THE RELATIONSHIP BETWEEN BODY IMAGE DISTURBANCE AND HEALTH MAINTENANCE BEHAVIORS: AN ASSESSMENT OF BREAST SELF-EXAMINATION AMONG WOMEN

A dissertation submitted to Kent State University in partial fulfillment of the requirements for the degree of Doctor of Philosophy

by

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CHAPTER I

INTRODUCTION

Body image is a multidimensional concept that refers to the way in which an individual experiences or evaluates his or her body shape, weight, or overall appearance as well as one’s thoughts, feelings, attitudes, perceptions, and behaviors related to these domains of physical appearance (Cash & Henry, 1995; Stewart & Williamson, 2004). Thus, a disturbance in body image can manifest in a variety of ways including dysfunctional perceptions, cognitions, emotions, and behaviors that can impact one’s daily functioning and quality of life (Cash & Deagle, 1997; Cash & Smolak, 2011).

Although body image disturbances exist in both men and women (Heywood & McCabe, 2006; Markey & Markey, 2005; Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006), women have higher rates of body image disturbances as measured by concerns about weight and physical appearance as well as drive for thinness than males (Cohane & Pope, 2001; Pliner, Chaiken, & Flett, 1990); in fact, body image disturbances are so common among women in Western culture that researchers consider dissatisfaction with one’s appearance to be normative (Cash & Henry, 1995; Rodin, Silberstein, & Striegel-Moore, 1984). Furthermore, from a developmental perspective, body image disturbances occur in both young and middle-aged women and are relatively stable across the life span (Tiggemann, 2004).
In addition to contributing to impairments in one’s daily experiences, mental health, and quality of life (Cash & Smolak, 2011), body image disturbances are strongly associated with eating pathology. Women with body image disturbances are more likely than body satisfied women to engage in a variety of extreme weight loss behaviors including fasting or significantly reducing caloric intake, adhering to highly restrictive diets, exercising excessively, and engaging in a variety of purging behaviors (Heywood & McCabe, 2006; Keel, 2005; LePage, Crowther, Harrington, & Engler, 2008; Markey & Markey, 2005; Newmark-Sztainer et al., 2006; Pomeroy, 2004; Stice, 2002). Notably, research has found body dissatisfaction to be a consistent risk and maintenance factor for unhealthy eating behaviors characterized by cycles of binging and purging (Stice, 2002). In addition to contributing to the development of these maladaptive compensatory eating behaviors at a non-clinical or sub-threshold level, disturbed body image is also a leading precursor to the development of full-symptom eating disorders like anorexia nervosa and bulimia nervosa (Attie & Brooks-Gunn, 1989; Brooks-Gunn, Attie, Burrow, Rosso, & Warren, 1989; Cattarin & Thompson, 1994; Thompson, Coover, Richards, Johnson, & Cattarin, 1995). Thus, when women develop a disturbed body image, they are at risk for developing eating pathology and experiencing the associated health consequences, including metabolic, gastrointestinal, and cardiovascular consequences (Keel, 2005; Mitchell, Pomeroy, & Huber, 1988; Pomeroy, 2004; Silber, 2005; Steffen, Mitchell, Roerig, & Lancaster, 2007).

Although body image disturbances have been consistently linked to health compromising eating pathology (Stice, 2002), it is likely that such a pervasive problem
would be related to other types of health behaviors as well. To further explore this assumption, the current study examines the relationship between body image disturbances and the frequency with which women engage in an important health maintenance behavior, breast self-examination (BSE). Two potential moderators, health anxiety and risk perception, are also examined. A secondary purpose of this study is to examine the impact of body image disturbances on the experience of negative affect during BSE. The literature review begins with a discussion of the domains of disturbed body image that are of interest to this study, body shame and body avoidance, followed by a discussion of the dependent variable of interest, BSE, and its importance to the maintenance of women’s health. Next, research examining body mass index (BMI) as a predictor of frequency of cancer screening behaviors among women is explored. Next, seven studies that have more directly examined the relationship between body image disturbances and frequency of cancer screening behaviors among women are discussed in detail. Finally, the two potential moderating variables, health anxiety and risk perception, are defined and the role they may play in the hypothesized relationship between body image disturbances and frequency of BSE is outlined.

**Body Shame**

One of the primary domains of body image disturbance is the cognitive-affective domain, which encompasses dysfunctional cognitions and negative affect. A disturbance in body image typically encompasses dysfunctional assumptions about one’s body shape or weight, negative emotions, such as sadness and guilt, and negative psychological outcomes, including depression and low self-esteem (Cash, 2002; Rosen, 1992). Another
negative affective manifestation of body image disturbance, albeit a less thoroughly researched one, is body shame. Body shame encompasses the belief that one is inferior as a result of having objectionable, unattractive, or unfavorable physical traits in comparison to the cultural standard for beauty (Bessenoff & Snow, 2006; Goss & Gilbert, 2002). Thus, body shame is closely associated with internalization of the thin ideal.

Internalization occurs when individuals incorporate messages about physical attractiveness they receive from various sources including culture, family, and peers into their overall worldview (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004). When young women internalize a cultural ideal for thinness and perceive a discrepancy between their appearance and that ideal, affective body image disturbances including shame, embarrassment, and self-consciousness about body shape, size, or weight may result (Bessenoff & Snow, 2006; Noll & Fredrickson, 1998). Furthermore, some theorists argue that because women in Western culture are inundated with information about the importance of weight control, they internalize the belief that failing to maintain thinness is shameful and indicative of a lack of will power (Gilbert & Thompson, 2002).

Body shame occurs not only in young women but in older women as well, making it a salient construct for all age groups (McKinley & Lyon, 2008). While young women may experience shame about the weight gain and development of fat associated with puberty and pregnancy, older women may experience shame about the physical changes of menopause that increase the discrepancy between their actual appearance and the cultural ideal for beauty (McKinley & Lyon, 2008). In addition to being a negative affective disturbance in and of itself, body shame is also associated with several
cognitive, affective, and behavioral consequences. Women who develop body shame may feel both morally and physically inferior and may perceive themselves to be susceptible to ridicule from others, including their peers and family members, as a result of their perceived inadequacies during situations in which physical appearance is salient (Gilbert, 2002; Noll & Fredrickson, 1998). As a result of this fear of ridicule, women experiencing body shame may feel the urge to avoid, hide, or change their perceived flaws or discrepancies from the cultural ideal in hopes of ensuring their social acceptance or decreasing negative affect (Ackard, Kearney-Cooke, & Peterson, 2000; Choma, Shove, Busseri, Sadava, & Hosker, 2009; Schooler, Ward, Merriweather, & Caruthers, 2005). These behaviors serve to maintain or exacerbate body image disturbances like body shame and may also contribute to the development of eating pathology (Shafran, Fairburn, Robinson, & Lask, 2004).

**Body Avoidance**

In addition to disturbances in affect, body image has several behavioral components as women with body image disturbances frequently engage in specific body-related behaviors, including body checking behaviors and body avoidance (Fairburn, 2008; Shafran et al., 2004; Tiggemann & Lacey, 2009; Trautmann, Worthy, & Lokken, 2007). Body dissatisfied women may cycle between periods of both scrutinizing their weight and shape and actively avoiding the examination of their weight and shape. More specifically, body avoidance behaviors are thought to be a manifestation of the overvaluation of weight and shape found among women with body image disturbances and eating disorders (Shafran et al., 2004). When women engage in body avoidance, they
go to great lengths to avoid seeing their weight or body shape by wearing baggy clothing that conceals their shape, avoiding brightly colored clothing that might attract attention, getting dressed in the dark, avoiding examining their reflection in mirrors, and avoiding weighing themselves (Fairburn, 2008; Trautmann et al., 2007). Because daily life involves many situations in which seeing one’s body is necessary or unavoidable, body avoidance can significantly impair functioning (Fairburn, 2008). For instance, a woman evidencing body avoidance would likely find it extremely distressing to perform essential activities, such as bathing or trying on clothing, or may avoid leisure activities or interpersonal situations, including going to a beach or engaging in physical intimacies with a partner (Tiggemann & Lacy, 2009; Trautmann et al., 2007).

In addition to being a manifestation of body image disturbance, body avoidance may also serve to exacerbate preoccupation with body weight and shape (Shafran et al., 2004). As a result of their tendency to avoid looking at their bodies or weighing themselves, women who engage in body avoidance may not allow themselves the opportunity to disprove their irrational thoughts and dysfunctional assumptions about their weight and shape (Crowther & Williams, 2011). Upon systematic examination of their bodies, these women would likely find that their catastrophic assumptions and fears about being overweight and unattractive were largely inaccurate. Research examining treatment for behavioral body image disturbances supports this assertion as women receiving a mirror exposure treatment involving the systematic examination of their reflections evidenced improvements in the behavioral and cognitive-affective domains of body image (Delinsky & Wilson, 2006). Exposure to the feared stimulus of one’s body
can decrease body image disturbances; however, without treatment many women with disturbed body image continue to avoid the examination of their weight and appearance, which only maintains their distress (Delinsky & Wilson, 2006; Shafran et al., 2004).

**Body Image and Health Maintenance Behaviors**

In addition to being associated with health compromising behaviors like pathological eating and inappropriate compensatory weight control strategies, body image, along with its cognitive, affective, perceptual, and behavioral manifestations, may also be associated with various health maintenance behaviors. Health maintenance behaviors are behaviors that one engages in for the purpose of promoting health and preventing negative health outcomes. A variety of behaviors fall into the category of health maintenance behaviors, including engaging in routine medical examinations and screenings for various diseases and physical conditions. These types of disease screenings and physical examinations help to maintain health in that they serve to detect any physical problems that may require treatment before serious complications occur. One of the primary types of routine disease screening physicians recommend for women is cancer screening for various types of cancer including breast, gynecological, and skin cancer (American Cancer Society [ACS], 2012a, 2012b, 2012c). While other health maintenance behaviors are also important for disease prevention and health promotion among women (e.g., hand washing, sleep hygiene, adequate nutrition, physical activity, blood pressure monitoring, etc.), this study focuses on cancer screening behaviors for a variety of reasons. While other health maintenance behaviors are also important for health promotion, cancer screenings are unique in that they are essential for the
prevention and detection of a potentially terminal disease that often requires immediate
Additionally, unlike some health maintenance behaviors, cancer screenings are discrete
behaviors that can be easily monitored and measured through medical records and patient
self-report; therefore, cancer screening behaviors lend themselves well to research. Most
importantly, unlike other health maintenance behaviors, cancer screening behaviors often
require either a manual or visual examination of one’s own body or exposure of one’s
body to a medical professional making these behaviors relevant to the body image
literature. One such body-focused cancer screening behavior is BSE.

