally, research done by Lewis & Arbuthnott (2012) found over 13 million yearly searches worldwide for phrases similar to “pro-ana” and “thinspiration”.

Pro-eating disorder sites are not homogenous: some contend that eating disorders are diseases, while others conceptualize these disorders as a lifestyle choice (Csipke & Horne, 2007; Strife & Rickard, 2011). Because of the diversity among these sites, “being pro-eating disorder” cannot be easily conceptualized as a movement. Brotsky & Giles (2007) refer to these websites as having “shared behaviors” not a “shared philosophy”. Still, some generalizations are possible: the majority of sites typically cover information on weight loss techniques and “thinspiration” material (pictures or videos of emaciated women). Some include the “Thin commandments”, quotes such as “being thin is more important than being healthy” (Borzekowski, Schenk, Wilson, & Peebles, 2010).

Pro-eating disorder websites represent a novel research area. A group of existing research has focused on analyzing the content of these websites (Borzekowski et. al., 2010; Chelsey, Alberts, Klein, & Kreipe, 2003; Norris, Boydell, Pinhas, & Katzman, 2006). The evidence is mixed regarding whether these websites have a positive effect (e.g. providing social support) or negative effect (e.g. promoting extreme weight loss) on viewers. A study conducted with French

pro-eating disorder website visitors reflects this ambivalence because participants' two main reasons for visiting these sites were learning new weight loss techniques and receiving social support (Rodgers, Skowron, & Chabrol, 2012). This situation is confounded by the diversity across sites and these might have different impacts on viewers. For example, Borzekowski et. al. (2010) analyzed and categorized these websites into three groups based on perceived level of harm—low, medium and high. Recovery information was mostly found on the less harmful sites, while the contention that these disorders are choices was mostly prevalent on the most harmful. From a broader perspective, Rouleau and von Ranson's (2011) systematic review identified three potential risks: offering people "social support" that could actually be harmful, reinforcing people's pathological eating behaviors and discouraging them from searching for help.

A small proportion of research has focused on the impact of these websites on individuals that were suffering or have suffered from eating disorders. For example, Wilson, Peebles, Hardy, and Litt (2006) found that participants who visited pro-eating disorder sites had more hospital stays compared to those that did not visit them, but found no significant differences in other health outcomes. Schroeder (2009) conducted in-depth interviews with seven women between the ages of 19 and 25. Several of these women stated that the websites provided a competitive weight loss environment and that their interaction with other viewers trivialized the gravity of their behaviors. Nonetheless, they affirmed that visiting the sites also increased their sense of belonging.

In addition, experimental research has shown potentially negative effects of viewing these sites. Bardone-Cone and Cass (2007) randomized undergraduate students to view a pro-eating disorder site, a female fashion site with average-sized models or an un-related home decoration site. Pro-eating disorder website viewers reported decreased self-esteem and higher

perception of their weight compared to the other groups, but the long-term sustainability of these results could not be assessed. Similarly, Jett, LaPorte, and Wanchism (2010) also exposed a group of non-disordered female college participants either to a pro-eating disorder website, an exercise website or a travel information website. A few weeks after exposure, the pro-eating disorder group had reduced their caloric intake.

Other sets of studies have focused on the sites' users regardless if they have an eating disorder or not. Csipke and Horne (2007) developed their own survey (Pro-Anorexia Website Survey, PAWS) that asked visitors about frequency of usage, self-esteem after viewing, body image, reasons for visiting, and whether they considered these sites to be harmful or helpful, among others. The majority of their participants (69%) was under the age of 22 and visited these websites at least once a day (41%). These authors also found that the main reasons for visiting were their need for support and the wish to engage in disordered eating, but different kinds of visitors focused on different features of the sites. "Active" visitors (those that interacted with other users and posted in chat rooms or forums) visited these sites more frequently, sought emotional support, and experienced a rise in their self-esteem. In contrast, "passive" visitors (those that only read the information) focused on learning about weight loss behaviors. A recent study by Peebles et. al. (2012) focused on a large group of adult pro-eating disorder website users and categorized them according to their usage (light, medium, and heavy as measured by frequency of use and duration since first time of use). Medium and heavy users represented around 40% of the sample each. Their results showed that the heaviest use was associated with greater levels of eating disorder psychopathology and decreased quality of life.

Of special interest to this project was the work of Custers & van den Bulck (2009), who performed a study with an undiagnosed sample of seventh, ninth, and eleventh graders in

Belgium. They were interested in participants' attitudes towards the existence of pro-eating disorder websites and in the prevalence of exposure to these sites. Only 10% had previously visited these sites. Most participants conveyed a negative attitude towards their existence (25% stated they were "very bad", 44% stated they were "bad or somewhat bad", and 32% stated they were "somewhat good, good or very good"). Attitudes were assessed regardless of previous exposure. Although several participants with a positive attitude had not visited them, on average, participants with a positive attitude were more likely to have visited them compared to those that thought that their existence was "very bad". Moreover, frequent visitors showed a higher drive for thinness and a higher propensity for perfectionism, features usually associated with eating disorders.

This project extended upon this research in several ways. First, it was performed with a U.S. sample. Second, it was done with adults aged 18 and older since both the prevalence of exposure and the attitudes towards these websites might well differ in an older population. Finally, and most importantly, this project went a step further in assessing attitudes (e.g. if participants consider these websites harmful or helpful and acceptable or unacceptable). Aside from directly asking participants' opinion about the existence of these websites, it also assessed endorsement of typical pro-eating disorder website content (e.g. the "thin commandments") whether participants had visited such websites or not. This approach provided a clearer picture of participants' genuine endorsement of pro-eating disorder beliefs.

A study by Juarez, Soto, and Pritchard (2012) also provided important background for this project since it addressed the topic of internalization of pro-eating disorder websites' content. They explored whether internalization of general media as measured by the Multidimensional Media Influence Scale (MMIS) and internalization of pro-eating disorder

websites (based on their adaptation of some MMIS questions) were both correlated with drive for thinness in women and drive for muscularity in men in an adult college population. Their results showed that internalization of both general media and pro-eating disorder websites was positively correlated with drive for thinness and drive for muscularity. However, internalization of pro-eating disorder websites was a stronger predictor of both types of drive than general media internalization.

This project followed a similar approach. The association between thin-ideal internalization and disordered eating was also measured, but the internalization of pro-eating disorder content was assessed in a different way. Asking about the endorsement of the thin commandments had the advantage that participants did not need to know about the existence of pro-eating disorder websites in order to respond whether they agreed or not with these commandments.

The first objective of this study was to compare visitors and non-visitors on various measures of eating disorder psychopathology and on their attitudes towards pro-eating disorder websites. These sites can be considered an extreme interpretation of society's appreciation for thinness and might serve as an additional vehicle for reinforcement of this appreciation. The belief in Hesse-Biber's (1996, 2007) view that disordered eating occurs along a continuum translates into the premise that pro-eating disorder websites' appeal and/or harm might expand further than the group of people that meet the full diagnostic criteria for eating disorders. While individuals might think of these websites as unacceptable and potentially harmful, they could be more vulnerable to their content than they realize. Based on the aforementioned research, on the view of eating disorders as a continuum, and on the tripartite model of influence we hypothesized that: 1) Visitors would be more likely to exhibit eating disorder psychopathology

and overvaluation of thinness compared to non-visitors; 2) Visitors would exhibit a more positive view of pro-eating disorder websites compared to non-visitors; and 3) Participants with the greatest thin-ideal internalization would exhibit greater disordered eating behaviors, regardless of whether they met full diagnostic criteria for an eating disorder.

