Like traditional media, information on the World Wide Web may encourage both healthy and unhealthy behaviors. This study reports on the content analysis of a particular genre of Web site that promotes unhealthy behaviors: pro-eating disorder Web sites. Framed in message design theory, the results of this study indicate that messages on pro-eating disorder Web sites promote response efficacy in continuing disordered behaviors, but messages promoting severity and susceptibility to weight gain and self-efficacy were not common. Given the importance of combining response and self-efficacy messages for maximal effectiveness of messages, the pro-eating disorder sites may have limited effectiveness in effecting behavioral change among site visitors.

The Internet is recognized as an important tool for those who seek out and provide health-related information (Johnsen, Rosenvinge, & Gammon, 2002; Williams, 2003). Health communicators are increasingly turning to the primary text presentation system on the Internet, the World Wide Web (i.e., the Web; James & Jansen, 1998) to provide prevention information and supportive interventions about health issues via Web pages, online discussion forums, and e-mail (Finfgeld, 2000; Winzelberg et al., 2000; Zabinski et al., 2000). The Web is a unique source of information because those who desire health information can seek it out anonymously (Pingree et al., 1996; Rice & Katz, 2001). Moreover, it can be a channel for informal communication about health issues, a substantive area of health communication that has been largely neglected by researchers (Cline, 2003).

Although the Web can be a source of legitimate health-promotion information, the darker side of the Web has been acknowledged (Johnsen et al., 2002). That is, the Web may also be used as a tool for the exchange of inaccurate information and promotion of unhealthy or destructive behaviors (Finfgeld, 2000; Johnsen et al., 2002). This study uses the principles of health message design theories in a content analysis of a particular genre of Web site: those that promote eating disorders. Specifically, this study has two primary goals. First, to describe the general content and structure of these Web sites (termed the structural characteristics of the sites, following the work of McMillan, 2000). Second, the extended parallel processing model (EPPM; Witte, 1992, 1994) is used as a framework for examining the specific message content on so-called pro-ana (pro-anorexia) and pro-mia (pro-bulimia) Web sites. Before turning to a discussion of the theoretical framework, it is first necessary to draw the distinctions between several types of eating disorders, address the nature of communication about eating disorders, and examine the ways in which eating disorders are addressed in content on the Web.

EATING DISORDERS IN THE UNITED STATES

A burgeoning obesity problem in the United States has been accompanied by mounting anxiety about weight and body shape and increased incidence of eating disorders (Killen et al., 1996). The prevalence of eating disorders among young women is particularly alarming (National Eating Disorders Association, 2003); some estimates indicate that 25% of college women are at risk for developing an eating disorder (Drewnowski, Yee, Kurth, & Krahn, 1994). Although there are a number of diagnosable eating disorders, the most common are anorexia nervosa and bulimia nervosa (Spearing, 2001).

Anorexia nervosa is a condition that is characterized by food refusal and marked weight loss (Lee, 1996); techniques to maintain weight may include excessive or compulsive exercise and purging by means of vomiting and use of laxatives,
enemas, and diuretics (Goldmann, 1999; Spearing, 2001). Bulimia nervosa is a condition characterized by frequent binge eating followed by behaviors designed to compensate for weight gain (Spearing, 2001), including excessive exercise; fasting; self-induced vomiting; and/or purging with the use of laxatives, diuretics, enemas, or other medications (Spearing, 2001).

Although both anorexia nervosa and bulimia can be cured or prevented through therapeutic intervention (Enright & Tootell, 1986; Grodner, 1991; National Eating Disorders Association, 2003), many people with eating disorders do not seek out help for the disorder (Smalec & Klingle, 2000). Persons with eating disorders tend to keep their disordered behaviors secret and delay treatment because they may not perceive that they have a health problem (National Eating Disorder Association, 2003) or because face-to-face communication about the disorder may be perceived as shameful and stigmatizing (Fairburn & Beglin, 1993; Skarderud, 2003). Given the fact that many people with eating disorders do not seek professional help for the disorder and that communicating about the disorder may be embarrassing or stigmatizing for some, the characteristics of the Internet make it a particularly good tool for communicating with persons who have eating disorders (Skarderud, 2003).

INTERNET-BASED INFORMATION ABOUT EATING DISORDERS

Internet-based information sources appear to be a particularly good way for those with sensitive health concerns to obtain information and support without face-to-face interaction (Rice & Katz, 2001). People may use the Internet rather than other media due to the perception that the Internet can offer “convenience, anonymity, reliability, interactivity, and asynchronicity” (Rice & Katz, 2001, p. 94). Health communication content on the Internet can take the form of what Cline (2003) calls formal, planned health communication or informal, incidental messages. Moreover, Internet-based communication is unique from other mediated communication in that it involves quasi-interpersonal communication (Rice & Katz, 2001) with varying degrees of interactivity (Eveland, 2003) and intimacy.