The American Cancer Society suggests that women over the age of 20, after
discussing the risks and benefits of self-screening, consider performing monthly BSEs by
applying pressure to the breasts to check for lumps and examining the physical
appearance of the breast and nipple for any unusual discharge or skin changes (ACS,
2012a). Despite recent speculation that BSE should no longer be recommended due to its
ineffectiveness in reducing mortality related to breast cancer (Hackshaw & Paul, 2003;
Humphrey, Helfand, Chan, & Woolf, 2002; Weiss, 2003), these screenings are still
widely presented as options for women’s health regimens (National Cancer Institute,
2012). In fact, some experts suggest that this body of research is flawed and incomplete
and, thus, should not yet inform screening recommendations (Kearney & Murray, 2009).
Despite continued recommendations for regular BSE, rates of engaging regularly in these
behaviors are low. Research suggests that only about one third of women regularly
perform BSEs; furthermore, only about 27% of women perform them adequately
Overall, BSE appears to play a small role in the detection of smaller and more localized tumors and is a cost-effective screening method (ACS, 2012a; Weiss, 2003). Additionally, survival after breast cancer diagnosis may be longer among women regularly engaging in BSE (Weiss, 2003), even if overall mortality is not impacted. Furthermore, research suggests that BSE is more effective when performed correctly (Harvey, Miller, Baines, & Corey, 1997); thus, education has the potential to increase the benefits of this screening behavior and may explain the lack of benefits to BSE found in some studies. Because of the potential benefits of performing BSEs regularly and correctly, identifying those groups of women who are most at risk for non-adherence is important. One empirically supported predictor of non-adherence is BMI. Because BMI is associated with body image disturbances (Sarwer, Dilks, & Spitzer, 2011; Saules, Collings, Wiedemann, & Fowler, 2009; Striegel-Moore & Franko, 2002), examining research on the relationship between BMI and frequency of body-focused cancer screening behaviors may inform the relationship between body image disturbances and frequency of BSE.

**BMI and Body-Focused Cancer Screening Behaviors**

Research suggests that women who are obese (BMI ≥ 30) or morbidly obese (BMI ≥ 40) as defined using the cut points established by the Centers for Disease Control and Prevention (CDC, 2006) evidence a pattern of non-adherence to the general recommendations for several general health maintenance behaviors, including
maintaining a healthy weight and obtaining routine physical examinations (e.g., Drury & Louis, 2002). Additionally, obesity is related to frequency of two specific body-focused cancer screening behaviors that share several features with BSEs. Obese women are more likely to report intentionally delaying mammograms and cervical cancer screenings (Amy, Allborg, Lyons, & Keranen, 2006; Fontaine, Heo, & Allison, 2001). Furthermore, obese women report receiving fewer routine mammograms and cervical cancer screenings in the past than women of normal weight (Amy et al., 2006; Banerjea, Findley, & Sambamoorthi, 2008; Cohen et al., 2008; Ferrante, Chen, Crabtree, & Wartenberg, 2007; Ferrante, Chen, & Jacobs, 2006; Maruthur, Bolen, Brancati, & Clark, 2009; Ostbye, Taylor, Yancy, & Krause, 2005; Wee, McCarthy, Davis, & Phillips, 2000; Wee, McCarthy, Davis, & Phillips, 2004; Wee, Phillips, & McCarthy, 2005) and are more likely than normal weight women to have received no screenings at all in the recent past (Zhu, Wu, Jatoi, Potter, & Shriver, 2006). This relationship between obesity and body-focused cancer screenings appears to increase linearly, as morbidly obese women report receiving the fewest screenings (Amy et al., 2006). However, some studies demonstrate a curvilinear relationship with both underweight and overweight women reporting the fewest screenings (Banerjea et al., 2008; Fontaine et al., 2001; Zhu et al., 2006). Additionally, the link between BMI and non-adherence is more pronounced among Caucasian women (Fontaine et al., 2001; Maruther et al., 2009; Ostbye et al., 2005; Wee et al., 2004; Wee et al., 2005). Despite the wealth of research linking BMI to the frequency of receiving cervical cancer screenings and mammograms, to my
knowledge, no studies have directly examined the impact of obesity on frequency of BSEs.

Although BSEs differ from mammograms and cervical cancer screenings in that BSEs are performed at home without the help of a physician and involve the examination of one’s own body, all of these behaviors fall into the broad category of body-focused cancer screening behaviors and, thus, share several common features. Body-focused cancer screening behaviors, as they are defined for the purpose of this research, involve the exposure or examination of one’s unclothed body and may heighten body consciousness or awareness. Thus, the relationship between BMI and frequency of BSE may be similar to the relationship between BMI and other body-focused cancer screening behaviors. However, without supporting data, definitive conclusions cannot yet be made. Thus, one can only conclude that women outside of the normal weight range, but particularly morbidly obese Caucasian women, are at greatest risk for engaging in less frequent mammograms and cervical cancer screenings, and, based on theory, may be at risk for performing fewer BSEs as well (Fontaine et al., 2001; Maruther et al., 2009; Ostbye et al., 2005; Wee et al., 2004; Wee et al., 2005).

A variety of factors may help to illuminate this link between BMI and frequency of body-focused cancer screening behaviors. First of all, obese women are more likely than women of normal weight to delay or avoid seeking general health care services (Drury & Louis, 2002). In the absence of contact with primary care physicians and gynecologists, obese women are less likely to receive recommendations to engage in cancer screenings and, thus, may be unaware of the importance of engaging in screening
behaviors. Furthermore, when obese women initiate contact with their primary care physicians, the quality of care may be different. Research suggests that physicians spend less time educating obese patients about their health than normal weight women (Bertakis & Azari, 2005). In the absence of thorough health education, obese women may lack the knowledge about how or when to engage in cancer screening behaviors. Additionally, obese individuals are more likely to have medical comorbidities (e.g., mobility impairments) that may be negatively related to frequency of obtaining cancer screenings (Park, Park, Park, Kim, & Park, 2010; Sansone, Sansone, & Wiederman, 1998).

Furthermore, research has demonstrated a negative relationship between BMI and socioeconomic status (Kennedy, Paeratakul, Ryan, & Bray, 2007). Thus, obese individuals may have less access to medical care, lower income, and less education, which may predict lower rates of engaging in cancer screenings (Kennedy et al., 2007). Finally, obese women are less likely than non-obese women to engage in a wide variety of healthy behaviors (Fontaine et al., 2001). If obese women are less focused on general health maintenance and promotion (i.e., exercise, nutrition, weight maintenance, etc.), they may also be less likely to perform cancer screenings. However, many studies that have demonstrated a significant negative association between BMI and frequency of engaging in cancer screening behaviors control for confounding variables, including socioeconomic status, access to health care, access to health insurance, education, mobility, personal concern about health and well-being, self-efficacy, and physician recommendations for cancer screenings (Amy et al., 2006; Ferrante et al., 2007; Wee et
Thus, it is clear that these variables do not fully inform the link between BMI and body-focused cancer screening frequency.

**Body Image Disturbances and Body-Focused Cancer Screening Behaviors**

One variable that may facilitate an understanding of the relationship between BMI and body-focused cancer screening behaviors but has been largely ignored in the literature is body image. While mild dissatisfaction or displeasure with one’s body is so common it is considered to be normative among women (Rodin et al., 1984), more severe body image disturbances are less common but are likely more impactful (Cash & Deagle, 1997). Body image disturbances that surpass a mild level of general dissatisfaction significantly impact women’s perceptions, thoughts, feelings, and behaviors and, as a result, may also negatively impact frequency of engaging in body-focused cancer screening behaviors (Cash & Deagle, 1997). There are several indications that body image may play a role in this literature and, thus, several reasons to focus on this variable. In the studies that demonstrate a negative association between BMI and body-focused cancer screening behaviors, some participants, when asked about their motivations for avoiding or delaying body-focused cancer screenings, cited general embarrassment, discomfort about being weighed on the physician’s scale, fear of receiving unsolicited advice to lose weight, and dissatisfaction with insensitive health care providers (Amy et al., 2006; Drury & Louis, 2002; Wee et al., 2005). However, body image disturbances were not directly measured or assessed in these studies. While some obese women do suffer from body image disturbances (Sarwer et al., 2011; Saules et al., 2009; Striegel-Moore & Franko, 2002), using BMI as a proxy for body image
disturbances (i.e., assuming that all obese women are body dissatisfied) is not methodologically sound as women across the spectrum of body weight can experience body satisfaction or dissatisfaction (American Psychiatric Association [APA], 2000; Rodin et al., 1984). While self-reported feelings of embarrassment or discomfort related to one’s body do not equate to a body image disturbance, this qualitative data suggests that body image is an important variable to more thoroughly examine in this literature.

Research indicating that both overweight and underweight women are less adherent than women of normal weight (Banerjea et al., 2008; Fontaine et al., 2001; Zhu et al., 2006) supports the supposition that body image may play a role in the relationship between BMI and adherence to body-focused cancer screening behaviors. Although not directly measured in these studies, both overweight and underweight women may share a common body image disturbance, albeit perhaps for different reasons. Whereas overweight women may be dissatisfied with their body size and shape as a result of their excess weight, underweight women may have a disturbed body image due to dysfunctional beliefs about their appearance, which subsequently contributed to weight loss behaviors (Cash, 2002; Cash & Smolak, 2011). Body image disturbances in both groups may contribute to a delay or avoidance of body-focused cancer screenings. Additionally, in support of the role of body image is research suggesting that obese Caucasian women but not obese women from underrepresented ethnic groups have been found to engage in less frequent body-focused cancer screenings (Fontaine et al., 2001; Maruther et al., 2009; Ostbye et al., 2005; Wee et al., 2004; Wee et al., 2005). Some research suggests that Caucasian women report higher levels of body image disturbances
than women of other ethnicities, as underrepresented cultures do not equate extreme thinness with beauty to the extent that mainstream Caucasian culture does (Wildes, Emery, & Simons, 2001). Thus, obese or overweight women from underrepresented ethnic groups are more likely to be body satisfied than obese or overweight Caucasian women (Wildes et al., 2001). If a disturbed body image does predict less frequent body-focused cancer screenings, it follows that groups of women who have higher rates of body image disturbances will be more strongly impacted. Such findings paired with the qualitative responses from participants in the obesity studies point to the potential role of body image disturbances in the relationship between BMI and frequency of body-focused cancer screening behaviors; however, because these previously mentioned studies did not measure body image disturbances, conclusions are only tentative.

To my knowledge, only seven studies have utilized various measures of body image to more directly assess whether body image disturbances are associated with body-focused cancer screening frequency. These studies have focused on BSEs as well as other body-focused cancer screening behaviors, including mammograms, skin self-examinations, cervical cancer screenings, and colorectal screenings. In a large scale quantitative study by Clark et al. (2009), researchers examined a variety of barriers to engaging in cancer screenings, including mammography, colorectal screenings, and cervical cancer screenings, in a large sample of unmarried women of various sexual orientations. Body image was one of the most frequently endorsed barriers that participants cited as a reason they delayed or avoided comprehensive cancer screening behaviors (Clark et al., 2009). In fact, participants who cited body image concerns as well
as barriers associated with taking time off of work for the screenings were less likely to report completing cancer screenings on schedule than women who did not cite these barriers (Clark et al., 2009); however, the presence of body image disturbances as a barrier was assessed with a single item.