A secondary objective was to develop and validate a measure of thin-ideal internalization—the Thin Commandments Scale (TCS). One popular and previously validated measure of thin-idealization internalization is the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ-3) (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004). However, Bell & Dittmar (2011) recently called for the use of a different measure. Their rationale was that the SATAQ-3 simultaneously assesses several things such as comparison propensity and thin-idealization internalization. They also stated that the scale asks questions mainly about TV and magazines and argued that people are exposed to the thin ideal through several other venues. Thus, this study had the goal of developing a more general scale rather than assessing media exposure specifically. The project’s final hypothesis was that the TCS could become an additional measure of thin-ideal internalization.

Methods

Participants

Participants were 420 community volunteers over the age of 18 who consented to an anonymous, online survey containing a battery of questionnaires on dieting history, current eating behaviors, attitudes towards the thin ideal, attitudes towards and experience with pro-eating disorder websites, and a demographic questionnaire. Participants were excluded if they had more than two missing values for the main measure of interest, the Thin Commandments

Scale described below. Following exclusion due to missing responses, data from 331 participants were suitable for analysis.

Procedure

Participants were recruited via advertisements posted in the “volunteers” section of Craigslist in the United States’ biggest cities (e.g. Chicago, New York, Los Angeles, Washington D.C., Houston, Seattle, Detroit). To ensure geographic distribution, the survey was posted in at least one major city in all U.S. states except Hawaii. The advertisements varied in text, seeking volunteers to respond to questionnaires on “dieting”, “diet and eating habits”, “diet and weight”, “diet and weight control”, and/or “eating, weight, and body image”. The ads contained a link to Survey Monkey (<http://www.surveymonkey.com>), a research-based Web server with secure 128-bit data encryption. The data were gathered between April and August 2013.

This survey’s questions were part of a larger study of eating disorders, the *Investigation of latent constructs in binge eating disorder*. This study received institutional review board approval from the Human Investigation Committee (HIC) of the Yale School of Medicine. Participants provided informed consent before entering the survey. No personal identifying information was collected, but participants could choose to enter a drawing for a 1-in-20 chance to a \$50 gift certificate. To do so, they provided their email address through a separate link, which could not be matched to their responses and thus ensured anonymity.

Measures

Demographic and weight/ dieting history variables. Participants provided their demographic information, specifically sex, age, race/ethnicity, and education. For geographic region,

participants reported zip code, which was then categorized according to U.S. Postal Service regions. Additionally, participants responded weight and dieting related questions: “In terms of your current weight, do you perceive yourself to be: underweight, normal weight, overweight, or obese?”; “are you currently dieting to lose weight?”; “have you ever been overweight by at least 10 lbs as a child or 15 lbs as an adult (when not pregnant)?”; and "during the past 6 months my weight has: decreased by 10 lbs or more, decreased by 5 to 10 lbs, been relatively stable, increased by 5 to 10 lbs, increased by 10 lbs or more”. Participants also reported their height and weight, which were converted into BMI (weight in kg / height in meters-squared). Based on BMI, the following weight status categories were used: underweight (BMI < 18.5), normal weight (BMI between 18.5 and 24.9), overweight (BMI between 25.0 and 29.9) and obese (BMI \geq 30). Each participant’s actual weight status and perceived weight status were compared to assess whether they accurately classified themselves in their respective weight category.

Thin Commandments Scale (TCS). The full list of thin commandments was originally developed by a practicing eating disorder psychotherapist (Costin, 1997, pp. 12-19). She created the list based on her patients’ common belief system regarding body shape/weight and eating. The clinician uses it in order to explain to her patients and their parents that, either consciously or unconsciously, their disorders make them live according to these guidelines. In contrast, a group of pro-eating disorder sites have distorted the use of these statements and have disseminated them as goals or facts to live by (Borzekowski et. al., 2010). The list was transformed into a measure for the purposes of this study. To our knowledge, prior studies have not used it in a similar capacity before. It is composed of 11 items and some examples are “being thin is more important than being healthy,” “losing weight is good/ gaining weight is bad”, and “being thin

and not eating are signs of true will power and success”. Items were scored on a 5-point Likert scale (from “definitely disagree” to “definitely agree”). In this study, the measure showed high internal consistency ($\alpha=0.92$). For the analysis, a mean score was computed for each participant, such that lower scores (approaching a score 1) indicate non-eating-disordered attitudes whereas higher scores approaching 5 indicate pathological endorsement of the thin commandments. The sample’s mean score was 2.21 ($N=331$, $SD=0.91$, $range=1.00-5.00$).

Eating Disorders Examination Questionnaire (EDE-Q). This scale was developed by Fairburn & Beglin (1994) and is the self-report version of the Eating Disorders Examination diagnostic interview (Fairburn & Cooper, 1993). The EDE-Q is widely used and is a reliable and valid measure in identifying eating disorders. It is composed of 36 items, which assess four different features: dietary restraint, eating concerns, weight concerns, and shape concerns. Participants should respond based on their attitudes and behaviors over the last 28 days. Questions such as “have you been deliberately trying to limit the amount of food you eat to influence your shape and weight?” and “have you had a definite fear that you might gain weight or become fat?” are graded on a 7-point ordinal scale (from “no days” to “everyday”). Questions such as “has your weight influenced how you think about (judge) yourself as a person?” are graded on a 7-point Likert scale (from “no importance” to “supreme importance”). Other items inquire about the exact frequency of purging and excessive exercise behaviors, as well as the frequency of laxative and diuretic use. The measure yields scores for 4 subscales (restraint, eating concerns, weight concerns and shape concerns) and a global score. Possible scores for each subscale range from 0 to 6, with higher scores indicating greater eating disorder psychopathology. In this study, the global scale and subscales showed high internal consistency: Restraint ($\alpha=0.84$), Eating

concerns ($\alpha=0.88$), Shape concerns ($\alpha=0.90$), Weight Concerns ($\alpha=0.83$), and Total ($\alpha=0.95$). The sample's mean global score was 2.56 ($N=308$, $SD=1.49$, $range=0.03-6.00$).

Beck Depression Inventory (BDI). It was created by Beck, Ward, Mendelson, Mock, and Erbaugh (1961) and it was included in this study since individuals with disordered eating frequently exhibit depressive features as well. The BDI is a 21-item, widely used measure of depressive signs and symptoms (e.g. sense of failure, lack of satisfaction, suicidal feelings, social withdrawal, and sleep disturbances). Each item is scored from 0 to 3 depending on the intensity of the symptom (Beck, Steer, & Garbin, 1988). For example, the statements associated with "mood" are as follows: "I do not feel sad", "I feel sad", "I am sad all the time and I can't snap out of it", and "I am so sad or unhappy that I can't stand it". A total score is calculated and higher scores are indicative of greater depression levels. The range of possible scores is 0 to 63. In this study, it showed high internal consistency ($\alpha=0.92$). The sample's mean total score was 16.2 ($N=279$, $SD=11.76$, $range=0.00-57.00$).

Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ-3)-Internalization Subscale. The SATAQ-3 was developed by Thompson et. al. (2004) and is a revision of two previous scales (Heinberg & Thompson, 1995; Cusumano & Thompson, 1997). The scale has 30 items evaluating exposure to the thin ideal in TV, music videos, and/or magazines. Additionally, some items refer to athletes' appearance and body shape. This project employed the 9-item Internalization General Subscale. Questions include "I compare my body to the bodies of TV and movie stars" and "I wish I looked like the models in music videos". The subscale is graded on a 5-point Likert scale (from "definitely disagree" to "definitely agree"). In this study, the scale

showed high internal consistency ($\alpha=0.95$). For the analysis, a mean score was computed for each participant. Higher scores indicate greater exposure to and internalization of the thin ideal. The sample's mean score was 3.01 ($N=330$, $SD=1.15$, $range=1.00-5.00$).