Like most health-related issues, information about eating disorders is readily available on the Web (Johnsen et al., 2002), but researchers have a fairly limited understanding of the nature of this content (Tomasello, 2001). Internet-based information about eating disorders generally comes in the form of Web sites developed and facilitated by nongovernmental eating disorder prevention organizations (e.g., the National Eating Disorders Association), state and federal government (e.g., National Institutes of Health), media outlets, and private individuals. The Internet has also been used to discourage eating disorders through provision of prevention and supportive information in the form of targeted interventions (e.g., Celio et al., 2000; Zabinski et al., 2000) and formation of support groups (Johnsen et al., 2002; Winzberg, 1997).

There is mounting evidence that the content found on the Web and Internet-mediated interactions may be used not only to help people cope with eating disorders in a way to become healthy but also to enable them to continue unhealthy behaviors (Johnsen et al., 2002; Udovitch, 2002). The popular press has documented the existence of so-called pro-ana and pro-mia Web sites (Udovitch, 2002). The content and discourse on these sites appears to promote a pro-eating disorder culture. Although the potential persuasive power of these online groups has been documented in the popular press, with some calling for a ban on any pro-eating disorder sites (Adams-Alwine, 2003), the characteristics and content of these sites are not well understood by researchers. Theoretically based content analysis of these sites may provide insight into the nature of communication about eating disorders and how lay health communicators design health communication messages.

HEALTH MESSAGE DESIGN THEORY

Message design theories such as the EPPM (Witte, 1992, 1994) provide a framework for effective ways to communicate health-related information. The EPPM (based on work by Leventhal, 1970; Rogers, 1975) describes the components of a message that are necessary to motivate behavior change and proposes that effective health risk messages should contain two main components: threat and efficacy (for complete exposition, see Witte, 1992). According to the EPPM, the content of messages are exogenous variables in the model. The threat component of a message should be designed to make audiences perceive that they are susceptible to a severe health threat. These message factors should motivate two beliefs in the people who see the message. Perceived severity is described as the individual’s belief regarding the seriousness of the threat and perceived susceptibility is the individual’s belief regarding his or her chances of experiencing the threat (Witte, 1992). These factors combine to determine the extent to which people perceive they are at risk for a health threat. See Table 1 for definitions of the message variables derived from Witte (1992).

The efficacy component of the message, also exogenous to the EPPM model, is designed to convince individuals they are able to perform some behavior (i.e., perceived self-efficacy) and that the behavior or the desired outcome of the message (typically termed a recommended response) effectively averts the threat (i.e., perceived response efficacy). Thus, a highly efficacious message should convince people that engaging in some recommended response will work to reduce their level of risk for the health threat and that engaging in this recommended response is simple and effective (Witte, 1992).
The EPPM proposes that people may respond to a health risk message in one of three ways. First, if a message does not induce a perception of risk, people will not react to the message because without the perception of a risk they are not motivated to pay attention to or process the message. Second, if people perceive high levels of risk and low efficacy, they will take steps to quell their emotional reaction to the threat (termed fear control) as opposed to taking action to reduce their risk. Finally, if persons perceive high levels of risk and high levels of efficacy, then they are motivated to protect themselves against the threat, often by performing the response recommended in the message (Witte, 1992, 1994).

Experimental tests of the effects of the various components of the EPPM, perceived risk in particular, have met with mixed success (see Rimal & Real, 2003, for a discussion). The EPPM has been used as the theoretical framework for formative and summative analysis of communication campaigns for a variety of issues, including radon awareness (Witte, Berkowitz, et al., 1998), HIV/AIDS prevention (Cameron, Witte, Lapinski, & Nzyuko, 1999; Witte, Cameron, Lapinski, & Nzyuko, 1998), and other issues. These analyses indicate that communication campaigns often focus on messages designed to increase perceptions of threat without increasing efficacy levels (Cameron et al., 1999). This is problematic for campaigns because, according to the EPPM, if messages increase threat perceptions without concurrently increasing efficacy perceptions, maladaptive responses are likely to occur. This article follows the models of these earlier studies in that it uses the EPPM as a framework for examining the content of existing messages, but in this case, the messages were created by lay health communicators rather than campaign designers.

RATIONALE AND RESEARCH QUESTIONS

The EPPM and other message design theories have been widely used in the design and evaluation of persuasive campaigns by professional communicators and researchers (cf. Lapinski & Witte, 1998, for a review); however, many of the concepts central to these theories are relatively intuitive. That is, although lay health communicators may not be aware of the complex relations among the variables as described in the EPPM, the unique power or main effects of the variables that comprise theories such as the EPPM may be used by people in everyday message design. Indeed, research on interpersonal influence processes indicates that in everyday communication people use both simple (e.g., Hunter & Boster, 1987, Wiseman & Schenk-Hamlin, 1981) and complex (Cody & Seiter, 2001) social influence strategies. It is possible then, that lay health communicators use the influence strategies specified in message design theories when communicating with others to convince them to engage in some action.