One qualitative study focused exclusively on the relationship between body image and frequency of receiving screenings for gynecological cancers. Oscarsson, Wijma, and Benzein (2008) interviewed a small group of Swedish women who had failed to participate in the recommended cervical cancer screenings for the past five years. A content analysis of the interview transcripts revealed several themes, one of which was a desire to avoid screenings due to dislike of one’s body (Oscarsson et al., 2008). More specifically, participants reported that perceptions about their bodies being flawed, disfigured, or disgusting as well as discomfort related to allowing strangers to see their naked body contributed to their non-adherence (Oscarsson et al., 2008). However, this study used a small non-representative sample and lacked a psychometrically sound measure of body image disturbance. Additionally, one qualitative study focused exclusively on the impact of body image on frequency of mammography. Thomas and Usher (2009) interviewed women about their attitudes and experiences related to their breasts and their experiences with mammography. Based on an analysis of the content of the interviews, they concluded that body image, or negative feelings about the appearance of one’s breasts, contributed to “breast conflict” which, in turn, negatively impacted the decision to receive mammograms (Thomas & Usher, 2009); however, this study also did not include measures that assessed body image disturbances.
Two quantitative studies have focused exclusively on the link between body image and skin self-examination for the purpose of detecting skin cancer. Jensen and Moriarty (2008) surveyed college students regarding their skin self-examination behaviors as well as related variables, including beliefs related to skin self-examinations, perceived risk, and bodily discomfort (i.e., feeling uncomfortable looking at one’s body), which was assessed with a one-item measure. Results suggested that bodily discomfort was one of several significant predictors of frequency of performing skin self-examinations in the past year for women but not for men; women with more bodily discomfort performed fewer skin self-examinations (Jensen & Moriarty, 2008). Similarly, Risica and colleagues (2008) recruited a large sample to participate in a telephone survey assessing frequency of thorough skin self-examination (i.e., examining the seven key areas of the body) and body dissatisfaction, which was assessed with a one-item measure. Results demonstrated that individuals with higher body satisfaction reported more frequently engaging in thorough skin self-examinations than individuals with body dissatisfaction; however, this effect was more pronounced among women. Although these studies provide support for the link between body image disturbances and general body-focused cancer screening behaviors, studies specifically examining BSEs are also needed.

To my knowledge, only two studies have examined the relationship between body image disturbances and BSEs, one of which examined both skin self-examinations and BSEs concurrently. In a qualitative study, Fish and Wilkinson (2003) examined a group of lesbian women who reported never engaging in BSE and assessed their motivations for
avoiding these behaviors. One of the most common explanations participants gave was that they were uncomfortable with their bodies, which the researchers interpreted as evidence that body image disturbances may play a role (Fish & Wilkinson, 2003). However, no measure of body image disturbance was included in this study. Finally, Chait, Thompson, and Jacobsen (2009) conducted a quantitative study to determine whether body image disturbances impacted frequency of performing BSEs and skin self-examinations as well as intentions to perform these behaviors in the future. Results indicated that women with higher body-areas satisfaction and more positive overall appearance evaluations, as assessed by an empirically supported measure of body image, reported performing more skin self-examinations in the previous year than women with a more disturbed body image (Chait et al., 2009). However, they did not find that these domains of body image were related to behaviors or intentions for BSE (Chait et al., 2009). Authors cite the potential impact of biases in retrospective recall of breast checking behaviors and low response rates as potential methodological explanations for this null finding (Chait et al., 2009). However, they also posit that qualitative differences between skin self-examinations and BSEs may play a role (i.e., skin self-examination requires examination of one’s full body, while BSE requires examination only of one’s breasts; Chait et al., 2009).

Clearly, research is lacking in this area as only seven studies have examined the impact of body image on frequency of body-focused cancer screening behaviors, six of which utilized non-empirically validated measures for body image disturbances. Furthermore, only two of these studies examined the relationship between body image
disturbance and BSE, the body-focused cancer screening behavior of interest to the current study. These two most relevant studies do not offer consistent support as one study was qualitative in nature and the other revealed a non-significant relationship between body image and BSE frequency (Chait et al., 2009; Fish & Wilkinson, 2003). However, one cannot draw conclusions about the relationship between body image and BSE based on the results of a single study. Furthermore, despite the relative strength of the study by Chait and colleagues (2009), this study has some limitations. Most notably, researchers focused exclusively on the cognitive-affective component of body image by measuring general appearance satisfaction, evaluation, and investment while ignoring other dimensions of body image, including body avoidance and body shame (Chait et al., 2009). Other domains of disturbed body image including behavioral disturbances, perceptual disturbances, and more specific types of affective disturbances have not yet been investigated as predictors of BSE frequency. To clarify these pathways, additional quantitative research is needed and at this time, only tentative conclusions can be made about the relationship between body image disturbances and BSE.

Moderators of the Relationship between Body Image Disturbances and BSE

Despite this tentative empirical evidence for the association between body image disturbances and the avoidance of cancer screening behaviors, the relationship between these variables may be more complex; moderator variables may help to illuminate the subtleties of this relationship. A moderator is a variable that affects the relationship between an independent variable and a dependent variable by either strengthening or weakening the relationship (Baron & Kenny, 1986), in this case, the relationship between
body image disturbance and BSE frequency. The fact that moderating variables were not examined in the few studies that assessed the direct impact of body image disturbances on cancer screening behaviors may explain some of the inconsistencies in the findings (e.g., Chait et al., 2009). Given that the current study focuses exclusively on the prediction of a specific body-focused cancer screening behavior, BSE, variables integral to the cancer literature are likely the most relevant moderators.

**Health Anxiety**

One variable that may function as a moderating variable between body image disturbances and BSE is health anxiety. Health anxiety refers to worries, dysfunctional cognitions, and preoccupations related to one’s physical health (Asmundson, Taylor, Sevgur, & Cox, 2001). Health anxiety exists on a continuum and is not always severe enough to warrant a clinical diagnosis; thus, health anxiety is different from hypochondriasis, a severe, clinical form of health anxiety paired with the dysfunctional belief that one has an illness despite evidence to the contrary (APA, 2000; Hadjistavroupoulos, Craig, & Hadjistavropoulos, 1998). Health anxiety is related to several specific styles of thinking. Individuals with health anxiety evidence an attentional bias in that they selectively attend to health and illness-related information (Hadjistavroupoulos et al., 1998; Owens, Asmundson, Hadjistavroupoulos, & Owens, 2004). Furthermore, health anxiety is associated with a cognitive bias in that affected individuals overwhelmingly interpret health and illness-related information negatively (Hadjistavroupoulos et al., 1998; Owens et al., 2004). Additionally, individuals with health anxiety ruminate about their health concerns (Marcus, Hughes, & Arnau, 2008).
This negative cognitive style can exacerbate health anxiety and is hypothesized to contribute to negative affect, avoidance of health care, and other dysfunctional behaviors (Marcus et al., 2008).

Overall, research suggests that health anxiety contributes to increased health care utilization (Salkovskis & Warwick, 1986). Even when statistically controlling for physical health, individuals with higher levels of health anxiety are more likely to initiate contact with their physician and report more frequent visits to health care offices than individuals with low levels of health anxiety (Barsky, Ettner, Horsky, & Bates, 2001; Conroy, Smyth, Siriwardena, & Fernandes, 1999). Additionally, individuals with higher levels of health anxiety are also more likely to seek medical advice from family members and friends and to seek out medical information about their symptoms on the internet (Conroy et al., 1999; Eastin & Guinsler, 2006). Furthermore, the dysfunctional cognitive style associated with health anxiety likely contributes to a tendency to interpret medical information as a need for personal action. According to one study, when individuals with health anxiety read information about healthy diets, they were more likely to report a desire to begin dieting and exercising than low health anxiety individuals who read the same information (Hadjistavropoulos & Lawrence, 2007). However, the theorized link between health anxiety and avoidance of health care seeking behaviors has received less support. In fact, some research has found that health anxious and non-health anxious individuals do not significantly differ in terms of their willingness to seek health or illness-related information or additional medical testing after receiving a diagnosis (Hadjistavropoulos et al., 1998). Furthermore, individuals with higher health anxiety tend
to view medical testing as a positive experience as it decreases their worry about specific disorders more so than for individuals with lower levels of health anxiety (Miles & Wardle, 2006).

Research also demonstrates a relationship between health anxiety and utilization of cancer screening services. It has consistently been found that individuals with greater levels of health anxiety related to cancer are more likely to receive cancer screenings than individuals with less worry. More specifically, research suggests that cancer worries and concerns related to breast cancer predict adherence to mammography and BSE recommendations (Diefenbach, Miller, & Daly, 1999; Erblich, Bovbjerg, & Valdimarsdottir, 2000; Hailey, Carter, & Burnett, 2000; Hay, McCaul, & Magnan, 2006; McCaul, Schroeder, & Reid, 1996; Moser, McCaul, Peters, Nelson, & Marcus, 2007). Thus, having at least a moderate level of non-pathological health anxiety appears to enhance motivation to engage in self-protective cancer screening behaviors (McCaul et al., 1996). However, one study revealed that one domain of cancer-specific health anxiety, intrusive thoughts about cancer, predicted over-performance of BSE, which was defined as engaging in BSEs more than once a month (Erblich et al., 2000). While regular health screening behaviors typically reduce anxiety for individuals with health anxiety, the over-performance of BSE appears to exacerbate and maintain cancer-specific health anxiety (Erblich et al., 2000; Miles & Wardle, 2006). Thus, for most individuals, a moderate level of health anxiety is adaptive and motivating; however, severe levels can impair psychological health and interfere with functioning by contributing to excessive and unnecessary behaviors.
Because of the association between health anxiety and both general health behaviors and cancer screening behaviors, health anxiety may serve as a moderating variable in the relationship between body image disturbances and BSE frequency. Body image disturbances have been linked to engaging in less frequent body-focused cancer screening behaviors (Chait et al., 2004; Fish & Wilkinson, 2003; Jensen & Moriarty, 2008; Risica et al., 2008; Thomas & Usher, 2009). However, research suggests that health anxiety is related not to avoidance of health care but to utilization, and sometimes overutilization of health care services (Barsky et al., 2001; Conroy et al., 1999; Diefenbach et al., 1999; Erblich et al., 2000; Hailey et al., 2000; Hay et al., 2006; Moser et al., 2007). As a result, as health anxiety increases, the negative relationship between body image disturbances and BSE frequency may be attenuated. For instance, if a woman suffers from both a disturbed body image and a moderate to high level of health anxiety, she may be less likely to avoid or delay engaging in cancer screening behaviors despite a desire to avoid these behaviors as a result of her disturbed body image. Therefore, health anxiety may serve as a moderator of this relationship.

**Risk Perception**

In addition to health anxiety, another variable that may impact the relationship between body image disturbances and BSE frequency is risk perception. Risk perception as it relates to health refers to beliefs about one’s susceptibility to experiencing a particular health problem or consequence (Rimal & Turner, 2009). Risk perception can be measured in a variety of ways; it is commonly measured by asking individuals to estimate their risk for a specific health consequence qualitatively (i.e., above average risk,
average risk, below average risk, etc.) or to rate how their personal risk for a specific health consequence compares to the general population’s risk or to their peer group’s risk (Rimal & Turner, 2009). However, cognitive errors or biases may be present in one’s self-assessment including both underestimation and overestimation of risk. These biases have implications for health behaviors.

In general, individuals tend to underestimate their own risk of experiencing negative health events (Gold, 2008) and consistently rate themselves as being at a below average risk for a variety of health problems, including cancer, heart attack, venereal diseases, HIV, and diabetes, even when they have one or more risk factors and are knowledgeable about these risks (Absetz, Aro, Rehnberg, & Sutton, 2000; Baker, Dye, Dennison, & Ainsworth, 2001; Clarke, Williams, & Arthey, 1997; Weinstein, 1980, 1982, 1987). While some individuals are accurate in assessing their risk as low risk for a particular health problem, it is statistically impossible for all individuals to be at a below average risk; thus, a cognitive error referred to as unrealistic optimism is said to be present (Weinstein, 1982). The opposite effect, unrealistic pessimism, has also been demonstrated, albeit, less frequently, regarding the development of various types of disease (Dolinski, Gromski, & Zawisza, 1987; Morrison, Ager, & Willock, 1999; Skinner, Kreuter, Kobrin, & Strecher, 1998).