Attitudes towards the existence of pro-eating disorder websites. One research objective was to assess participants' attitudes towards pro-eating disorder websites regardless of whether they had previous exposure (i.e., regardless of whether they had personally visited one of such sites). Thus, all participants were provided with the following definition: *“Pro-eating disorder websites are also referred to as “pro-ana” and “pro-mia” websites. Not every website is the same, but the majority of them have several of the following features: Created by and most often visited by adolescents and young people who either currently suffer from, or have suffered from, an eating disorder; Demonstrate indecisiveness or ambivalence towards recovery. Some sites actively oppose recovery, while a few of them may encourage it; Belief that eating disorders are lifestyle choices and not diseases; Promote the idea that weight loss is a sign of success; Encourage weight loss by various methods, including purging, fasting, and laxative use; Provide “tips and tricks” such as how to lose weight faster or how to hide an eating disorder from others; Include “thinspiration” material like videos or pictures of very thin celebrities to motivate weight loss”*. The definition was created for this study and it is based on prior research, mostly content analyses (Borzekowski et. al., 2010; Csipke & Horne, 2007; Gavin, Rodham, & Poyer, 2008; Mulveen & Hepworth, 2006; Norris et. al., 2006; Rouleau, & von Ranson, 2011; and Wilson et. al., 2006). Participants were then asked if they considered the existence of these websites acceptable/unacceptable and whether they considered these websites harmful/helpful. Both of these questions were evaluated on 5-point Likert scales (from “definitely harmful” to “definitely

helpful” and “definitely unacceptable” to “definitely acceptable”). Lastly, participants were asked if they considered the sites’ visitors healthy or unhealthy. This was graded on a 9-point scale in which 1 represented unhealthy and 9 represented healthy.

Data analytic strategy

For the questionnaire development portion of the study, reliability was evaluated by calculating Cronbach’s alpha and an exploratory factor analysis (principal components analysis) was also performed. To assess its concurrent validity, correlation coefficients between the Thin Commandments Scale and the SATAQ-3 and the EDE-Q subscales and global scale were computed. Finally, multiple linear regression analyses were conducted: the BDI, the Thin Commandments Scale and the SATAQ-3 were designated as the independent variables and the EDE-Q was the dependent variable. These regression analyses had the objective of comparing these measures’ effectiveness in explaining disordered eating behaviors.

The means and standard deviations were computed for the SATAQ-3, Thin Commandments Scale, EDE-Q and BDI measures. To assess differences between participants who had visited pro-eating disorder websites and those who had not, t-tests comparing scores on the SATAQ-3, EDE-Q, Thin Commandments Scale and BDI were conducted. These groups were also compared on demographic characteristics, on weight/dieting history variables, and on specific disordered eating behaviors (e.g. whether they have purged or not, binged or not) using chi-square tests for categorical outcomes and t-tests for continuous outcomes. The frequencies and percentages for the variables assessing attitudes towards pro-eating disorder websites were also calculated. To compare both groups’ attitudes toward pro-eating disorder websites, t-tests were employed.

The significance threshold for all tests was set to $p < 0.05$. All analyses were performed with the use of the SAS statistical software package version 9.1 (SAS Institute Inc., Cary, NC, USA).

Results

Psychometric properties of the Thin Commandments Scale

Table 1 depicts the 11 items comprising the Thin Commandments Scale (TCS).

Exploratory factor analysis. This analysis was conducted based on data from the 321 participants that had no missing values in the Thin Commandments portion of the survey. Data were evaluated using a principal components factor analysis. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.918 and the Bartlett's test of sphericity was statistically significant ($p < 0.001$), indicating that the data were appropriate for the analysis. As shown in Table 1, all 11 items had a factor loading higher than 0.65 and all loaded on a single factor. This factor accounted for 56.15% of the total variance.

Reliability analysis and tests of concurrent validity. This analysis utilized the same 321 observations and it was calculated using coefficient- α , which was 0.92. More specific item-total correlations are shown in Table 1. For all items, the item-total correlation was higher than 0.55. Concurrent validity was assessed using the SATAQ-3, the BDI, and the EDE-Q total and subscale scores. Table 2 summarizes the correlation of these variables with the Thin Commandments Scale scores. Although all correlations were highly significant ($p < 0.0001$), the Thin Commandments measure was more strongly correlated with the EDE-Q ($r = 0.71$,

$p < 0.0001$) and with the SATAQ-3 ($r = 0.50$, $p < 0.0001$) than with the BDI ($r = 0.36$, $p < 0.0001$).

Regression analyses. These analyses employed disordered eating behaviors as the dependent variable and the Thin Commandments Scale, SATAQ-3 and BDI as independent variables. Simple linear regression analyses showed that the TCS ($\beta = 1.151$, $t(308) = 17.62$, $p < 0.0001$), the SATAQ-3 ($\beta = 0.532$, $t(307) = 7.88$, $p < 0.0001$) and the BDI ($\beta = 0.067$, $t(279) = 10.52$, $p < 0.0001$) significantly explained EDE-Q total scores. Furthermore, multiple linear regression analyses that combined all three independent variables into one model were also conducted and are depicted in Table 3. The model predicted 59% of the variance in EDE-Q total scores, 36% of the variance in EDE-Q Restraint scores, 50% of the variance in EDE-Q Eating Concerns scores, 51% of the variance in EDE-Q Weight Concerns scores, and 51% of the variance in EDE-Q Shape Concerns scores. Finally, this model predicted 21% of the variance in the frequency of purging behavior. Table 3 shows that the SATAQ-3 measure remained a statistically significant predictor of mean scores on the EDE-Q Shape Concerns subscale only ($p = 0.030$). Table 3 also depicts that the TCS measure remained statistically significant for all dependent variables.

Comparison between visitors and non-visitors of pro-eating disorder websites

Approximately 20% of the sample reported visiting pro-eating disorder websites. The visiting frequency of this group was distributed as follows: several times a day ($n = 3$, 4.8%), once a day ($n = 2$, 3.2%), a few times a week ($n = 2$, 3.2%), a few times a month ($n = 6$, 9.7%), every few months ($n = 15$, 24.2%), and just once ($n = 34$, 54.8%). Since most visitors had been on these sites only once, all visitors were combined into one group. Thus, the following analyses compare visitors ($n = 62$, 19.3%) to non-visitors ($n = 260$, 80.8%).

Do visitors and non-visitors differ by demographic characteristics? Table 4 summarizes the demographic characteristics of the overall sample as well as for the two groups of interest. The majority of participants was female (n=271, 82.6%), Caucasian (n=244, 74.2%), between the ages of 18 and 34 (n=185, 63.6%) and had a college degree or above (n=173, 52.4%). Because the sample was predominantly Caucasian, all other ethnic groups were collapsed into the broader category of “non-Caucasian”. Individuals representing other ethnicities were originally distributed as follows: African-American (n=23, 7.0%), Hispanic (n=34, 10.3%), Asian (n=16, 4.9%), and other (n=12, 3.7%). Finally, the sample was also geographically diverse, as all regions in the continental U.S. were similarly represented: 27.6% (n=87) of participants were from the Northeast, 22.9% (n=72) from the South, 23.2% (n=73) from the Midwest, and 23.8% (n=75) from the West. Visitors and non-visitors did not significantly differ on any demographic variables save for age. Visitors (M=27.7 years, SD=9.5) were significantly younger compared to non-visitors (M=35.9 years, SD=14.2; $t(115.8)=-5.14$; $p < 0.0001$).