Like professional communicators, lay health communicators may create messages that promote either healthy or unhealthy behaviors (Ferguson et al., 1992). Both sides of this issue deserve attention from communication researchers (Cline, 2003); however, it is messages concerning unhealthy behaviors that are of interest in this investigation because these messages play an important role in influencing health behaviors (Wallack, 1989). Communication researchers are just beginning to explore the content and use of Internet-based information (Tomasello, 2001), in part, because of the unique challenge of analyzing a constantly changing phenomenon (McMillan, 2000). This study examines the extent to which the components of the EPPM are exhibited by Web sites designed by lay health communicators to encourage people with eating disorders to continue the behaviors that characterize that disorder (i.e., the pro-ana and pro-mia sites). To do this, it was necessary to consider message design theories from a new perspective. That is, the focus changes from a health threat in the traditional sense (e.g., contracting HIV and AIDS, dying from lung cancer) to factors that are likely to be threatening to people who have or are at risk for eating disorders, who are likely the primary audience for the pro-eating disorder Web sites (Udovitch, 2002). For those with or at risk for anorexia or

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<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Sample Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity</td>
<td>Messages promoting the seriousness or fear of gaining weight</td>
<td>“Fat is evil” and “If you aren’t thin, you aren’t attractive”</td>
</tr>
<tr>
<td>Susceptibility</td>
<td>Messages promoting the likelihood that target will experience weight gain</td>
<td>“What’s on your fingers today is on your hips tomorrow”</td>
</tr>
<tr>
<td>Recommended response</td>
<td>Actions or responses promoted in the messages</td>
<td>“Do you want to stay fat?”</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Messages promoting the ability to engage in some recommended behavioral response</td>
<td>“Drink cold water” and “Never eat after 6 p.m.”</td>
</tr>
<tr>
<td>Response efficacy</td>
<td>Messages promoting the effectiveness of some recommended response for avoiding weight gain</td>
<td>“Be strong” and “You can do it”</td>
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</table>

TABLE 1
Theoretical Variables, Definitions Derived From Witte (1992), and Sample Messages From the Web Sites
bulingemia nervosa, the risk that is central is weight gain (e.g., getting fat or gaining weight) and the actions taken by those with these disorders center around avoiding the threat of weight gain (Spearing, 2001).

The question then becomes, to what extent are the theoretical variables such as those addressed in message design theories exemplified in content of Web sites designed by lay health communicators? One way to better understand this issue is to examine the extent to which the sites exhibit messages containing the components of message design theories such as the EPPM. For example, these sites may have messages promoting the severity of (i.e., “Gaining weight is scary”) and susceptibility to (i.e., “If you eat anything, you will get fat”) the threat. Moreover, communicators may design messages containing information about the self or response efficacy of certain behavioral responses. Thus, this study used content analysis to examine the extent to which pro-eating disorder Web sites (pro-ana and pro-mia sites) contain messages exhibiting the variables described in the EPPM. First, however, given the relative novelty of research on pro-eating disorder Web sites and the limited research on the content of Web sites in general, this study sought to describe the structural characteristics of the sites, which includes the nature of the content of the sites, the links to external sites, and the services offered on the sites (Finfgeld, 2000; McMillan, 2000).

**RQ1:** What are the structural characteristics of pro-eating disorder Web sites?

The following research questions center on the variables in the EPPM. Specifically, the second and third research questions examine the extent to which pro-eating disorder sites exhibit messages promoting the severity of and susceptibility to the threat of weight gain. Targeting these variables is central to the model, and, according to the EPPM, targeting severity and susceptibility is a requisite initial step in the design of messages to change behaviors. That is, if severity and susceptibility are not promoted within a message (and perceive the threat. Moreover, communicators may design messages containing information about the self or response efficacy of certain behavioral responses. Thus, this study used content analysis to examine the extent to which pro-eating disorder Web sites (pro-ana and pro-mia sites) contain messages exhibiting the variables described in the EPPM. First, however, given the relative novelty of research on pro-eating disorder Web sites and the limited research on the content of Web sites in general, this study sought to describe the structural characteristics of the sites, which includes the nature of the content of the sites, the links to external sites, and the services offered on the sites (Finfgeld, 2000; McMillan, 2000).

**RQ2:** Do pro-eating disorder Web sites exhibit severity messages?

**RQ3:** Do pro-eating disorder Web sites exhibit susceptibility messages?

The next set of research questions address the extent to which the pro-eating disorder Web sites contain messages that address efficacy. Recall from the EPPM that promoting perceived efficacy is also necessary to increase the probability of adaptive processing of message content and behavior change. To do this, it is first necessary to determine which behaviors the sites recommend to avoid weight gain (i.e., recommended responses) and examine the response and self-efficacy messages for each recommended response. That is, messages about efficacy can only be considered contingent to some recommended response.

**RQ4:** What are the recommended responses promoted in the pro-eating disorder Web sites?

**RQ5:** Do pro-eating disorders Web sites exhibit response efficacy messages?

**RQ6:** Do pro-eating disorders Web sites exhibit self-efficacy messages?

Certainly, a significant portion of the content of the pro-eating disorder Web sites will not be related to the theoretical variables specified in the EPPM. The final research question is designed to address the content in the sites other than that which is relevant to the theoretical framework of this article in hopes of using this information to inform theory.