Several factors have emerged as predictors of risk perception. Research suggests that some individuals underestimate their risk because they lack awareness of the standing of their peers or the general population on the risk factors in question (Weinstein, 1980, 1983). Additionally, personal experience with a particular health
problem significantly impacts risk perception. Specifically, when an individual has a friend or family member with a particular health problem, that individual is less likely to be unrealistically optimistic when assessing their risk for that health problem (Weinstein, 1982; Weinstein, 1987). Research consistently demonstrates this effect for various types of cancer (Absetz et al., 2000; Honda, 2004; Katapodi, Dodd, Lee, & Facione, 2009; Mellon et al., 2008). Furthermore, individuals tend to report a higher perceived risk when they have personally experienced signs or symptoms of a health problem (French & Hevey, 2008; McQueen, Swank, Bastian, & Vernon, 2008).

Some researchers suggest that biases in risk perception may be adaptive in that they protect psychological health (Dillard, Midboe, & Klein, 2009). Unrealistic optimism may reduce anxiety about a specific health problem that might otherwise have contributed to disturbances in functioning (Dolinski et al., 1987; Gold, 2008). Despite enjoying psychological benefits, individuals with low risk perception related to health may be at risk for health consequences. According to the behavior modification hypothesis, if one perceives that he or she has a low risk of developing a particular health problem, he or she will be less likely to engage in health maintenance behaviors than individuals with a higher risk perception (Brewer, Weinstein, Cuite, & Herrington, 2004). Research examining a variety of different health maintenance behaviors supports this hypothesis. Individuals with a higher risk perception were found to be more likely to receive vaccinations (Brewer et al., 2004), perform BSEs (Bryan, 2001; Epstein et al., 1997), and receive mammograms (Gross, Filardo, Singh, Freedman, & Farrell, 2005) than individuals with lower risk perceptions (Katapodi et al., 2009; Larwood, 1978).
However, some inconsistencies exist in the literature. One study found no relationship between perceived risk for breast cancer and frequency of mammograms and clinical breast examinations (Martin & Degner, 2006). However, variables like knowledge and self-efficacy may help to explain the lack of significance in this study (Rimal & Juon, 2010). Despite some inconsistencies, research supports the link between risk perception and health maintenance behaviors, including body-focused cancer screening behaviors.

Because of the documented association between risk perception and body-focused cancer screening behaviors, risk perception may help to illuminate the link between body image and BSE frequency. Body image disturbances are associated with the avoidance or delay of some body-focused cancer screening behaviors (Chait et al., 2004; Fish & Wilkinson, 2003; Jensen & Moriarty, 2008; Risica et al., 2008; Thomas & Usher, 2009). However, having a high risk perception for certain health problems is associated with an increased frequency of engaging in health maintenance behaviors (Brewer et al., 2004; Bryan, 2001; Epstein et al., 1997; Gross et al., 2005; Katapodi et al., 2009; Larwood, 1978). As a result, as risk perception for breast cancer increases, the negative relationship between body image disturbances and BSE frequency may be attenuated. For instance, if a woman with body image disturbances also perceives herself to have a high personal risk for breast cancer, she may be less likely to avoid or delay routine BSEs despite her body image concerns than a body dissatisfied woman with a low risk perception for breast cancer. Thus, risk perception may serve as a moderator of the relationship between body image disturbances and BSE frequency.
The Current Study

The current study investigated the relationship between body image disturbances and BSE behaviors among 130 adult women. These relationships were examined among women who were at least 21 years of age as BSE is recommended for women over the age of 20 (ACS, 2012a). Body shame, an affective component of disturbed body image, and body avoidance, a behavioral component of disturbed body image, were examined as predictors of the frequency of past BSE as well as future intentions to perform BSE. This research also examined two potential moderators, health anxiety and risk perception, which were both hypothesized to attenuate the negative relationship between these two manifestations of body image disturbances and past frequency of BSE. Finally, a secondary purpose of this research was to investigate the potential impact of body image disturbances on the self-reported level of negative affect experienced during the practice of BSE.

This research is important for several reasons. First of all, research examining the relationship between body image disturbances and BSE is currently quite limited. Many studies infer body image disturbances by measuring BMI, a methodologically flawed practice. Only seven studies have examined the impact of body image on frequency of body-focused cancer screening behaviors, six of which utilized non-empirically validated measures for body image disturbances. Furthermore, of these seven studies, only two have examined the relationship between disturbed body image and frequency of BSE specifically and results of these studies were inconsistent (Chait et al., 2009; Fish & Wilkinson, 2003). Thus, the current research adds to this relatively new literature.
Additionally, this research is important given its clinical implications. Understanding the relationship between body image and frequency of BSE may inform body image prevention and treatment efforts as well as public health interventions aimed at increasing cancer awareness and encouraging regular BSE among women. The following four hypotheses were investigated.

1) Given that body avoidance is associated with the avoidance of social or personal activities in which exposure of one’s body is likely (Fairburn, 2008; Shafran et al., 2004; Trautmann et al., 2007), it is hypothesized that greater levels of body avoidance will be associated with:
   a. less frequent self-reported BSE in the past year
   b. and less frequent intended BSE in the coming year.

2) Because body shame is a distressing affective experience that may be elicited or heightened by body-focused experiences (Choma et al., 2009; Schooler et al., 2005), it is hypothesized that higher levels of body shame will be associated with:
   a. less frequent self-reported BSE in the past year
   b. and less frequent intended BSE in the coming year.

3) Given that health anxiety is associated with an increase in health care utilization (Barsky et al., 2001; Conroy et al., 1998), it is hypothesized that health anxiety will attenuate the negative relationship between body image disturbances, as measured by body avoidance and body shame, and frequency of BSE in the past year. Thus, health anxiety will serve as a moderator.
4) Given that having a high perceived personal risk for developing a health problem is associated with an increase in health maintenance behaviors (Brewer et al., 2004; Bryan, 2001; Epstein et al., 1997; Gross et al., 2005; Katapodi et al., 2009; Larwood, 1978), it is hypothesized that risk perception for breast cancer will attenuate the negative relationship between body image disturbances, as measured by body avoidance and body shame, and frequency of BSE in the past year. Thus, risk perception will serve as a moderator.

Additionally, given reports of general embarrassment among some overweight women regarding the performance of body-focused cancer screening behaviors (e.g., Amy et al., 2006; Drury & Louis, 2002; Wee et al., 2005) and research suggesting that exposure to one’s reflection initially contributes to an increase in distress among women with body image disturbances (Delinsky & Wilson, 2006), performing BSE may be associated with negative affect for women with a disturbed body image. Thus, the following research questions were investigated:

1) Body shame is a component of body image disturbance that can be elicited or heightened by body-focused experiences (Choma et al., 2009; Schooler et al., 2005) and is accompanied by other negative affective states (Bessenoff & Snow, 2006; Noll & Fredrickson, 1998); thus, women evidencing higher levels of body shame may experience greater levels of general state negative affect during BSE after controlling for physical discomfort.
2) Body avoidance is thought to be a manifestation of overvaluation of weight and shape, contributes to preoccupation with physical appearance, and often occurs in conjunction with body checking, or intense negative scrutiny of one’s body (Shafran et al., 2004; Tiggemann & Lacy, 2009; Trautmann et al., 2007). Thus, women with high levels of body avoidance may experience greater levels of general state negative affect during BSE after controlling for physical discomfort.
CHAPTER II

METHOD

Participants

Participants were 130 adult women consisting of undergraduate students, graduate students, and professional staff recruited from three campuses of a large public Midwestern university. Several selection criteria were communicated to potential participants during the recruitment process. Because BSE is recommended for women who are over the age of 20 (ACS, 2012a), participants were required to be at least 21 years of age. Additionally, women over the age of 40 were not invited to participate because of the potential for mammography, which is recommended for women over 40, to impact study variables. Research demonstrates that women receiving false positive or abnormal mammograms conduct more frequent BSEs post-mammogram than women receiving normal mammogram results (Lampic, Thurfjell, & Sjoden, 2003; Lerman et al., 1991). Furthermore, women who had been diagnosed with breast cancer or undergone breast biopsies were not invited to participate in the study to protect against similar confounds.

Several participants who completed the study were subsequently excluded because they did not meet these eligibility requirements; four participants were excluded because they fell below the minimum age requirement, three participants were excluded
because they reported a history of at least one breast biopsy, and three additional participants were excluded because they reported previous detection of a breast lump that required medical intervention. Thus, the final sample consisted of 120 participants. Participants in the final sample ranged in age from 21 to 40 with a mean age of 24.14 (SD = 4.78) and a mean BMI of 24.73 (SD = 5.75). One participant did not report her height; thus, her BMI could not be calculated. The majority of the sample (76.7%) were college undergraduates while 15% had completed a bachelor’s degree and 8.3% had completed an advanced degree (i.e., master’s or doctoral). Additionally, the majority of the sample identified as Caucasian (73.3%), African American (14.2%), or Asian (6.7%); one participant identified as Hispanic, one participant identified as American Indian, and 5 participants selected other. The majority of participants (91.7%) were United States natives while ten participants (8.3%) reported countries of origin including Asian, European, African, and Middle Eastern nations. Finally, the majority of the sample had never been married (74.2%) and had no children (81.7%).

Measures

Laboratory Questionnaires

Demographic questionnaire. The demographic questionnaire asked participants to report on their age, education level, race/ethnicity, occupation, marital status, and income level for demographic purposes. Self-reported height and weight were also assessed and were used to calculate BMI using the following formula: \[ \text{BMI} = \frac{\text{weight in pounds}}{\left(\text{height in inches}\right)^2} \times 703 \] (CDC, 2006). Additionally, to screen for participant
eligibility and to further describe the sample, participants were asked to report on any personal history of breast cancer diagnosis, breast lump detection, breast biopsies, or other diagnostic testing related to a breast abnormality, as well as family history of breast cancer, i.e., how many of their first degree female relatives (mother, grandmother, sister, aunt) had been diagnosed with breast cancer.

**Health literacy.** The Medical Term Recognition Test (METER; Rawson et al., 2009) is an 80-item self-report questionnaire measuring health literacy, or understanding of basic medical terms. Participants are presented with a list of 80 words (40 medical terms and 40 nonwords) and are instructed to place a check mark next to words that they recognize as real words. The METER is scored by summing the number of medical words correctly identified (Rawson et al., 2009). The METER is an efficient measure of health literacy as it takes only 2 minutes on average to complete (Rawson et al., 2009). The METER has been found to have good internal consistency ($\alpha = .93$; Rawson et al., 2009). Furthermore, the METER shows good construct validity as scores on the METER are related to scores on the Rapid Estimate of Adult Literacy in Medicine, another measure of health literacy (Rawson et al., 2009). In the current study, the METER was used for sample description only. Internal consistency for the current sample was good, $\alpha = .84$.