Do visitors and non-visitors differ in their weight history, dieting status, and actual and perceived weight? Table 5 shows participants’ dieting status, actual and perceived weight status, and weight history. The majority of the sample was either overweight (n=80, 24.5%) or obese (n=107, 32.7%) as determined by self-reported height and weight. Similarly, most participants perceived themselves to be overweight (n=140, 42.3%) or obese (n=49, 14.8%). Comparisons between actual and perceived weight status showed that the majority of people accurately estimated their weight status (n=222, 67.9%), while around a quarter of participants (n=81, 24.7%) underestimated it. Almost half of the sample (n=163, 49.7%) reported current dieting to

lose weight. Visitors and non-visitors significantly differed on BMI. Visitors' BMI ($M=25.4$, $SD=7.1$) was significantly lower than non-visitors' BMI ($M=29.0$, $SD=9.0$; $t(114.4)=-3.35$; $p=0.001$), but both groups were still overweight on average. Finally, although the groups did not significantly differ in whether they accurately reported their weight status, a marginally higher proportion of visitors ($n=7$, 11.3%) overestimated their weight compared to non-visitors ($n=17$, 6.6%) ($\chi^2(2, N=318)=4.82$, $p=0.090$).

Do visitors and non-visitors differ on the clinical features of eating disorders? Table 6 summarizes independent t-tests regarding the clinical features of eating disorders as measured by the EDE-Q total score and subscale scores, as well as BDI scores. The groups significantly differed in all of these features (all p -values <0.01), with visitors reporting higher levels of eating pathology and depressive features than non-visitors. Table 6 also compares visitors and non-visitors on specific maladaptive eating behaviors such as frequency of purging and frequency of binge eating. Approximately 18% ($n=53$) of the total sample had engaged in purging behaviors in the past 28 days. While 33% ($n=19$) of visitors had purged in the past 4 weeks, 14% ($n=34$) of non-visitors had done so ($\chi^2(1, N=295)=11.3$, $p=0.001$). The groups also significantly differed on the frequency of purge episodes in the past 4 weeks, ($t(59.9)=2.51$, $p=0.015$). Around 40% ($n=120$) of the total sample had engaged in binge eating behaviors in the past 28 days. Forty-four percent ($n=26$) of visitors and 39% of non-visitors ($n=94$) had binged in the past 4 weeks ($\chi^2(1, N=303)=0.61$, $p=0.434$). Both groups significantly differed on the frequency of their binge eating episodes ($t(301)=2.48$, $p=0.014$).

Do visitors and non-visitors differ on their overvaluation of thinness? Table 6 also summarizes independent t-tests regarding thin-ideal internalization and overvaluation of thinness as measured by the SATAQ-3 and the TCS. Visitors and non-visitors' scores were statistically different in all of these domains ($p < 0.01$), with visitors showing higher scores. Visitors endorsed higher beliefs in thin ideals of beauty as well as maladaptive ways of achieving these standards compared to non-visitors.

Do visitors and non-visitors differ on their attitudes towards pro-eating disorder websites?

Table 7 depicts visitors' and non-visitors' opinions regarding whether they think pro-eating disorder websites are harmful or helpful, whether these sites are acceptable or unacceptable, and whether these sites' users are healthy or unhealthy. Around 85% ($n=274$) of the total sample judged these websites as either "definitely harmful" or "harmful." Around 72% ($n=231$) of the sample considered the existence of these websites to be "definitely unacceptable" or "unacceptable", and around 88% ($n=283$) described the visitors of these websites as "definitely unhealthy" or "unhealthy". Independent t-tests compared groups on their perception of the acceptability, harmfulness, and healthfulness of users of these websites. Figure 1 shows both groups' mean scores. Lower scores reflected greater endorsement of websites' harmfulness, unacceptability and users' ill health. Independent t-tests revealed a borderline statistically significant difference regarding websites' harmfulness. Visitors were less likely to evaluate these websites as harmful compared to non-visitors ($M=1.9$, $SD=1.2$ vs $M=1.5$, $SD=0.9$; $t(78.9)=2.0$; $p=0.0505$). Furthermore, visitors were significantly less likely to judge these websites as unacceptable compared to non-visitors ($M=2.2$, $SD=1.2$ vs $M=1.9$, $SD=1.0$; $t(320)=2.10$;

$p=0.036$). Differences in both groups' evaluation of website users' health remained non-significant.

Discussion

The first objective of this study was to investigate differences between pro-eating disorder websites' visitors and non-visitors in regards to demographics, actual and perceived weight, weight history, and dieting status, as well as on measures of eating disorder psychopathology, overvaluation of thinness and depression. Both groups' attitudes in regards to pro-eating disorder websites were also examined.

Although visitors were statistically younger than non-visitors in the study sample, their mean age was 27.7 (range 18 to 66 years old). This finding indicates that the pro-eating disorder community might not only appeal to teenagers. Furthermore, visitors also exhibited a lower BMI than non-visitors. Still, both groups were—on average—overweight. Save for these two variables, the groups did not differ in other demographic or weight-related variables. The fact that some visitors were overweight can be considered a surprising finding, but it is consistent with the Peebles et. al. (2012) study in which over 50% of visitors had been overweight in the past and 20% were overweight at the time of the study.

In contrast to the demographic indicators, results showed significant differences between the groups in all measures of eating disorder psychopathology. Also, visitors reported greater depressive symptoms. Similarly, visitors showed greater overvaluation of thinness. This is consistent with the hypothesis that visitors would be more likely to engage in disordered eating and to overvalue thinness compared to non-visitors.

The project's results also showed that visitors and non-visitors differed in their attitudes

toward pro-eating disorder websites. While non-visitors were significantly more likely to judge these websites as harmful and as unacceptable compared to visitors, the majority of participants from both groups reported a negative evaluation of these sites. In regards to judging the sites' visitors as "healthy" or "unhealthy", both groups were equally likely to describe visitors as "unhealthy". These findings only partly confirmed the hypothesis that visitors would exhibit a more positive view of pro-eating disorder websites compared to non-visitors, since a substantial proportion of individuals in both groups judged these sites in a negative light. Nonetheless, this result is consistent with prior studies that have shown that while some visitors might consider that eating disorders are indeed diseases and might even know about the negative health effects associated with these diseases, they continue to visit the sites and to engage in harmful behaviors (Rodgers et. al., 2012; Williams & Reid, 2007).

It makes sense that individuals would engage in unhealthy behaviors in order to achieve thinness if they consider their (thin) appearance to be of greater value than their health. This situation might be related to what some authors have referred to as the ambivalence in eating disorder recovery. Garner & Bemis (1982) explain that eating disorders differ from other mental illnesses because other illnesses do not fulfill patients' goals or desires in any way. In contrast, eating disorders function to aid patients in achieving their "goals" (e.g. weight loss and resulting thinness). Consequently, individuals with eating disorders might not want to recover from the disorder because that would mean that they would also forgo the "success" associated with it (Garner & Bemis, 1982). Specific studies with the pro-eating disorder population support this ambivalence with regard to recovery from the disorder. For example, in the study done by Rodgers et. al. (2012), when asked about the detrimental effects of visiting these sites, 41% of their participants responded that "they did not care or that it did not apply to them" (p. 11).

Additionally, the authors found that visitors believed that thinness leads to happiness. Another example was an investigation done by Williams & Reid (2007), who reported that a group of pro-eating disorder website visitors acknowledged their unhealthy behaviors, but did not alter them because they equated starvation with success and happiness.