**RQ7:** What is the nature of the content of pro-eating disorder Web sites that is not related to the theoretical variables in the EPPM?

### METHOD

**Sampling**

The Internet search engine Google\(^1\) was used in a search during a 24-hr period in March of 2003 to draw the sample for the study. McMillan (2000) recommends sampling Internet-based content using a search engine during a limited time frame due to the fluid nature of the content. The search was done initially using the advanced search format in Google with the term “pro-eating disorder”\(^2\) as the search keyword. This keyword provided a list of 106 Web sites for the sample. Consistent with Elliott’s (1999) recommendations for sampling Internet-based content, the sites were reviewed for the evidence of several criteria to limit the sample. To meet the criteria for inclusion in the sample, Web sites had to include a home page, a menu, a list of links, and a list of tips; be an active site, be in the English lan-

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\(^1\)Google was chosen as the search engine because it uses all of the major search engines to complete a search, yielding the most complete search available.

\(^2\)The phrase was searched in quotations to provide a more refined and accurate search. When quotations are placed around the phrase in Google, the search engine ignores common words and locates Web pages or sites with the exact term being contained in the page or site.
guage; and be managed by an individual rather than an organization.³

Each page in the initial sample that yielded a links page was reviewed and all of the links were traced for potential pages for inclusion in the sample. Each linked page was evaluated using the criteria presented above. Additional Google searches made with the terms “pro-anorexia” and “pro-bulimia” generated thousands of Web page hits that were typically popular press articles about eating disorders. In each case, the search terms were chosen because they are likely terms that persons trying to access these sites might use. For each search, the top 200 hits were reviewed for the extent to which they met the sample selection criteria. The search procedures resulted in a final sample of 19 Web sites and more than 400 pages of content. The list of the Web sites included in the study is available from the author.

Coding Procedures

The elements included in the sample were printed during the 24-hr period in which the sampling took place to allow for reliable coding. Previous research has indicated that actual changes in Web page content may sometimes be misinterpreted as a lack of intercoder reliability (McMillan, 2000). The structural characteristics of the sites were examined by assessing the nature of the content of each of the sites by the first author. The structural characteristics of each site—including whether or not each site had a disclaimer, picture gallery, thinspiration section, internal and external links, and notes on the general focus of the content (as pro-anorexia, pro-bulimia, or generally pro-eating disorder)—were recorded in a database. The number of links to external sites was counted for each site.

Only the text on the home pages and tips sections were coded for the theoretical variables.⁴ The content of the sites was unitized by the coders with phrases as the unit of analysis. Coders were six members of the research team who were trained to recognize the theoretical variables. A description of the definitions derived from Witte (1992) and used by the coders is presented in Table 1. The recommended responses were coded into one of six categories of response⁵ derived from the literature on behavioral manifestations of anorexia and bulimia (e.g., National Eating Disorder Association, 2003; Spearing, 2001) and a cursory review of site content. The six primary recommended responses for avoiding weight gain or losing weight included purging (vomiting of previously ingested food), fasting (not eating or eating very small amounts of foods), use of drugs believed to facilitate weight loss (e.g., laxatives, diet pills, diuretics, herbal remedies), engaging in excessive exercise, excessive intake of water, and eating specific foods (e.g., low fat or carbohydrate foods, easily purged foods). Additional recommended responses were recorded and coded in an “other” category. Four of the Web sites were coded independently by all of the coders to establish intercoder reliability. Because of the large number of coders, intercoder reliability was calculated in terms of redefined Scott’s Pi⁶ (cf. Lombard, Snyder-Duch, & Bracken, 2002; Potter & Levine-Donnerstein, 1999) and resulted in π = .94 for the coding of whether or not each message fit the theoretical variables. The coding of the recommended responses yielded perfect agreement (π = 1.0). All disagreements were resolved by discussion among the coders.

RESULTS

Structural Characteristics of the Web Sites

The first research question examined the structural characteristics of pro-eating disorder Web sites. Because of the sampling constraints, all of the 19 Web sites included in the sample had a home page, a menu, a list of links to other Web sites, and a list of tips for avoiding weight gain. Most of the content of the sites focused on anorexia exclusively (n = 12). Fewer of the sites in our sample focused on both anorexia and bulimia (n = 6). Only one site dealt exclusively with bulimia. Review of the content of the sites indicated all of the sites

³ The distinction between organizational versus individually managed Web sites was included as a sampling criteria because I was interested here in the ways that lay communicators communicate about eating disorders. It is likely that organizational Web sites would be managed by professional health communicators. Given that I was not able to question site designers directly, I cannot be sure that the site designers do not have some training in health communication.