**Body dissatisfaction.** The Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987) is a 34-item self-report questionnaire measuring body dissatisfaction, or dissatisfaction with weight, body shape, and appearance. Participants
respond to questions about their thoughts and feelings related to their body image on a 6-point Likert scale, ranging from 1 (never) to 6 (always). Total scores represent a sum of the items with higher scores indicating more body dissatisfaction. Test-retest reliability for the BSQ ($r = .88$) is excellent (Rosen, Jones, Ramirez, & Waxman, 1996). The BSQ demonstrates good construct validity as scores on the BSQ are related to scores indicating body shame and feelings of embarrassment about physical appearance on the Body Dysmorphic Disorder Examination (Rosen et al., 1996). Furthermore the BSQ correlates with scores on the Eating Attitudes Test and with the Body Dissatisfaction subscale of the Eating Disorders Inventory (Cooper et al., 1987). In the current study, the BSQ was used for sample description only. Internal consistency for the current sample was excellent, $\alpha = .97$.

**Body avoidance.** The Body Image Avoidance Questionnaire (BIAQ; Rosen, Srebnik, Saltzberg, & Wendt, 1991) is a 19-item self-report questionnaire measuring the tendency to avoid behaviors or situations that involve examining one’s physical appearance or weight (i.e., wearing baggy clothing, avoiding scales, etc.). Various body avoidance behaviors are described and participants must report how frequently with which they currently engage in these behaviors on a 6-point Likert scale ranging from 0 (never) to 6 (always). Total scores represent a sum of the items with higher scores indicating a higher frequency of body avoidance behaviors. The BIAQ has sound psychometric properties. Both test-retest reliability ($r = .87$) and internal consistency ($\alpha = .89$) are good (Rosen et al., 1991). The BIAQ demonstrates good construct validity as scores on the BIAQ are correlated with scores on the Body Shape Questionnaire and a
test of body size estimation (Rosen et al., 1991). Additionally, the BIAQ can accurately discriminate between women with eating pathology and normal controls (Rosen et al., 1991). Internal consistency for the current sample was good, $\alpha = .86$.

**Body shame.** The Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996) is a 24-item self-report questionnaire measuring various dimensions of self-consciousness related to body objectification. The OBCS has three distinct subscales: surveillance, control beliefs, and body shame. Only the 8-item body shame subscale, which measures feelings of shame related to the failure to achieve the cultural ideal for thinness, was used for the current study. Participants rate their level of agreement with various statements related to feeling shame about one’s body (e.g., “I feel like I must be a bad person when I don’t look as good as I could”) on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). Total scores represent an average of the subscale items with higher scores representing higher levels of body shame. The body shame subscale of the OBCS has good psychometric properties. Previous research using this subscale demonstrates good internal consistency ($\alpha = .82$; Choma et al., 2009) and good test-retest reliability ($r = .79$; McKinley & Hyde, 1996). Additionally, the body shame scale of the OBCS demonstrates good convergent validity as scores on the body shame scale were negatively correlated with scores on the Body Esteem Scale (Franzoi & Shields, 1984; McKinley & Hyde, 1996). Internal consistency for the current sample was good, $\alpha = .87$. 
**Health anxiety.** The Illness Attitudes Scale (IAS; Kellner, 1986, 1987) is a 29-item self-report questionnaire measuring attitudes, beliefs, behaviors, and fears related to physical health. Participants respond to direct questions about their thoughts and behaviors (e.g., “When you feel a sensation in your body, do you worry about it?”) on a 5-point Likert scale ranging from 0 (no) to 4 (most of the time). Originally, nine subscales each consisting of three items were identified (Stewart & Watt, 2000); however, subsequent studies suggested that the original subscales lacked validity as Cronbach’s alphas ranged from .23 to .84 (Ferguson & Daniel, 1995). Factor analysis revealed that the IAS could be considered to be a unifactorial measure that taps overall health anxiety and general hypochondriacal concerns (Stewart & Watt, 2000). Total scores represent a sum of the items, with higher scores indicating a higher level of health anxiety and a greater frequency of health behaviors aimed at reducing this anxiety. Two of the scale’s items are not included in the calculation of the total score (item 22 and 26) and assess whether the individual carries a current medical diagnosis or is receiving treatment for a medical problem. Because studies of the psychometric properties of the IAS have focused primarily on the original subscales, less is known about the psychometric properties of the scale as a whole. The IAS is said to have good test-retest reliability (Stewart & Watt, 2000). Additionally, the IAS demonstrates good construct validity as it is related to scores on other measures of anxiety including the Anxiety Sensitivity Index (Stewart & Watt, 2000). Internal consistency for the current sample was good, $\alpha = .88$.

**Risk perception.** To assess one’s perceived risk of developing breast cancer, an item from the Heath Information National Trends Survey (HINTS), a biennial survey of
Americans assessing the impact of health information, was used. Items in the HINTS dataset were modeled after established risk perception items in recent research (Katapodi et al., 2009); however, response options differ somewhat from the original items. In the current study, participants were asked to rate their perceived chances for developing breast cancer in their lifetime on an 5-point Likert scale with responses ranging from 1 (very low) to 5 (very high). Intermediate scale anchors were provided to aid participants in the interpretation of the intermediate scale points as previous research demonstrates that without these intermediate anchors, participants misinterpret the scale values (Woloshin, Schwartz, Black, & Welch, 1999). Recent published research has successfully utilized cancer risk perception items from the HINTS survey (e.g., McQueen, Vernon, Meissner, & Rakawski, 2008).

**BSE behaviors.** A questionnaire composed by the primary investigator assessed participants’ behaviors, knowledge, and attitudes related to BSE. Participants were presented with an operational definition of BSE and asked to report on a dichotomous yes or no scale whether they had ever performed BSE before (“Have you ever performed a breast self-examination before?”). Those who answered in the positive were prompted to indicate at what age they completed their first BSE; those who answered in the negative were prompted to qualitatively indicate some potential reasons why they had not yet performed a BSE. Next, participants were asked to report how frequently they had performed a BSE in the past year (“In the past year, approximately how many breast self-examinations did you perform?”) and how frequently they intended to perform a BSE in the coming year (“In the coming year, approximately how many breast self-examinations
do you intend to perform?”) by writing in their answer in numerical form. To assess participant knowledge, participants responded on a dichotomous yes or no scale to indicate whether they had ever been taught how to correctly perform a BSE by a medical professional (“Have you been instructed on the correct performance of breast self-examination by a physician, nurse practitioner, nurse, or educational pamphlet?”). Furthermore, they were asked to provide written qualitative responses to questions tapping their knowledge of the general recommendations for when BSE should commence (“At what age should women start performing breast self-examinations?”) and how often women should engage in BSE (“In general, once women start performing breast self-examinations, about how often should they perform them?”).

To assess participant attitudes regarding the performance of BSE, participants responded on a dichotomous yes or no scale indicating whether they had been encouraged to complete a BSE (“Have you been encouraged to engage in regular breast self-examinations by a physician, nurse practitioner, or nurse?”) and also were asked to report their beliefs regarding the importance of BSE (“How important do you believe breast self-examinations are for the detection of breast cancer and the protection of health?”) on a 5-point Likert scale with responses ranging from 1 (very unimportant) to 5 (very important). Finally, this questionnaire asked participants to rate how confident they were in their ability to perform a BSE (“How confident do you feel in your ability to correctly perform breast self-examinations?”) using a 5-point Likert scale with responses ranging from 1 (very slightly or not at all) to 5 (extremely).
Follow-up Questionnaires

*Opening questions.* On each of the three monthly follow-up questionnaires, participants completed several items constructed by the primary investigator. Participants were first asked whether they had performed a BSE that month ("Did you perform a breast self-examination between the dates listed above?") and responded on a dichotomous yes or no scale. Participants selecting “no” on this item were instructed not to complete the remainder of the monthly questionnaire while participants selecting “yes” proceeded. Participants were asked to rate the physical discomfort they experienced during the BSE on a 5-point Likert scale with responses ranging from 1 (*slightly or none at all*) to 5 (*an extreme amount*). Finally, participants were asked whether they detected any breast lumps during the BSE ("Did you detect any breast lumps or other physical abnormalities during the examination?") and responded on a dichotomous yes or no scale. Participants endorsing this item were instructed to contact their primary care physician or gynecologist promptly.

*Affect.* The Positive and Negative Affect Schedule-Expanded Form (PANAS-X; Watson & Clark, 1994) is a 60-item self-report inventory measuring various emotions. The measure contains 13 subscales that tap different emotional states including negative affect, positive affect, guilt, and fear. The negative and positive affect subscales were used for the present study. The negative affect subscale is composed of 10 items that measure negative emotions and general distress while the positive affect subscale is composed of 10 items that measure positive emotions and general contentment. In the
current study, participants reported to what extent the listed emotions represented the moods they experienced during their most recent BSE by responding on a 5-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely). Total subscale scores indicate a sum of the subscale items with higher scores indicating a higher level of the specified mood state. The negative affect subscale ($\alpha = .85-.90;$ Watson & Clark, 1994) and positive affect subscale ($\alpha = .83-.90;$ Watson & Clark, 1994) have demonstrated high internal consistency as well as adequate test-retest reliability ($r = .71;)$ Watson & Clark, 1994). Furthermore, the PANAS-X demonstrates good convergent validity; the subscales on the PANAS-X are highly correlated with the corresponding scales on the Profile of Mood States (Watson & Clark, 1994). Of note, alphas for the PANAS-X subscales were calculated for each of the three assessments in the follow-up portion of the study as the subscales were administered at each of these time points. Internal consistency for the current sample was good for the positive affect subscale ($\alpha = .84-.89);$ however, the range was much wider for the negative affect subscale ($\alpha = .50-.83$).

**Post-study measure.** The follow-up questionnaires include a brief post-study questionnaire that includes three questions composed by the primary investigator. Participants were first asked to indicate how many total BSEs they had completed over the course of the 3-month follow-up portion of the study (“How many total breast self-examinations did you complete over the past three months?”) by writing in a numerical response. Next, reactivity was assessed (“Do you believe that participating in a study about breast self-examination made you engage in these examinations more frequently than you normally would?”) on a 4-point Likert scale with responses ranging from 1 (not
at all) to 4 (definitely). Finally, participants who did not complete at least one of the three monthly BSEs were instructed to complete the final item that assessed motivations for non-adherence (“If you did not complete a breast self-examination each month for the past three months, what were your reasons for not completing them? Select all that apply.”). Participants checked the motivations for non-adherence provided that applied to them. The other option allowed participants to provide qualitative responses to this item.

**Procedure**

Participants were recruited via the General Psychology Research website, the Community Psychology Research website, departmental listservs, a university-wide email newsletter, and flyers distributed on campus bulletin boards. The study description included information about the eligibility requirements for the study. Participants either signed up for an appointment slot using the General Psychology Research Website or contacted the primary investigator via email to schedule an appointment. The primary investigator and a research assistant met participants in small groups of 1-8 women. Following informed consent, participants completed a battery of questionnaires in the laboratory. Participants received either research credits or entries into a raffle for gift cards, whichever they preferred, as compensation for their completion of the laboratory portion of the study. Participants were then instructed on how to complete the second part of the study. Participants were informed about the American Cancer Society’s recommendation for monthly BSEs (ACS, 2012a) and were asked to follow their regular BSE routine over the subsequent three months with one exception; they were encouraged to complete at least one BSE at home over the subsequent three months but were
informed that they would not be penalized if they did not comply. Participants were given an instructional pamphlet about BSE provided by the American Cancer Society to increase consistency across participants. Participants were instructed to complete one monthly follow-up questionnaire for each of the three follow-up months. Participants were instructed to complete the monthly questionnaire immediately after performing the BSE; participants not completing a BSE in a given month were free to complete the questionnaire at any time during the month. Participants were instructed to promptly contact their primary care physician or gynecologist if they detected any breast lumps or other physical abnormalities in their breasts during the study. At the end of the three months, participants completed a brief post-study questionnaire and were instructed to mail their completed questionnaires to the primary investigator using a pre-paid envelope. To increase compliance, participants were sent reminder emails at the end of each of the three months. Once the completed questionnaires were received, participants were emailed a debriefing form and were awarded either additional research credits or entries into the gift card raffle as compensation for their participation in the second part of the study.
CHAPTER III

RESULTS

Preliminary Analyses

The database was constructed by the primary investigator and data from the questionnaire battery was entered by both the primary investigator and a research assistant. Data were examined for accuracy by the primary investigator; several instances of out of range values that had been entered in error were corrected. Preliminary descriptive analyses were conducted to determine the amount of missing data present on study variables of interest. Only a small amount of missing data (0.26%) for the entire dataset was present at the item level. Furthermore, the missing data was not concentrated on any single questionnaire or item. However, one participant was missing 13.8% of her data on the IAS, a questionnaire central to the health anxiety moderation analyses. Thus, this participant was excluded from analyses involving this moderator. Given the small amount of missing data, mean imputation was utilized for the purposes of generating scores on measures. Although mean imputation reduces variance in scores (Tabachnick & Fidell, 2007), this was likely not detrimental due to the very small percentage of missing data.