A secondary objective of this study was methodological: the development and validation of the Thin Commandments Scale (TCS) as a measure of thin-ideal internalization. In regards to its main psychometric properties, this measure proved to be both a reliable and valid measure of a single construct. Additionally, the TCS showed to be a useful measure in explaining the various facets of disordered eating behaviors. Scores on the Thin Commandments Scale were highly correlated with scores on the EDE-Q for disordered eating and were significantly, but modestly, correlated with participants' depression scores. Multiple regression analyses showed that while depression and thin-ideal internalization (as measured by the SATAQ-3) significantly explained some aspects of eating disorder psychopathology, only the Thin Commandments Scale was a significant predictor of all of the primary outcome variables (i.e., dietary restraint, eating concerns, shape concerns, weight concerns, purging, and global eating pathology as measured by the EDE-Q). These regression analyses revealed that the Thin Commandments Scale significantly explained disordered eating above-and-beyond what was explained by previously established measures such as the BDI for depression and the Socio-cultural Attitudes Toward Appearance Questionnaire (SATAQ-3) for thin-ideal internalization. These analyses confirmed the hypothesis that participants with the greatest thin-ideal internalization would exhibit greater disordered eating behaviors, regardless of whether they met full diagnostic criteria for an eating disorder.

However, contrary to the project's fourth hypothesis, the Thin Commandments Scale

might not be an alternative measure of thin-ideal internalization. Correlation analyses showed that the TCS and the SATAQ-3 Internalization Subscale shared only 25% of the variance. Thus, the scales appear to measure two related, but different constructs. If the Thin Commandments Scale does not gauge thin-ideal internalization, what aspects of eating disorder psychopathology is it capturing? One potential explanation is that this scale is more effectively identifying the presence of common cognitive distortions held among individuals suffering from eating disorders.

Cognitive distortions are erroneous beliefs such as the above-mentioned idea that thinness equals beauty and success. Garner & Bemis (1982) have stated that cognitive distortions can manifest in different types of erroneous thinking and cite the following examples: overgeneralizations (“I used to be of normal weight, and I wasn’t happy. So I *know* gaining weight isn’t going to make me feel better”), magnifications (“Gaining five pounds would push me over the brink”), and all-or-none reasoning (“If I can’t master this area of my life, I’ll lose everything”), among others (p. 137). The problem with these distortions is that they are not easily changed with the use of logical reasoning (Garner & Bemis, 1982) and serve to exacerbate the disorder because they are rigidly held and motivate extreme dieting behavior. Greater knowledge does not necessarily translate into behavior change (Beck, Rush, Shaw, & Emery, 1978 as cited in Garner & Bemis, 1982). Still, it is possible for patients to challenge and modify these distortions through techniques such as cognitive behavioral therapy.

In regards to the Thin Commandments Scale, the statement “You can never be too thin” can be considered an example of a cognitive distortion that is likely to drive unhealthy eating behaviors. Additionally, other commandments such as “being thin is more important than being healthy”, “losing weight is good/gaining weight is bad”, “you must buy clothes, cut your hair,

take laxatives, starve yourself, do anything to make yourself look thinner,” and “being thin and not eating are signs of true will power and success” are examples of cognitive distortions. As previously stated, Carolyn Costin (1997) uses this list precisely to explain to her patients that while their eating disorders make them live according to these guidelines, these represent inadequate beliefs. The Thin Commandments Scale may have clinical utility as an index of therapeutic success. Specifically, the TCS could be used to measure whether patients’ cognitive distortions decrease over the course of cognitive therapy by having them complete this instrument over the course of treatment. Additionally, the Thin Commandments Scale could be used in survey research to identify those who are most at risk for developing disordered eating even before they have engaged in specific unhealthy eating behaviors.

This study suffered from the following limitations. First, the presence of selection bias cannot be ruled out. The Craigslist advertisement asked that volunteers complete a questionnaire on dieting behaviors and weight concerns, something that could have had the most appeal to participants with various levels of disordered eating. Second, participants’ weight and height could not be measured directly because this study relied on an Internet survey. There is no way to determine if participants accurately reported their true measures. Nonetheless, previous studies have shown that there is a high degree of correlation ($r > 0.9$) between actual and self-reported height and weight (Stunkard & Albaum, 1981). Furthermore, studies that have focused on clinical populations have also stated that the degree of misreporting regarding weight is minor and that it is not correlated with eating disorder psychopathology (White, Masheb, Burke-Martindale, Rothschild, & Grilo, 2007; White, Masheb, & Grilo, 2010). Third, since only 20 percent of the sample had visited these websites, this group only had a small number of men and a small number of members from ethnic minorities. Thus, the study was not adequately powered

to carry out richer subgroup analyses in regards to gender and ethnicity. Fourth, since the majority of visitors had been on these sites only once, the presence of dose-response in regards to frequency of website usage similar to the analysis done by Peebles et. al. (2012) (e.g. compare “heavy users” versus “light users”) could not be assessed. Lastly, this study was cross-sectional. Accordingly, temporality could not be determined—do those that visit pro-eating disorder websites already exhibit disordered eating behaviors or do they develop these behaviors as a result of visiting the sites?

Regardless of the aforementioned limitations, this study contributed in furthering existing knowledge about pro-eating disorder websites and their visitors. The first objective was to compare visitors and non-visitors on various measures. Results confirmed prior research that showed that visitors were more likely to exhibit eating disordered behaviors and attitudes (e.g. Custers & Van den Bulck, 2009) but also expanded upon this research. The use of a community sample revealed that visitors might not be restricted to teenage or college populations. Additionally, this project confirmed previous research (e.g. Peebles et. al., 2012) that showed that not all visitors conform to the stereotype of disordered eating individuals as the sample’s visitors were, on average, overweight. The distinct characteristics of this sample serve to support Hesse-Biber’s (1996, 2007) view that disordered eating occurs across a continuum and is not limited to those individuals that are captured by the DSM-5 criteria.

From a broader public health perspective, the fact that some visitors might not conform to the eating disorder stereotype generates concerns. Having excess weight defies the identity that some pro-eating disorder website users typically endorse. For example, previous studies have shown that not all visitors are judged equally. Giles (2006) states that while all visitors might have an eating disorder in common (what this author refers to as their “macro-level identity”),

they each fit into different subgroups (anorexia, bulimia, EDNOS, “wannabes”) that are not valued equally (their “micro-level identity”). Among the micro-identities, Giles explains that anorexia is at the top of the hierarchy and that those that do not have an eating disorder are sometimes described as “wannabes”. Similarly, Boero & Pascoe (2012) state that users try to defend their “true ana” identity as opposed to the “wannarexics”. Wannarexics are shunned because they are thought to be less disciplined. Since being called a wannarexic is an insult, users try to prove that they are “real anorexics”. They do this through posting pictures of their emaciated selves or by sharing their weight with other visitors (Boero & Pascoe, 2012). The fact that the visitors in this sample were—on average—overweight is of concern because they might be doubly affected by visiting these sites. For one thing, they are learning about unhealthy weight loss tips. For another, they might feel that they are being rejected by their “own” (other disordered eating individuals). Hopefully, forthcoming investigations will delve into this matter further.

Moreover, future research should be sufficiently powered to assess differences between visitors and non-visitors by gender and ethnicity. In regards to gender, Juarez et. al. (2012) tackled this topic in college-aged men, but more research is still needed with this population. How could typical thinspiration images (usually depicting women) specifically affect men? In regards to ethnicity, results showed that both Caucasian and non-Caucasian populations were equally likely to have visited these websites, but coming investigations should have a greater representation of minorities to confirm these findings. Furthermore, this study focused on the U.S. population, but other investigators could compare U.S. citizens with foreign populations as citizens from other countries (e. g. Australia, Belgium, Canada, Czech Republic, France, Mexico, Norway, among others) also visit these websites (Lewis & Arbuthnott, 2012).