⁴ The sections were chosen because they were common across all Web sites in the sample and consisted primarily of text. Other sections (e.g., Thinspiration) were primarily photographs and text taken from external sources rather than created by the Web site designer. Ha and James (1998) make the case that the home page is the ideal unit of analysis for examination of Web content because the content of the home page drives subsequent exposure to the other content of the site. Moreover, it should be noted that the argument can be made that the pictures represent mechanisms for increasing perceived severity, susceptibility, or efficacy. The pictures were not coded for several reasons. First, attempts at coding the pictures revealed the inherently subjective nature of interpreting these photographs, and, second, the focus of this study is primarily on explicit text-based messages.

⁵ One could consider recommended responses in a hierarchy in which “staying bulimic” or “becoming anorexic” are at the top of the hierarchy and the responses discussed here are at the next level of the hierarchy. For this investigation behavioral responses were analyzed as the unit of recommended response.

⁶ It is acknowledged by the author that like all assessments of intercoder reliability (Potter & Levine-Donnerstein, 1999), Scott’s Pi has limitations as a mechanism for assessing intercoder reliability, including that it overcorrects for chance agreement (Lombard et al., 2002). This method was chosen as the most appropriate assessment of intercoder reliability for this investigation because of the categorical nature of the variables, the large number of coders, and because of the conservative nature of the test (Lombard et al., 2002).
were designed and maintained by individuals claiming to have an eating disorder. Nearly all of the sites contained pictures or graphical representations of thin women. Several sites had a section on the home page called “Ana of the Month” that exhibited a picture of a thin woman, in some cases a famous person or model, accompanied by a description of her weight-related characteristics. Many of the sites contained factual information about eating disorders, diaries kept by the person who maintained the site, body mass index calculators, and listings of “safe” foods and pills. Most sites also contained guest books in which new visitors to the site could sign in and list their current weight and goal weight.

There were several additional structural characteristics of the sites that were common to many of the sites. Thirteen of the sites contained forums for posting messages and chat rooms for real-time communication with other people accessing the sites. In addition, 12 of the 19 Web sites included galleries in which art or photographs were posted. Most of the Web sites (n = 14) presented disclaimers regarding the content of the site (e.g., “This site is NOT here to ‘encourage’ people without an (eating disorder) to ‘become anorexic’ …”) and warning people who do not currently have an eating disorder not to enter the site (e.g., “This is an anorexic site. If you do not have an eating disorder I advise you to leave”). Many of the disclaimer statements were overtly hostile and clearly promoted eating disorders.

Nearly all of the sites (n = 16) had inspirational sections that were often entitled “Thinspiration” and offered photographs, lyrics of songs, poetry, and quotations encouraging readers to continue their disorder. The content of the inspirational sections contained what site designers commonly termed triggers, reverse triggers, and distractors. According to the descriptions provided on several sites, triggers are typically photographs to motivate or encourage continuation of disordered behaviors. Reverse triggers are images designed to repel receivers (generally photographs of obese women), and distractors are designed to help the receiver not think about eating despite hunger. Next to a series of pictures of rail-thin models and celebrities, one site included the following statement regarding triggers: “Whatever your ana taste, hopefully you will find a picture here to trigger and motivate you. There are also ‘reverse triggers’: hideous fat images to remind us of where we never want to go.”

All of the sites offered links to other external sites. The average number of links across sites was fairly high (M = 48.42, SD = 52.32, minimum = 3, maximum = 182) with substantial variation in the number of links provided on the sites. Many of the sites provided evaluative comments next to the links and several sites allowed people who accessed the site to add their favorite links to the list of links. The links were most frequently for pro-anorexia sites or other pro-eating disorder Web sites. Other links also went to dieting or exercise-related sites, book stores, sites promoting self-mutilation, and even eating disorder recovery sites.

### Severity and Susceptibility Messages

RQ2 and RQ3 were proposed to determine the prevalence of messages promoting the severity of and receivers’ susceptibility to gaining weight. Relative to other types of messages, few messages overtly promoted severity or susceptibility in the textual content of the sites. Of the 19 Web sites, 16 exhibited severity messages and 10 exhibited susceptibility messages. Severity messages typically promoted the dangers of eating and becoming overweight and were most frequently exhibited a listing of the “Ana Commandments” or “Thin Commandments” modeled after the biblical Ten Commandments. The commandments are inclusive of statements such as “Thou shalt not eat fattening food without punishing thyself afterward,” “Being thin is always more important than being healthy,” and “If you are not thin, you are not attractive.”

Other overt statement promoted the receivers’ susceptibility to getting fat or gaining weight. These statements were often worded such that they focused directly on the receiver with the word “you” as the subject. For example one site stated: “Think about how you would look 10–15 pounds heavier … scary huh?” and another: “Do you want to stay heavier … scary huh?” and another: “Do you want to stay fat?” and “Just look at yourself in the mirror … see all the fat that you need to get rid of …?” The statements regarding susceptibility were generally accompanied by some recommended response and response efficacy message. For each variable, the average number of messages per site, standard deviation, number of messages, and percentage of the total are shown in Table 2.

#### Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>Number of Messages</th>
<th>% of Total Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity messages</td>
<td>2.84</td>
<td>6.02</td>
<td>54</td>
<td>3.30</td>
</tr>
<tr>
<td>Susceptibility messages</td>
<td>1.16</td>
<td>1.77</td>
<td>22</td>
<td>1.03</td>
</tr>
<tr>
<td>Response efficacy messages</td>
<td>40.58</td>
<td>21.78</td>
<td>767</td>
<td>48.00</td>
</tr>
<tr>
<td>Self-efficacy messages</td>
<td>1.11</td>
<td>2.05</td>
<td>25</td>
<td>1.50</td>
</tr>
<tr>
<td>Nonrelevant messages</td>
<td>38.58</td>
<td>42.54</td>
<td>733</td>
<td>45.70</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>1,601</td>
<td></td>
</tr>
</tbody>
</table>
Recommended Responses

RQ4 centered on the responses recommended in the Web sites for avoiding the threat of weight gain. All 19 of the sites included at least one of the six recommended responses from the coding scheme, as well as a large number of other recommended responses. The recommended responses were often found in the “tips” section of a site. The recommended responses mentioned most frequently by the sites were eating particular types of foods (31% of the recommended responses), using medicinal remedies to avoid weight gain (18%), and fasting (15%). Less frequently, the sites addressed purging (5% of the recommended responses), excessive exercise (8%), and water intake (10%). A number of the recommended responses were coded on the “other” category (31%).

Because of the number of responses coded into the “other” category, these recommended responses were subsequently reviewed to determine the nature of these responses. Behaviors coded in the “other” category varied extensively in terms of their complexity (i.e., elaborate vs. simple tasks) and difficulty (i.e., hard vs. easy to do) and included things such as “eat on small, dark plates,” “buy small clothes,” “take cold showers to stimulate your metabolism,” “make a list of all the things you shouldn’t eat and read it 20 times,” and “wear gooey lipstick … so it will smudge when you eat.” Several of the messages coded in the “other” category centered around methods for eating (e.g., eating slowly) to avoid eating too much food and intentionally exposing oneself to external messages or stimuli to discourage eating (e.g., “Read magazines, my favorites are Vogue and Cosmo,” “Keep a thinspiration book. Get a really nice journal or something and print pictures of skinny models, tips, quotes, or workouts, and glue it in there,” and “Spend a little time every day on pro-anorexic sites”).

Response and Self-Efficacy Messages

To address RQ5 and RQ6, messages were examined to determine whether they promoted either self or response efficacy for each of the recommended responses discussed previously. The balance of the efficacy messages centered on the response efficacy of the various recommended responses. All 19 of the Web sites exhibited response efficacy messages. Of the total messages, 48% represented response efficacy messages (See Table 2).

Many of the response efficacy messages dealt with intake of particular types of food as responses that work to avert the threat of weight gain. These messages promoted particular foods or types of food as optimal for boosting one’s metabolism, for having low caloric or fat levels, or for creating the sensation of being full without calories. For example, several sites indicated “Eat spicy foods it will boost your metabolism,” “Foods with high water content are the most filling,” and “ … soup is good for a low calorie way to fill up.”

Other messages promoted the response efficacy of fasting as a strategy for weight loss. These messages encouraged minimal or no caloric intake such as: “Brush your mouth and teeth often … a fresh mouth helps keep you from wanting to eat,” “Chew food and then spit it out you will still swallow a small amount of food … it feels like you are actually eating,” and “Pour something gross on your food like dish soap or salt so you can’t eat it.” Several messages provided strategies (e.g., placing empty food containers strategically) to help convince significant others that one is eating when one is not.

The Web sites consistently promoted drinking water (particularly ice water) as a highly efficacious method for maintaining or losing weight. It was generally promoted as a no calorie alternative to food and to other drinks. Moreover, several sites indicated that drinking very cold water increases the metabolism, thereby burning calories and promoting weight loss. As one site said “We absolutely must drink water to survive it has zero calories so there is no excuse not to drink it.”

Most of the sites promoted the response efficacy of diet pills, diuretics, laxatives, herbal supplements, and other drugs as mechanisms for weight loss. Sites often provided evaluations and uses of medicinal weight loss products. Like many other messages promoted in these sites, some drugs were promoted because they are believed to raise the metabolism or promote fat or calorie burning. As one site indicated “Take one or two aspirins a day-it raises metabolism” and another said “Buy vinegar pills … or put vinegar in your food it soaks up fat.” Other substances were praised for their ability to reduce the appetite (e.g., ephedra and Ma Huang) or to rid the body of food. It should be mentioned that several of the sites warned against consuming laxatives and diuretics as mechanisms for weight loss, in some cases because of the potential for dehydration and in others because of the stated futility of losing “water weight.”

For response efficacy messages centered around purging, a number of sites discussed consumption of foods designed to facilitate the purging process or “marker foods.” As one site said “When binging … use marker foods which are basically things like tomatoes or chocolate … these will easily show up in a purge and can be a guideline for how much is left inside.” Another site discussed the importance of food texture for purging: “Choose something that you enjoy eating and that will be easy enough to purge, something with sauce, something soft, or something semi-liquid is usually good.”