Preliminary analyses focused on normality, linearity, multicollinearity, and the presence of outliers. Non-normal distributions were detected for the items assessing
frequency of BSE in the past year (skewness = 4.09; kurtosis = 19.20) and anticipated frequency of BSE in the coming year (skewness = 2.96; kurtosis = 10.97) using the cutoff guidelines of 2 for skewness and 6 for kurtosis recommended by Maxwell and Delaney (2004). The remaining variables and total scale scores were all within range for normality. Next, the data were examined for the presence of outliers, as outliers have the potential to contribute to both Type I and Type II errors (Howell, 2002; Tabachnick & Fidell, 2007). Cases were examined for the presence of very large unstandardized scores (i.e., scores in excess of 3.29; Tabachnick & Fidell, 2007). Using this method, three univariate outliers each were detected on the variable assessing frequency of BSE in the past year and the variable assessing frequency of intended BSE in the coming year. The examination of box plots confirmed these univariate outliers. Case summaries were examined to determine whether these outliers were accurate participant responses or should be excluded.

Of the three outliers on the variable assessing BSE in the past year, two were responses of 52 BSEs in the past year and one was a response of 35 BSEs in the past year. Two of the participants providing these responses had a family history of breast cancer and two reported that they believed BSE should be performed weekly. On the variable assessing BSE intentions in the coming year, all three outliers were responses of 52 intended BSEs in the coming year. One of the participants providing these responses had a family history of breast cancer and all three reported that they believed BSE should be performed weekly. Research suggests that intrusive thoughts about breast cancer predicts over-performance of BSE (i.e., performing BSEs more than once a month;
Erblich et al., 2000); thus, these women may be experiencing frequent thoughts or worry about breast cancer due to being misinformed about how frequently one should perform BSE or their family history of breast cancer, and may be over-performing BSEs as a result. Thus, these outliers likely represent accurate participant responses, and, as such, the subjects producing the outliers were retained. Given the non-normality of these variables and the presence of outliers, they both exhibited a lack of linearity upon examination of bivariate scatterplots. All other variables central to analyses demonstrated adequate linearity.

Although lack of normality and the presence of outliers can negatively impact model fit and contribute to error (Tabachnick & Fidell, 2007), transformations were not an ideal solution for two reasons. First of all, it is believed that this non-normal distribution likely represents the true frequency of BSE behaviors among women. Secondly, given that the scale of these variables is meaningful (i.e., frequency of a behavior within a discrete period of time), transformations may be detrimental to interpretation (Tabachnick & Fidell, 2007). However, given the severe non-normality of the data and the resulting violation of the assumptions of linear regression, transformations were deemed necessary. A square root transformation was selected as this transformation achieved skewness and kurtosis values within normal limits for both past year BSE (skewness = 1.57; kurtosis = 3.18) and BSE intentions (skewness = 0.80; kurtosis = 1.51).

Finally, variables were evaluated for multicollinearity as the removal of redundant variables is often necessary to strengthen statistical analyses (Tabachnick & Fidell,
An examination of the correlation matrix (see Table 2) revealed that the two predictors, body shame and body avoidance \((r = .69, p < .01)\), and the two dependent variables, BSE in past year and BSE intentions \((r = .76, p < .01)\), demonstrated correlation coefficients that approached or exceeded the recommended cutoff for multicollinearity of .70 (Tabachnick & Fidell, 2007); however, given that neither these two predictors nor these two dependent variable are included in the same statistical model, multicollinearity was not thought to be a significant issue.

Multiple linear regression is the statistical technique that was utilized to test hypotheses. Regression is a statistical technique that is appropriate for studies that seek to determine the impact of several independent variables on a dependent variable as well as studies that seek to determine whether an independent variable has predictive power even after a covariate has been entered into the equation (Tabachnick & Fidell, 2007). Thus, regression is an appropriate statistical analysis given the current study’s examination of the impact of both main effects and interaction terms on a given outcome variable and the use of a covariate term. Additionally, regression can be used when independent variables are either continuous or dichotomous (Tabachnick & Fidell, 2007); the covariate, independent variables, and moderators in the current analyses are all continuous. To aid in interpretation, all of these continuous variables were standardized prior to being entered into the regression equation.

Characteristics of the Sample

The final sample consisted of 120 participants. For descriptive purposes, means and standard deviations for the major demographic variables and variables central to
analyses are presented in Table 1. Using cut points established by the CDC (2006), 5.8% of the sample was underweight (BMI < 18.5), 52.5% was in the normal weight range (BMI between 18.5 and 24.9), 24.2% was overweight (BMI 25.0 to 29.9), and 16.7% was obese (BMI > 30); the one participant who did not report her height could not be classified. The sample had a mean score of 91.59 (SD = 38.84) on the BSQ (Cooper et al., 1987). The sample’s mean body dissatisfaction score was slightly higher than means reported in previous research for a community sample (M = 81.5, SD = 21.4; Cooper et al., 1987) and a sample of women characterized as being unconcerned with weight and shape (M = 55.9 SD = 14.4; Cooper et al., 1987).

**Health History, Access to Health Care, and Health Literacy**

None of the 120 participants from the final sample reported a personal history of a breast cancer diagnosis or biopsy. One participant reported a history of detecting a breast lump that was due to infection and treated with antibiotics; thus, she was retained in the sample. A total of 38 participants (31.7%) reported a family history of breast cancer occurring in at least one female biological relative (i.e., mother, grandmother, great grandmother, aunt, great aunt). Of those 38 women, 9 (23.7%) reported having two family members with breast cancer. Of those 9 women, 6 (66.7%) reported a history of breast cancer from both a maternal and paternal female relative. In terms of access to health care, the majority of the sample (82.5%) reported currently having health insurance, having a primary care physician (74.2%), and having a gynecologist (70.0%).

Based on scores on the METER, the current sample is quite health literate (M = 36.50, SD = 4.16; Range = 18-40), with the average score falling in the functional health
Table 1

*Descriptive Statistics for Study Variables of Interest*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Mass Index (BMI)</td>
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<td>5.75</td>
<td>15.98</td>
<td>51.55</td>
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<tr>
<td>Age</td>
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<td>4.78</td>
<td>21.00</td>
<td>40.00</td>
</tr>
<tr>
<td>Health Literacy (METER)</td>
<td>36.50</td>
<td>4.16</td>
<td>18.00</td>
<td>40.00</td>
</tr>
<tr>
<td>Family History of Breast Cancer</td>
<td>0.39</td>
<td>0.63</td>
<td>0.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Body Avoidance (BIAQ)</td>
<td>30.09</td>
<td>12.90</td>
<td>8.00</td>
<td>73.00</td>
</tr>
<tr>
<td>Body Shame (OBCS)</td>
<td>23.50</td>
<td>9.51</td>
<td>8.00</td>
<td>45.00</td>
</tr>
<tr>
<td>Risk Perception</td>
<td>2.47</td>
<td>1.00</td>
<td>1.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Health Anxiety (IAS)</td>
<td>34.75</td>
<td>14.24</td>
<td>1.00</td>
<td>73.00</td>
</tr>
<tr>
<td>Past Year BSE</td>
<td>4.13</td>
<td>8.66</td>
<td>0.00</td>
<td>55.00</td>
</tr>
<tr>
<td>BSE Intentions</td>
<td>7.73</td>
<td>9.44</td>
<td>0.00</td>
<td>52.00</td>
</tr>
</tbody>
</table>

*Note:* BSE = breast self-examination; Untransformed variables for past year BSE and BSE intentions were used for descriptive purposes. All values represent raw, nonstandardized scores.

literacy range of 35-40 established by previous research on the measure (Rawson et al., 2009). Furthermore, only 3 participants (2.5%) and 14 participants (11.7%) fell into the low (scores of 0-20) and marginal (scores of 21-34) health literacy categories respectively, while the majority of participants (85.8%) demonstrated functional health literacy (Rawson et al., 2009). This was likely due, in part, to the high education level of the sample.
Despite the high general health literacy of the sample and the fact that the majority of participants (82.5%) reported that they had been taught how and when to perform BSEs by a medical professional, knowledge of this cancer screening behavior differed widely across the sample. Only 17 participants (14.17%) correctly identified 20 to 21 years of age as the age at which a woman should begin engaging in regular BSEs. Other responses ranged from 10 to 40 years of age, with 11 participants (9.2%) reporting that they did not know. The most frequent response, given by 31 participants (25.8%) was 18 years of age. However, the majority of participants (70.8%) did correctly identify that the general recommendation for BSE frequency is once per month, while 15.8% believed BSEs should be performed less frequently (e.g., every 3 months, every 6 months, annually), 11.7% believed BSEs should be performed more frequently (e.g., weekly, daily), and 1.7% provided vague responses (e.g., “As often as possible”).

Furthermore, participants varied widely in terms of their self-efficacy related to BSE, i.e., how confident they were that they could perform BSEs correctly, with 14.2% of the sample reporting being “very slightly or not at all” confident, 20.0% reporting “a little” confidence, 36.7% reporting being “moderately” confident, 16.7% reporting “quite a bit” of confidence, and 12.5% reporting being “extremely” confident in their BSE abilities.

Three quarters of the sample (75.0%) reported that a medical professional had encouraged them to regularly perform BSEs, and the majority of the sample (85.8%) endorsed the belief that BSE is either somewhat important or very important for the detection of breast cancer. A similar percentage of the sample (73.3%) reported that they had performed at least one BSE previously in their lifetime, while 26.7% reported that
they had not. Among those participants reporting a history of performing at least one BSE, the most common age reported for initiation of BSE was 18 years old ($n = 25; 28.4\%$). Among those participants reporting that they had never performed a BSE before, the most common qualitative responses regarding their explanations for not performing a BSE fell into the following general themes: lack of knowledge (e.g., “I don’t know what I’m looking for”; “Never been taught how to do one properly”), low risk perception (e.g., “No one in my family has had it”; “I don’t think I’m at the age to worry about it”), forgetfulness (e.g., “I haven’t thought much about it”; “I never think of doing it”), and physician-related factors (e.g., “My doctor does one when I go for pap test”; “My gynecologist performs them”).