In regards to the study's secondary objective, the development and validation of the Thin Commandments Scale, replication with other populations is needed to confirm these preliminary successful findings. More detailed subgroup analyses are also needed. Also, future research could recruit a greater number of visitors and divide them into light, moderate and heavy users as done by the Peebles et. al. study (2012) to assess whether heavy and light users differ on their endorsement of the Thin Commandments. Moreover, aside from identifying individuals that are most at risk for developing an eating disorder, longitudinal research could measure whether those initially found to be more vulnerable eventually developed some form of eating pathology. Future research should also use the TCS at the start and end of treatment to assess if recovery is indeed associated with lower endorsement of the thin commandments. Other studies could compare pro-eating disorder website visitors with other groups such as those individuals that identify as "pro-recovery". The pro-recovery movement seeks to "be a light of inspiration in the darkness of the Pro-Ana online community" (Eating Disorder Hope Pro-Recovery Movement, 2012). If pro-recovery users are less likely to endorse the commandments, this might confirm that pro-eating disorder website visitors are more affected by these cognitive distortions and might take a longer time to recover.

References

- Bardone-Cone, A. M., & Cass, K. M. (2007). What does viewing a pro-anorexia website do? An experimental examination of website exposure and moderating effects. *International Journal of Eating Disorders, 40*(6), 537-548.
- Beck, A. T., Steer, R.A., & Garbin, M.G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8*(1), 77-100.
- Bell, B.T., & Dittmar, H. (2011). Does Media Type Matter? The Role of Identification in Adolescent Girls' Media Consumption and the Impact of Different Thin-Ideal Media on Body Image. *Sex Roles, 65* (7-8), 478–490.
- Boero, N., & Pascoe, C.J. (2012). Pro-anorexia Communities and Online Interaction: Bringing the Pro-ana Body Online. *Body & Society, 18*(2), 27-57.
- Borzekowski, D. L., Schenk, S., Wilson, J. L., & Peebles, R. (2010). E-Ana and e-mia: A content analysis of pro-eating disorder web sites. *American Journal of Public Health, 100*(8), 1526-1534.
- Brotzky, S., & Giles, D. (2007). Inside the “Pro-ana” Community: A Covert Online Participant Observation. *Eating Disorders, 15*(2), 93-109.
- Chelsey, E. B., Alberts, J. D., Klein, J. D., & Kreipe, R. E. (2003). Pro or con: Anorexia nervosa and the internet. *Journal of Adolescent Health, 32*(2), 123-124.
- Costin, C. (1997). *Your dieting daughter. Is the dying for attention?* New York, NY: Routledge.
- Csipke, E., & Horne, O. (2007). Pro-eating disorder websites: Users' opinions. *European Eating Disorders Review, 15*(3), 196-206.
- Custers, K., & Van den Bulck, J. (2009). Viewership of pro-anorexia websites in seventh, ninth, and eleventh graders. *European Eating Disorders Review, 17*(3), 214-219.
- Cusumano, D. L., & Thompson, J. K. (1997). Body image and body shape ideals in magazines: Exposure, awareness, and internalization. *Sex Roles, 37* (9-10), 701-721.

- Eating Disorder Hope. (2012). Eating Disorder Hope Pro-Recovery Movement. Retrieved from: <http://www.eatingdisorderhope.com/about/pro-recovery-movement-and-eating-disorders>
- Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders*, 16(4), 363–370.
- Fairburn, C. G., & Cooper, Z. (1993). The Eating Disorder Examination (12th edition). In C. G. Fairburn, & G. T. Wilson (Eds.), *Binge eating: Nature, assessment, and treatment* (pp. 317–360). New York, NY: Guilford Press.
- Garner, D.M., & Bemis, K.M. (1982). A cognitive-behavioral approach to anorexia nervosa. *Cognitive therapy and research*, 6(2), 123-150.
- Gavin, J., Rodham, K., & Poyer, H. (2008). The presentation of “pro-anorexia” in online group interactions. *Qualitative Health Research*, 18(3), 325-333.
- Giles, D. (2006). Constructing identities in cyberspace: the case of eating disorders. *British Journal of Social Psychology*, 45(3), 463-477.
- Heinberg, L.J., Thompson, J.K., & Stormer, S. (1995). Development and validation of the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ). *International Journal of Eating Disorders*, 17 (1), 81–89.
- Hesse-Biber, S. (2007). *The Cult of Thinness*. 2nd Edition. New York, NY: Oxford University Press.
- Hesse-Biber, S. (1996). *Am I thin enough yet? The cult of thinness and the commercialization of identity*. New York, NY: Oxford University Press.
- Jett, S., LaPorte, D. J., & Wanchism, J. (2010). Impact of exposure to pro-eating disorder websites on eating behaviour in college women. *European Eating Disorders Review* 18(5), 410-416.
- Juarez, L., Soto, E., & Pritchard, M.E. (2012). Drive for muscularity and drive for thinness: the impact of pro-anorexia websites. *Eating Disorders*, 20(2), 99-112.
- Juarascio, A., Shoaib, A., & Timko, C. (2010). Pro-eating Disorder Communities on social networking sites: a content analysis. *Eating Disorders*, 18(5), 393-407.

- Lewis, S.P., & Arbuthnott, A.E. (2012). Searching for *Thinspiration*: The Nature of Internet Searches for Pro-Eating Disorder Websites. *Cyberpsychology, Behavior, and Social Networking*, *15*(4), 200-204.
- Mulveen, R., & Hepworth, J. (2006). An interpretative phenomenological analysis of participation in a pro-anorexia internet site and its relationship with disordered eating. *Journal of Health Psychology*, *11*(2), 283-296.
- Norris, M. L., Boydell, K. M., Pinhas, L., & Katzman, D. K. (2006). Ana and the internet: A review of pro-anorexia websites. *International Journal of Eating Disorders*, *39*(6), 443-447.
- Peebles, R., Wilson, J.L., Litt, I.F., Hardy, K.K., Lock, J.D., Mann, J.R., & Borzekowski, D.L. (2012). Disordered Eating in a Digital Age: Eating Behaviors, Health, and Quality of Life in Users of Websites With Pro-Eating Disorder Content. *Journal of Medical Internet Research*, *14*(5), e148.
- Rodgers, R.F., Skowron, S., & Chabrol, H. (2012). Disordered Eating and Group Membership Among Members of a Pro anorexic Online Community. *European Eating Disorders Review*, *20* (1), 9–12.
- Rouleau, C., & von Ranson, K. (2011). Potential risks of pro-eating disorder websites. *Clinical Psychology Review*, *31*(4), 525–531.
- Schroeder, P. A. (2009). Adolescent girls in recovery for eating disorders: Exploring past pro-anorexia internet community experiences. A Psy.D. clinical dissertation presented to the faculty of the California School of Professional Psychology at Alliant International University San Diego. Retrieved from: <http://proquest.umi.com/pqdlink?Ver=1&Exp=12-03-2016&FMT=7&DID=1966308741&RQT=309&attempt=1>
- Shroff, H., & Thompson, J.K. (2006). The tripartite influence model of body image and eating disturbance: A replication with adolescent girls. *Body image*, *3* (1), 17–23.
- Smith, A.R., Joiner Jr., T.E., & Dodd, D.R. (2014). Examining Implicit Attitudes Toward Emaciation and Thinness in Anorexia Nervosa. *International Journal of Eating Disorders*, *47*(2), 138-147.
- Stice, E., Schupak-Neuberg, E., Shaw, H.E., & Stein, R.I. (1994). Relation of Media Exposure to Eating Disorder Symptomatology: An Examination of Mediating Mechanisms. *Journal of Abnormal Psychology*, *103*(4), 836-840.