Finally, messages also addressed the efficacy of exercising as an important tool for weight loss. Some talked about exercising at night to avoid raising suspicion and the importance of exercise for burning mistakenly consumed calories. One site spoke to the importance of “fidgeting” for burning calories when one is forced to sit for extended periods of time.

Only six Web sites contained messages regarding self-efficacy. These messages accounted for only 1% of the total messages. Those that mentioned self-efficacy addressed general self-efficacy related to avoiding weight gain, rather than
self-efficacy linked specifically to some recommended response. For example, the text in one site said “Don’t get discouraged with yourself!” and another said: “Be strong and you will be better than everyone else.” These messages followed a common theme of addressing the uniqueness and individuality of people who are pro-ana or pro-mia—suggesting that those who have eating disorders are stronger and have more willpower and control than other people. One site said “This is your life you only get one on this earth: take control.”

Other Content
The final research question asked about the nature of the content of the Web sites that was not directly relevant to the EPPM. Of the total messages on Web sites, many were not relevant to the EPPM. Nonrelevant messages accounted for 733 of the 1,601 messages coded from the sites. Messages that were not relevant to the theoretical variables addressed in the EPPM were found on all of the Web sites. The content of these messages most typically fell into four categories of messages, those addressing the structure of the site (e.g., “Links on this page do not work … I am fixing this problem as we speak”), navigation through the site (e.g., “Click on the picture above to enter the website”), warnings or disclaimers related to site content (“I, nor this site, are trying to help anyone kill themselves”), or descriptions of site content (“This is my site and its all about eating disorders”). As previously mentioned, the sites also contained pictures, but these were not considered in this analysis.

DISCUSSION
Web sites promoting eating disorders have received attention in the popular press but are not well understood by communication researchers. These sites provide a unique opportunity for insight into the ways in which lay health communicators promote unhealthy behaviors. This study was designed to examine the structural characteristics and content of Web sites promoting eating disorders and to explore the ways in which lay communicators design risk messages.

Examination of the structural characteristics of the sites indicated that the sites provide forums for both synchronous and asynchronous communication, large numbers of links to external sites, disclaimers regarding site content, and extensive pictorial content. The large number of links, the extensive content on the sites, and the diaries and the opportunities for both synchronous and asynchronous communication on the sites suggests that a great deal of time is spent by site designers on the design and maintenance of the sites. The extensive input from people accessing the sites suggests that site users are also spending time to maintain these sites. It appears that the sites may serve as a hobby for many of the creators and users and may actually serve as a trigger or mechanism to continue eating disordered behaviors (akin to a cue to action; a point to be discussed subsequently). Indeed, several sites recommended that people go to and participate in pro-ana and pro-mia Web sites when they need motivation to continue their disordered behaviors. To examine the textual content of the sites, the EPPM was used as a framework to determine the extent to which the Web sites promote severity and susceptibility of weight gain and efficacy around behaviors to prevent weight gain. The analysis indicated that messages promoting severity and susceptibility were relatively infrequent and that messages promoting efficacy, response efficacy in particular, were common. Moreover, the efficacy messages promoted a variety of recommended responses, including fasting, purging, consumption of diet pills, and exercise, as well as many other responses.

The relative infrequency of textual content addressing the severity and susceptibility to weight gain is not unexpected given the probable audience for the pro-eating disorder Web sites. It is likely that people accessing the sites have some type of eating disorder (either diagnosed or undiagnosed). By definition, someone who has an eating disorder is already fearful of and perhaps obsessed with the threat of weight gain. That is, those who access the sites are likely to have high levels of perceived severity and susceptibility and this may be recognized by site designers.

The content of these sites reveals that the designers may intuitively realize that, for most of the people accessing these sites, increasing perceived threat is not necessary because, first, many accessing the site are already high in perceived severity and susceptibility and, second, many of the people accessing the sites are maintaining as opposed to initiating a behavior. Although the EPPM does not currently address this distinction, other theoretical perspectives (e.g., stages of change, DiClemente & Prochaska, 1985; and social cognitive theory, Bandura, 1982) suggest that such a distinction has important implications for message design. Theoretical advancement of the EPPM then, might center on understanding the attributes of the behaviors targeted within a message (e.g., is the behavior new or continuing) and how variations in these attributes interact with perceptions of threat and efficacy. For example, for behaviors that are being maintained, people may have relatively strong beliefs about their own levels of self-efficacy and the response efficacy of a variety of potential responses. In the case of newly initiated behaviors, people may not know whether or not they are able to engage in a recommended response and may be unsure or unaware of the variety and efficacy of potential responses, thus changing the way that these variables would be targeted with messages.