**Relationships among the Variables**

Bivariate correlational analyses were used to examine the relationships among the potential covariates, predictors, moderator variables, and outcome variables (see Table 2). With respect to potential covariates, BMI was significantly related to age ($r = .35, p < .001$), body avoidance ($r = .49, p < .001$), and body shame ($r = .34, p < .001$), and self-reported BSE in the past year ($r = .21, p = .021$). Age was significantly related to body avoidance ($r = .20, p = .031$) and self-reported BSE in the past year ($r = .23, p = .011$). Health literacy was significantly related to body avoidance ($r = .23, p = .011$). Family history of breast cancer was significantly related to risk perception ($r = .47, p < .001$) and health anxiety ($r = .21, p = .024$). There were also some significant relationships among the major variables of interest. Body avoidance was significantly related to body shame ($r = .69, p < .001$). Body shame was significantly related to health anxiety ($r = .20, p =
Table 2

*Bivariate Correlations between Study Variables of Interest*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Body Mass Index (BMI)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>2. Age</td>
<td>.35**</td>
<td>---</td>
<td>---</td>
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<td>3. Health Literacy (METER)</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
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<td>---</td>
</tr>
<tr>
<td>4. Family History of Breast Cancer</td>
<td>.13</td>
<td>.05</td>
<td>-.09</td>
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<td>---</td>
<td>---</td>
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<td>---</td>
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<td>5. Body Avoidance (BIAQ)</td>
<td>.49**</td>
<td>.20*</td>
<td>.23*</td>
<td>.10</td>
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<td>---</td>
</tr>
<tr>
<td>6. Body Shame (OBCS)</td>
<td>.34**</td>
<td>.04</td>
<td>.11</td>
<td>.04</td>
<td>.69**</td>
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<td>.04</td>
<td>.47**</td>
<td>.07</td>
<td>.13</td>
<td>---</td>
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<td>---</td>
</tr>
<tr>
<td>8. Health Anxiety (IAS)</td>
<td>.12</td>
<td>.14</td>
<td>-.07</td>
<td>.21*</td>
<td>.18</td>
<td>.20*</td>
<td>.33**</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>9. Past Year BSE</td>
<td>.21*</td>
<td>.23*</td>
<td>.05</td>
<td>.14</td>
<td>-.01</td>
<td>-.12</td>
<td>.11</td>
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<td>10. BSE Intentions</td>
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<td>-.09</td>
<td>-.14</td>
<td>.03</td>
<td>-.03</td>
<td>.76**</td>
</tr>
</tbody>
</table>

*Note. BSE = breast self-examination.  
**p < .001; *p < .05.*

.032). Risk perception was significantly related to health anxiety (r = .33, p < .001).

Finally, self-reported BSE in the past year was significantly related to BSE intentions for the coming year (r = .76, p < .001).

**Major Analyses**

Because of the documented impact of BMI on body-focused cancer screening behaviors (Amy et al., 2006; Banerjea et al., 2008; Cohen et al., 2008; Ferrante et al., 2006; Ferrante et al., 2007; Fontaine et al., 2001; Maruthur et al., 2009; Ostbye et al., 2005; Wee et al., 2000; Wee et al., 2004; Wee et al., 2005; Zhu et al., 2006) and the significant correlations between BMI and both body shame and body avoidance and BSE in the past year (see Table 2), BMI was entered as a control variable in all of the
regression analyses. Additionally, given research suggesting that predictors of actual BSE performance change as age increases (Bryan, 2001) and the significant correlations between age and BSE in the past year, age was entered as a covariate as well, but only for the models including BSE in the past year. Health literacy and family history of breast cancer were two variables that were preliminarily considered as covariates but were not utilized given the lack of significant correlations between these two variables and the outcome variables (see Table 2). Listwise case deletion was utilized; thus, any cases with missing data on the variables being examined were automatically removed from analyses. Given that one participant was missing BMI, she was excluded from all analyses including BMI via this method.

Hypothesis 1 stated that body avoidance would predict both frequency of BSE over the past year and frequency of intended BSE in the coming year such that more body avoidance would be associated with less frequent past year BSE and intended BSE. Two separate hierarchical linear regression analyses, one analysis for each of the two dependent variables, were conducted to test hypothesis one. In the first analysis, BMI and age were entered at block one as control variables, body avoidance was entered at block two as the predictor, and BSE in the past year was the dependent variable. Results indicated that the overall model was not significant, \( F(3, 115) = 2.19, p = .093 \), and explained 5.4% of the variance in the dependent variable (\( R^2 = .054 \)). After controlling for BMI (\( B = .225, SE = .168, \beta = .145, t(118) = 1.34, p = .183 \)) and age (\( B = .254, SE = .151, \beta = .163, t(118) = 1.68, p = .095 \)), the main effect for body avoidance was not significant (\( B = -.111, SE = .163, \beta = -.071, t(118) = -.680, p = .498 \)).
In the second analysis, BMI was entered at block one as a control variable, body avoidance was entered at block two as a predictor, and BSE intentions for the coming year was the dependent variable. Results indicated that the overall model was not significant, $F(2, 116) = 0.805, p = .450$, and explained 1.4% of the variance in the outcome variable ($R^2 = .014$). After controlling for BMI, ($B = .125, SE = .157, \beta = .084, t(118) = .797, p = .427$), the main effect for body avoidance was not significant ($B = -.199, SE = .159, \beta = -.132, t(118) = -1.25, p = .213$). Thus, hypothesis 1 was not supported (see Table 3).

Hypothesis 2 stated that body shame would predict both frequency of BSE over the past year and frequency of intended BSE in the coming year, such that more body shame would be associated with less frequent past year BSE and intended BSE. Two separate hierarchical linear regression analyses, one analysis for each of the two dependent variables, were conducted to test hypothesis 2. In the first analysis, BMI and age were entered at block one as control variables, body shame was entered at block two as the predictor, and BSE in the past year was the dependent variable. Results indicated that the overall model was significant, $F(3, 115) = 3.15, p = .028$, and explained 7.6% of the variance in the dependent variable ($R^2 = .076$). After controlling for BMI ($B = .272, SE = .158, \beta = .175, t(118) = 1.72, p = .088$) and age ($B = .224, SE = .149, \beta = .144, t(118) = 1.51, p = .135$), the main effect for body shame approached statistical significance ($B = -.264, SE = .148, \beta = -.171, t(118) = -1.79, p = .077$) and explained 2.6% of additional variance in the outcome variable ($R^2\Delta = .026$).
Table 3

Results of Hypotheses 1 and 2 and Post Hoc Analyses 1 and 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>BSE in the Past Year</th>
<th>BSE Intentions for the Coming Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$R^2$</td>
<td>$\Delta R^2$</td>
</tr>
<tr>
<td>Hypothesis 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
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<td>.050</td>
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<td>BMI</td>
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<td>Age</td>
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<td>.151</td>
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<tr>
<td>Step 2</td>
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<td>.004</td>
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<td>BIAQ</td>
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<td>.163</td>
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<tr>
<td>Post Hoc 1</td>
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</tr>
<tr>
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<tr>
<td>OBCS</td>
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<td>.186</td>
</tr>
</tbody>
</table>

Note. BSE = breast self-examination; BMI = body mass index; BIAQ = body avoidance; OBCS = body shame. Dash indicates that age was not entered into the regression model.

* $p < .05$. 
In the second model, BMI was entered at block one as a control variable, body shame was entered at block two as the predictor, and BSE intentions for the coming year was the dependent variable. Results indicated that the overall model was not significant, $F(2, 116) = 1.52, p = .222$, and explained only 2.6% of variance in the outcome variable ($R^2 = .026$). After controlling for BMI ($B = .115, SE = .145, \beta = .077, t(118) = .792, p = .430$), the main effect for body shame approached statistical significance ($B = -.250, SE = .144, \beta = -.169, t(118) = -1.73, p = .086$) and explained 2.5% of additional variance in the outcome variable ($R^2 \Delta = .025$). Thus, hypothesis 2 was not supported (see Table 3).

Hypothesis 3 stated that health anxiety would attenuate the negative relationship between body image disturbances, as measured by body avoidance and body shame, and frequency of BSE over the past year. Two separate hierarchical linear regression analyses, one analysis for each of the two predictors, were conducted to test hypothesis 3. In the first analysis, BMI and age were entered at block one as control variables, body avoidance and health anxiety were entered at block two, the interaction term between body avoidance and health anxiety was entered at block three, and BSE in the past year was the dependent variable. Results indicated that the overall model was not significant, $F(5, 112) = .912, p = .476$, and explained only 3.9% of variance in the outcome variable ($R^2 = .039$). After controlling for BMI ($B = .155, SE = .163, \beta = .106, t(117) = .955, p = .341$) and age ($B = .147, SE = .146, \beta = .099, t(117) = 1.01, p = .315$), the main effects for body avoidance ($B = -.103, SE = .161, \beta = -.071, t(117) = -.637, p = .526$) and health anxiety ($B = .180, SE = .144, \beta = .121, t(117) = 1.24, p = .217$) were not significant nor
was the interaction term between body avoidance and health anxiety ($B = -.020, SE = .142, \beta = -.014, t(117) = -.140, p = .889$).

In the second analysis, BMI and age were entered at block one as control variables, body shame and health anxiety were entered at block two, the interaction term between body shame and health anxiety was entered at block three, and BSE in the past year was the dependent variable. Results indicated that the overall model was not significant, $F(5, 112) = 1.47, p = .206$, and explained 6.1% of variance in the outcome variable ($R^2 = .061$). After controlling for BMI ($B = .203, SE = .152, \beta = .139, t(117) = 1.34, p = .183$) and age ($B = .119, SE = .144, \beta = .080, t(117) = .825, p = .411$), the main effect for body shame approached statistical significance ($B = -.254, SE = .144, \beta = -.177, t(117) = -1.77, p = .080$) while the main effect for health anxiety ($B = .206, SE = .144, \beta = .139, t(117) = 1.44, p = .154$) was not significant. The addition of the main effects explained 3.7% of additional variance in the outcome variable ($R^2_A = .037$). Additionally, the interaction term ($B = -.015, SE = .128, \beta = -.011, t(117) = -.113, p = .910$) was not significant. Thus, hypothesis 3 was not supported (see Table 4).