- Strife, S., & Rickard, K. (2011). The Conceptualization of Anorexia: The Pro-Ana Perspective. *Affilia*, 26(2), 213-217.
- Stunkard, A.J., & Albaum, J.M. (1981). The accuracy of self-reported weights. *American Journal of Clinical Nutrition*, 34(8), 1593–1599.
- Syed-Abdul, S., Fernandez-Luque, L., Jian, W.S., Li, Y.C., Crain, S., Hsu, M.H., ... Liou, D.M. (2013). Misleading Health-Related Information Promoted Through Video-Based Social Media: Anorexia on YouTube. *Journal of Medical Internet Research*, 15 (2), e30.
- Thompson, K.J., van den Berg, P., Roehrig, M., Guarda, A.S., & Heinberg, L.J. (2004). The Sociocultural Attitudes Towards Appearance Scale-3 (SATAQ-3): Development and Validation. *International Journal of Eating Disorders*, 35(3), 293-304.
- Thompson, J.K., & Stice, E. (2001). Thin-Ideal Internalization: Mounting Evidence for a New Risk Factor for Body-Image Disturbance and Eating Pathology. *Current Directions in Psychological Science*, 10(5), 181-183.
- White, M.A., Masheb, R.M., Burke-Martindale, C., Rothschild, B., & Grilo, C.M. (2007). Accuracy of Self-reported Weight Among Bariatric Surgery Candidates: The Influence of Race and Weight Cycling. *Obesity*, 15(11), 2761-2768.
- White, M.A., Masheb, R.M., & Grilo, C.M. (2010). Accuracy of Self-reported Weight and Height in Binge Eating Disorder: Misreport is not Related to Psychological Factors. *Obesity*, 18(6), 1266-1269.
- Williams, S., & Reid, M. (2007). A grounded theory approach to the phenomenon of pro-anorexia. *Addiction Research & Theory*, 15(2), 141–152.
- Wilson, J. L., Peebles, R., Hardy, K.K., & Litt, I. F. (2006). Surfing for thinness: A pilot study of pro-eating disorder web site usage in adolescents with eating disorders. *Pediatrics*, 118(6), e1635-e1643.
- Yom-Tov, E., Fernandez-Luque, L., Weber, I. & Crain, S. (2012). Pro-Anorexia and Pro-Recovery Photo Sharing: A Tale of Two Warring Tribes. *Journal of Medical Internet Research*, 14(6), e151.

Table 1

Thin Commandments Scale items

Scale items	Item mean	Standard deviation	Item total correlation	Factor loading
1. If you aren't thin, you aren't attractive.	2.45	1.23	0.67	0.73
2. Being thin is more important than being healthy.	1.71	1.00	0.73	0.80
3. You must buy clothes, cut your hair, take laxatives, starve yourself, and do anything to make yourself look thinner.	1.67	1.09	0.74	0.81
4. Thou shall not eat without feeling guilty.	2.17	1.30	0.73	0.79
5. Thou shall not eat fattening food without punishing oneself afterwards.	2.07	1.28	0.74	0.80
6. Thou shall count calories and restrict intake accordingly.	2.66	1.35	0.61	0.67
7. What the scale says is the most important thing.	2.35	1.28	0.71	0.76
8. Losing weight is good/gaining weight is bad.	3.37	1.27	0.59	0.65
9. You can never be too thin.	1.66	1.06	0.66	0.74
10. Being thin and not eating are signs of true will power and success.	1.87	1.19	0.72	0.79
11. If you are thin, you will be loved and accepted.	2.30	1.38	0.62	0.68

Table 2

Correlations between Thin Commandments Scale and other study measures

Measure	r	p
EDE-Q Total	0.71	<0.0001
EDE-Q Restraint	0.60	<0.0001
EDE-Q Eating Concerns	0.65	<0.0001
EDE-Q Shape Concerns	0.60	<0.0001
EDE-Q Weight Concerns	0.64	<0.0001
SATAQ-3	0.50	<0.0001
BDI	0.36	<0.0001

Table 3

Multiple linear regression analyses predicting disordered eating behaviors from BDI, SATAQ-3 and Thin Commandments Scale measures

Dependent variable	Variable	B ^a	SE(B)	t	p
EDE-Q total (R ² = 0.585)	Constant	-0.277	0.178	-1.56	0.120
	BDI	0.040	0.005	7.66	<0.0001
	SATAQ	0.033	0.058	0.57	0.567
	Thin Commandments	0.930	0.076	12.23	<0.0001
EDE-Q Restraint (R ² = 0.364)	Constant	-0.147	0.246	-0.60	0.551
	BDI	0.012	0.007	1.59	0.114
	SATAQ	-0.080	0.080	-0.99	0.321
	Thin Commandments	1.076	0.105	10.25	<0.0001
EDE-Q Eating Concerns (R ² = 0.497)	Constant	-1.098	0.224	-4.88	<0.0001
	BDI	0.045	0.007	6.76	<0.0001
	SATAQ	-0.050	0.073	-0.67	0.501
	Thin Commandments	1.016	0.096	10.57	<0.0001
EDE-Q Shape Concerns (R ² = 0.507)	Constant	0.280	0.224	1.25	0.212
	BDI	0.056	0.007	8.47	<0.0001
	SATAQ	0.159	0.073	2.18	0.030
	Thin Commandments	0.767	0.096	8.00	<0.0001
EDE-Q Weight Concerns (R ² = 0.506)	Constant	-0.137	0.218	-0.63	0.529
	BDI	0.048	0.006	7.51	<0.0001
	SATAQ	0.102	0.071	1.43	0.153
	Thin Commandments	0.858	0.093	9.20	<0.0001
Frequency of purging (R ² = 0.214)	Constant	-6.594	1.562	-4.22	<0.0001
	BDI	0.268	0.046	5.79	<0.0001
	SATAQ	0.004	0.508	0.01	0.993
	Thin Commandments	2.256	0.676	3.34	0.001

^a Unadjusted coefficients.

Table 4

Participant Demographics^a

Characteristic	Total sample (N=331) ^b	Visitors (N=62) ^b	Non-visitors (N=260) ^b	P ^c
Sex				
Male	57 (17.4)	6 (9.7)	47 (18.3)	0.102
Female	271 (82.6)	56 (90.3)	210 (81.7)	
Race				
Caucasian	244 (74.2)	45 (72.6)	194 (75.2)	0.671
Non-Caucasian	85 (25.8)	17 (27.4)	64 (24.8)	
Age				
18-24 years	90 (30.9)	24 (44.4)	64 (27.7)	0.004
25-34 years	95 (32.7)	22 (40.7)	73 (31.6)	
35-44 years	31 (10.7)	5 (9.3)	26 (11.3)	
45-54 years	35 (12.0)	1 (1.9)	33 (14.3)	
55-64 years	30 (10.3)	1 (1.9)	27 (11.7)	
65-74 years	10 (3.4)	1 (1.9)	8 (3.5)	
Mean age	34.60 ± 14.03	27.7 ± 9.5	35.9 ± 14.2	
Education				
Some college or below	157 (47.6)	27 (43.6)	124 (47.9)	0.540
College degree or above	173 (52.4)	35 (56.5)	135 (52.1)	
Region				
Northeast	87 (27.6)	16 (28.1)	71 (28.5)	0.563
South	72 (22.9)	11 (19.3)	58 (23.3)	
Midwest	73 (23.2)	12 (21.1)	57 (22.9)	
West	75 (23.8)	18 (31.6)	56 (22.5)	
Pacific	8 (2.6)	0 (0.0)	7 (2.8)	

^a Table values are mean ± SD for continuous variables and n (column %) for categorical variables.