Although overt message content related to severity and susceptibility was relatively uncommon, the photographs termed reverse triggers by the site designers appear to be included to promote severity and susceptibility. Several of the site designers acknowledge that the pictorial content of the sites is designed to be used when receivers believe they are
likely to lapse from their disordered eating behaviors, a method for reinforcement of behaviors akin to cues to action as addressed in the health belief model (cf. Janz & Becker, 1984). The potential persuasive power of these images is recognized by the site creators; the internal links to the trigger pages are often accompanied by a disclaimer. The emphasis on cues to action in these sites and the apparent recognition by lay health communicators of the persuasive power of cues highlights the understudied nature of cues to action in the health communication literature. A cue to action is typically considered an internal or external trigger that affects the decision-making process (Janz & Becker, 1984) and is thought to impact perceptions of threat (Rosenstock, 1974), but conceptual refinement and research on how cues impact behavior is limited (for an exception see Mattson, 1999). The EPPM could be extended to include clear conceptualization of and explicit predictions about the role of cues to action in impacting behaviors—a role that may be distinct from that of other message content.

The limited number of self-efficacy messages exhibited in the sites followed a common theme of addressing the exceptionality of people who identify as pro-ana or pro-mia. The analysis indicated that these messages typically focused on the notion that people with eating disorders, particularly those who embrace the pro-eating disorder culture, are part of an exclusive and unique group of people who are able to control their eating while the world around them becomes obese. This finding has several implications for the design of efficacy messages and for the EPPM.

In health communication campaigns, self-efficacy messages are designed to convince people that they are able to engage in some recommended response (Witte, Berkowitz, et al., 1998). The messages in these Web sites included a self-efficacy promoting message but beyond this provided an argument or sometimes a series of arguments for high self-efficacy—by telling people that the reason they can engage in the recommended response is because they are unique or special in some way. The presentation of arguments or counterarguments to existing beliefs about self-efficacy is not something addressed in the EPPM, although it is addressed in the attitude change literature (e.g., Allen, 1991; Chaiken, 1980; Petty, Cacioppo, & Goldman, 1981). These studies have generally focused on changing attitudes about an issue as opposed to addressing the role of arguments and counterarguments in shifting efficacy perceptions. The unique nature of the Internet as a tool for mass communication is that it allows for more sophisticated message design than do other channels commonly used by communicators; this study indicates that lay health communicators may already be tapping in to this feature.

The sites contained large numbers of response efficacy messages promoting the use of purging, fasting, medicines, exercise, water intake, and particular foods as efficacious for reducing weight, accompanied by very pragmatic information concerning the use of these recommended responses. The sites also promoted a wide variety of other recommended responses ranging from the use of external stimuli to reduce the desire to eat to simple behaviors designed to reduce food consumption.

It is important to note that the responses promoted in these sites range in terms of complexity (from simple to complex) and in difficulty (from easily accomplished to more difficult). Indeed, the fact that many of our responses were coded into an “other” category, despite the fact that the coding scheme came from existing diagnostic tools, suggests that the site designers are considering a complex mix of potential behavioral responses. Because of the variety in complexity and difficulty of these strategies, the responses promoted on the sites have the potential for broad appeal to people who have or may be borderline for initiating an eating disorder. Moreover, presenting behavioral options in this form (as a range of options) is consistent with recent developments in health communication in which risk or harm reduction, rather than risk elimination, is central. That is, people may be more likely to engage in incremental risk reduction behaviors that are simple and easy to do (e.g., changing the type of plates from which one eats) rather than larger behavioral modification that is more complex and difficult (e.g., purging everything one ate for dinner). This suggests a fairly sophisticated thinking on the part of the site designers about the types of responses that can be implemented by the users. Fear appeals generally do not present a range of possible responses but a single recommended response (e.g., wear a condom every time you have sex) and may be ineffective in convincing people that there are smaller behavioral steps that can be taken to reduce their risk.

Second, according to the EPPM, response efficacy messages must be coupled with self-efficacy messages to elicit a functional behavioral response. The Web sites in this study did not exhibit response and self-efficacy messages coupled together. Indeed, the analysis indicated very few overt self-efficacy messages, indicating that lay health communicators may not intuitively understand the relation between self- and response efficacy that is central to the EPPM. Thus, if both of these components are necessary for behavior change, as the EPPM suggests, these sites should not have a significant impact on behaviors. In addition, there may be conditions under which self-efficacy messages are not necessary for convincing people to adopt a recommended response, conditions that are not specified in the EPPM. For example, the extent to which a behavior is being sustained or modified rather than initiated may impact the extent to which the process model central to the EPPM applies.

Like all examinations of Web-based content, this study faces the limitation of the fluid nature of the Web. Many of the sites analyzed in this article may no longer be active or may have changed substantially since the data were sampled. Indeed, during the process of coding for this study, some hosts banned pro-eating disorder content on sites—likely resulting in the elimination of many pro-eating disorder sites.
Further, the extent to which the messages were intentionally designed to convince people to maintain an eating disorder remains unknown, as does the impact of these messages on those who access these sites. Understanding of how people with or at risk for eating disorders use these sites and the goals of site designers may help health communicators further understand how to better use Internet-based communication.

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