^b Ns may not sum to 331, 62 or 260 due to missing data, and percentages may not sum to 100% due to rounding.

^c P-value is for t-test (continuous variables) or chi-square or Fisher's exact test (categorical variables).

^d The groups did not have equal variances. Satterthwaite correction applied.

Table 5

Participant dieting status, actual and perceived weight status, and weight history^a

Characteristic	Total sample (N=331) ^b	Visitors (N=62) ^b	Non-visitors (N=260) ^b	p ^c
History of being overweight				
Yes	220 (66.5)	38 (61.3)	173 (66.5)	0.421
No	87 (26.3)	17 (27.4)	70 (26.9)	
Don't know	24 (7.3)	7 (11.3)	17 (6.5)	
Weight status at present				
Underweight	23 (7.0)	6 (9.7)	17 (6.6)	0.036
Healthy weight	117 (35.8)	30 (48.4)	86 (33.6)	
Overweight	80 (24.5)	15 (24.2)	62 (24.2)	
Obese	107 (32.7)	11 (17.7)	91 (35.6)	
Mean BMI	28.4 ± 8.7	25.5 ± 7.1	29.0 ± 9.0	0.001 ^d
Perceived weight status				
Underweight	18 (5.4)	3 (4.8)	15 (5.8)	0.107
Healthy weight	124 (37.5)	30 (48.4)	93 (35.8)	
Overweight	140 (42.3)	25 (40.3)	108 (41.5)	
Obese	49 (14.8)	4 (6.5)	44 (16.9)	
Correct/incorrect estimation of weight status				
Underestimated weight	81 (24.8)	9 (14.5)	68 (26.6)	0.090
Perceived and actual weight status matched	222 (67.9)	46 (74.2)	171 (66.8)	
Overestimated weight	24 (7.3)	7 (11.3)	17 (6.6)	
Currently on a diet to lose weight				
Yes	163 (49.7)	36 (58.1)	124 (48.3)	0.165
No	165 (50.3)	26 (41.9)	133 (51.8)	
Weight change during the past 6 months				
Decreased by 10 pounds or more	42 (12.7)	10 (16.1)	31 (12.0)	0.421
Decreased by 5 to 10 pounds	62 (18.8)	8 (12.9)	54 (20.9)	
Been relatively stable	105 (31.8)	19 (30.7)	84 (32.4)	
Increased by 5 to 10 pounds	77 (23.3)	18 (29.0)	55 (21.2)	
Increased by 10 pounds or more	44 (13.3)	7 (11.3)	35 (13.5)	

^a Table values are mean ± SD for continuous variables and n (column %) for categorical variables.^b Ns may not sum to 331, 62 or 260 due to missing data, and percentages may not sum to 100% due to rounding.^c P-value is for t-test (continuous variables) or chi-square or Fisher's exact test (categorical variables).^d The groups did not have equal variances. Satterthwaite correction applied.

Table 6

Comparison of visitors and non-visitors on clinical features of eating disorders and on overvaluation of thinness^a

Feature	Visitors (N=62)	Non-visitors (N=260)	df	t	p
EDE-Q Total	3.2 ± 1.7	2.4 ± 1.4	305	3.71	<0.001
EDE-Q Restraint	2.9 ± 1.9	2.0 ± 1.6	306	3.79	<0.001
EDE-Q Eating Concerns	2.5 ± 1.9	1.6 ± 1.6	306	3.82	<0.001
EDE-Q Shape Concerns	3.9 ± 1.8	3.3 ± 1.7	305	2.69	0.008
EDE-Q Weight Concerns	3.4 ± 1.8	2.7 ± 1.6	305	2.71	0.007
EDE-Q Binge eating frequency (past 28 days)	6.6 ± 17.3	2.9 ± 7.8	301	2.48	0.014
EDE-Q Purging frequency (past 28 days)	6.9 ± 16.0	1.5 ± 6.0	59.9	2.51	0.015 ^b
BDI	20.3 ± 13.7	15.3 ± 11.1	70.7	2.49	0.015 ^b
Thin Commandments Scale	2.6 ± 1.1	2.1 ± 0.8	77.2	2.68	0.009 ^b
SATAQ	3.5 ± 1.2	2.9 ± 1.1	319	3.74	<0.001

^a Table values are mean ± SD that were obtained by independent t-tests.

^b The groups did not have equal variances. Satterthwaite correction applied.

Table 7

Comparison of visitors and non-visitors on attitudes toward pro-eating disorder websites^a

Characteristic	Total sample (N=331) ^b	Visitors (N=62) ^b	Non-visitors (N=260) ^b	p ^c
Effect of exposure on viewers				0.097
Definitely harmful	217 (67.4)	37 (59.7)	179 (69.1)	
Harmful	57 (17.7)	9 (14.5)	48 (18.5)	
Neither harmful nor helpful	21 (6.5)	7 (11.3)	14 (5.4)	
Helpful	19 (5.9)	6 (9.7)	13 (5.0)	
Definitely helpful	8 (2.5)	3 (4.8)	5 (1.9)	
Existence of these websites				0.172
Definitely unacceptable	137 (42.4)	22 (35.5)	114 (43.9)	
Unacceptable	94 (29.1)	17 (27.4)	77 (29.6)	
Neither acceptable or unacceptable	60 (18.6)	13 (21.0)	47 (18.1)	
Acceptable	24 (7.4)	6 (9.7)	18 (6.9)	
Definitely acceptable	8 (2.5)	4 (6.5)	4 (1.5)	
Visitors of these sites				0.409
Definitely unhealthy	213 (66.2)	37 (59.7)	176 (68.0)	
Unhealthy	70 (21.7)	16 (25.8)	53 (20.5)	
Neither healthy nor unhealthy	22 (6.8)	6 (9.7)	16 (6.2)	
Healthy	11 (3.4)	1 (1.6)	10 (3.9)	
Definitely healthy	6 (1.9)	2 (3.2)	4 (1.5)	

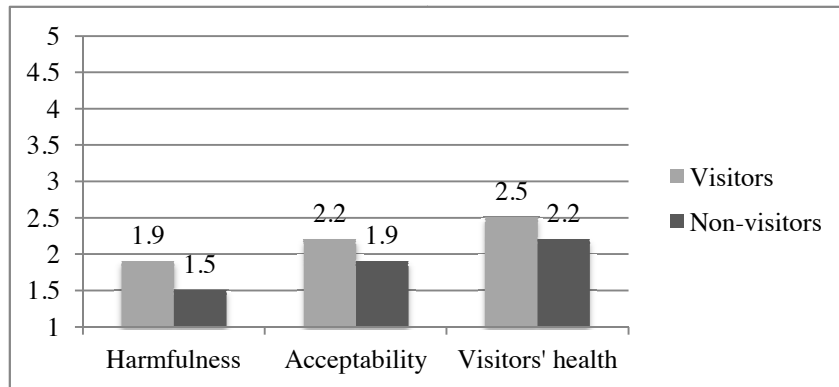
^a Table values are n(column %).

^b Ns may not sum to 331, 62 or 260 due to missing data, and percentages may not sum to 100% due to rounding.

^c P-value is for Fisher's exact test.

Figure 1

Comparison of visitors' and non-visitors' mean scores regarding websites' harmfulness, websites' unacceptability and users' health.



Note 1- Significance levels: harmfulness ($p=0.051$), acceptability ($p=0.036$) and users' health ($p=0.166$).

Note 2- The groups did not have equal variances regarding websites' harmfulness. Satterthwaite correction applied.