Hypothesis 4 stated that risk perception would attenuate the negative relationship between body image disturbances, as measured by body avoidance and body shame, and frequency of BSE over the past year. Two separate hierarchical linear regression analyses, one analysis for each of the two predictors, were conducted to test hypothesis 4. In the first analysis, BMI and age were entered at block one as control variables, body avoidance and risk perception were entered at block two, the interaction term between body avoidance and risk perception was entered at block three, and BSE in the past year
Table 4

Results of Hypothesis 3 and Post Hoc Analysis 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
<th>B</th>
<th>SE</th>
<th>$\beta$</th>
<th>t(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
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<td>.024</td>
<td>.024</td>
<td>BMI</td>
<td>.155</td>
<td>.163</td>
<td>.106</td>
<td>.955 (117)</td>
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<td></td>
<td></td>
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<td>Age</td>
<td>.147</td>
<td>.146</td>
<td>.099</td>
<td>1.01 (117)</td>
</tr>
<tr>
<td>Step 2</td>
<td>.039</td>
<td>.015</td>
<td>BIAQ</td>
<td>-.103</td>
<td>.161</td>
<td>-.071</td>
<td>-.637 (117)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>IAS</td>
<td>.180</td>
<td>.144</td>
<td>.121</td>
<td>1.24 (117)</td>
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<td>Step 3</td>
<td>.039</td>
<td>.000</td>
<td>BIAQxIAS</td>
<td>-.020</td>
<td>.142</td>
<td>-.014</td>
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<tr>
<td>Step 1</td>
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<td>.024</td>
<td>BMI</td>
<td>.203</td>
<td>.152</td>
<td>.139</td>
<td>1.34 (117)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Age</td>
<td>.119</td>
<td>.144</td>
<td>.080</td>
<td>.825 (117)</td>
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<tr>
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<td>.037</td>
<td>OBCS</td>
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<td>-1.77 (117)</td>
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<td></td>
<td></td>
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<td>IAS</td>
<td>.206</td>
<td>.144</td>
<td>.139</td>
<td>1.44 (117)</td>
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<td>Step 3</td>
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<td>.000</td>
<td>OBCSxIAS</td>
<td>-.015</td>
<td>.128</td>
<td>-.011</td>
<td>-.113 (117)</td>
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<td>.033</td>
<td>BMI</td>
<td>.336</td>
<td>.196</td>
<td>.236</td>
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<td>BIAQ</td>
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<td>.202</td>
<td>-.144</td>
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<td></td>
<td></td>
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<td>IAS</td>
<td>.128</td>
<td>.183</td>
<td>.088</td>
<td>.700 (68)</td>
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<td>Step 3</td>
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<td>.003</td>
<td>BIAQxIAS</td>
<td>.091</td>
<td>.187</td>
<td>.062</td>
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<td>BMI</td>
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<td>.061</td>
<td>OBCS</td>
<td>-.341</td>
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<td>-.244</td>
<td>-1.96 (68)</td>
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<td></td>
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<td>.180</td>
<td>.112</td>
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<td>Step 3</td>
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<td>.000</td>
<td>OBCSxIAS</td>
<td>.012</td>
<td>.166</td>
<td>.009</td>
<td>.070 (68)</td>
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Note. BSE = breast self-examination; BMI = body mass index; BIAQ = body avoidance; IAS = health anxiety; OBCS = body shame.
was the dependent variable. Results indicated that the overall model was not significant, \( F(5, 113) = 1.70, p = .141 \), and explained 7.0% of variance in the dependent variable \( (R^2 = .070) \). After controlling for BMI \( (B = .205, SE = .169, \beta = .132, t(118) = 1.22, p = .227) \) and age \( (B = .252, SE = .151, \beta = .162, t(118) = 1.67, p = .098) \), the main effects for body avoidance \( (B = -.105, SE = .164, \beta = -.067, t(118) = -.642, p = .522) \) and risk perception \( (B = .206, SE = .149, \beta = .133, t(118) = 1.39, p = .168) \) were not significant nor was the interaction term between body avoidance and risk perception \( (B = -.068, SE = .137, \beta = -.048, t(118) = -.499, p = .619) \).

In the second analysis, BMI and age were entered at block one as control variables, body shame and risk perception were entered at block two, the interaction term between body shame and risk perception was entered at block three, and BSE in the past year was the dependent variable. Results indicated that the overall model was significant, \( F(5, 113) = 2.33, p = .047 \), and explained 9.4% of variance in the dependent variable \( (R^2 = .094) \). After controlling for BMI \( (B = .262, SE = .158, \beta = .169, t(118) = 1.66, p = .100) \) and age \( (B = .227, SE = .149, \beta = .146, t(118) = 1.52, p = .131) \), the main effect for body shame closely approached statistical significance \( (B = -.287, SE = .149, \beta = -.186, t(118) = -1.93, p = .056) \) and the main effect for risk perception was not significant \( (B = .206, SE = .149, \beta = .133, t(118) = 1.38, p = .171) \). The addition of the main effects explained 4.3% of additional variance in the outcome variable \( (R^2\Delta = .043) \). Additionally, the interaction term between body shame and risk perception was not statistically significant \( (B = .005, SE = .124, \beta = .004, t(118) = .039, p = .969) \). Thus, hypothesis 4 was not supported (see Table 5).
Table 5

*Results of Hypothesis 4 and Post Hoc 4*

<table>
<thead>
<tr>
<th>Variable</th>
<th>R²</th>
<th>ΔR²</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>t(df)</th>
<th>p</th>
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<td>.205</td>
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<td>.227</td>
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<td>.162</td>
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<td>Age</td>
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<td>.100</td>
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<td>-.067</td>
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<td>.206</td>
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<td>.168</td>
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</tr>
</tbody>
</table>

| Step 1          | .056 | .056*| .433 | .204| .274 | 2.12 (69) | .037*|
| BMI             |      |      |      |     |      |       |      |
| Step 2          | .118 | .062 | -.195| .210| -.122| -.929 (69) | .356 |
| BIAQ            |      |      |      |     |      |       |      |
| Risk            | .401 | .190 | .255 | .133| .135 | 2.12 (69) | .038*|
| Step 3          | .135 | .016 | -.214| .193| -.135| -1.11 (69) | .273 |
| BIAQxRisk       |      |      |      |     |      |       |      |

| Step 1          | .056 | .056*| .451 | .183| .285 | 2.46 (69) | .017*|
| BMI             |      |      |      |     |      |       |      |
| Step 2          | .177 | .120*| -.443| .183| -.282| -.242 (69) | .018*|
| OBCS            |      |      |      |     |      |       |      |
| Risk            | .439 | .190 | .279 | .133| .135 | 2.31 (69) | .024*|
| Step 3          | .183 | .006 | -.124| .174| -.085| -.710 (69) | .481 |
| OBCSxRisk       |      |      |      |     |      |       |      |

*Note.* BSE = breast self-examination; BMI = body mass index; BIAQ = body avoidance; Risk = risk perception for breast cancer; OBCS = body shame.

* p < .05.
Secondary Research Questions

The follow-up questionnaires were completed and returned by 49 (37.7%) of the original 130 participants; however, four of the participants who completed the follow-up questionnaires were participants who were previously excluded from the study due to a failure to meet eligibility requirements. Thus, these four participants were also excluded from the follow-up questionnaire analyses, leaving a total of 45 participants (37.5%) with valid follow-up data out of the overall sample of 120. To determine whether any mean differences existed between those who did and did not return the follow-up questionnaires, a series of independent samples t-tests were conducted. Dependent variables included both of the predictors, body shame and body avoidance, both moderators, health anxiety and risk perception, and two demographic variables that had emerged as salient in previous analyses, age and BMI. Statistically significant group differences emerged on age, \( t(118) = -2.23, p = .028 \), and body shame, \( t(118) = 3.00, p = .003 \). However, no significant group differences emerged on body avoidance, health anxiety, risk perception, or BMI. The group that completed the follow-up questionnaires, on average, was older (\( M = 25.38, SD = 5.61, \text{Range} = 21-40 \)) and had lower levels of body shame (\( M = 20.24, SD = 8.46 \)) than the group that did not return their follow-up questionnaires (\( M_{\text{age}} = 23.40, SD = 4.08; M_{\text{body shame}} = 25.45, SD = 9.62 \)).

Of the 45 women with valid follow-up questionnaire data, 36 women (80.0%) had completed at least one BSE over the three month follow-up period, while 9 women (20.0%) had not completed any BSEs. Of the 36 women completing at least one BSE, 7 women (19.4%) had completed 1 BSE, 11 women (30.6%) had completed 2 BSEs, 14
women (38.9%) had completed 3 BSEs, and 4 women (11.1%) had completed 4 BSEs. None of the women reported completing more than 4 BSEs in the three month follow-up period. The mean number of BSEs completed in the follow-up period was 1.93 ($SD = 1.29$, Range = 0-4). Of note, 4 of the participants who completed the follow-up portion of the study were only able to complete 2 months of follow-up data as opposed to 3 months due to deadlines related to the psychology subject pool website, and thus, did not receive forms for a month 3 assessment or have the opportunity to complete a third monthly BSE. However, in the interest of maximizing sample size, these participants were retained in analyses.

To determine whether any mean differences existed between those who completed at least one BSE over the follow-up period ($n = 36$) and those who did not ($n = 9$), a series of independent samples t-tests were conducted. Dependent variables included both of the predictors, body shame and body avoidance, both moderators, health anxiety and risk perception, and two relevant demographic variables, age and BMI. Statistically significant group differences emerged on body shame, $t(43) = 2.09, p = .042$, risk perception, $t(43) = 2.12, p = .032$, and health anxiety, $t(43) = 2.67, p = .029$. However, no group differences emerged on age, BMI, or body avoidance. The group who completed at least one BSE over the follow-up period had on average less body shame ($M = 18.97, SD = 7.30$), lower risk perception for breast cancer ($M = 2.19, SD = 0.79$), and less health anxiety ($M = 34.28, SD = 12.51$) than those who did not complete any BSE over the follow up period ($M_{\text{body shame}} = 25.33, SD = 11.15; M_{\text{risk perception}} = 2.89, SD = 1.05; M_{\text{health anxiety}} = 45.89, SD = 18.24$).
To examine the relationships between the frequency of BSE over the follow-up period and other study variables of interest (BMI, age, health literacy, family history of breast cancer, body shame, body avoidance, risk perception, health anxiety, BSE in the past year, BSE intentions for the coming year), bivariate correlations were examined using the sample of 45 participants with valid follow-up data. Frequency of BSE over the follow-up period was significantly associated with body shame ($r = -.30, p = .048$) and BMI ($r = -.33, p = .027$) but was not associated with any of the other variables under examination. These significant negative correlations indicate that higher levels of body shame and higher BMIs are associated with less frequent BSE over the three month follow-up period. However, given the relationship between BMI and body shame in this subsample ($r = .29, p = .054$), an additional analysis was conducted to determine the unique effect of body shame on frequency of BSE over the follow-up period after controlling for BMI. Thus, a regression analysis was conducted with BMI entered at block one as a control variable, body shame entered at block two as a predictor, and frequency of BSE over the follow-up period as the dependent variable. The overall model was statistically significant, $F(2, 41) = 3.70, p = .033$, and explained 15.3% of variance in the dependent variable ($R^2 = .153$). However, after controlling for BMI ($B = -.342, SE = .190, \beta = -.270, t(43) = -1.80, p = .080$), the main effect for body shame was not statistically significant ($B = -.269, SE = .188, \beta = -.215, t(43) = -1.43, p = .161$).

Research questions 1 and 2 stated that women with higher levels of body image disturbances, as measured by body shame and body avoidance, may experience more general negative affect during BSE after controlling for physical discomfort. To prepare
the data for analyses testing the research question, first missing data on the PANAS-X was addressed. Of the 36 participants who reported at least one BSE over the follow-up period and provided affect data, 4 of them filled out the PANAS-X incorrectly by placing checkmarks by the affect items they wished to endorse instead of using the Likert scale to indicate endorsement of each affect item. Given that the PANAS-X could not be scored for these four participants, they were excluded from all analyses involving the PANAS-X bringing the final N for these analyses to 32. Next, to further prepare the data for analyses, two new variables were created that represented the negative affect and positive affect subscale scores associated with the first BSE that participant completed over the course of the follow-up period, regardless of whether it occurred in month one, two, or three. A corresponding new variable was created that represented the physical discomfort rating associated with each participant’s first BSE.

To examine the relationship between the negative and positive affect associated with one’s first BSE and other study variables of interest (physical discomfort, BMI, age, body shame, body avoidance), bivariate correlations were examined. Physical discomfort during the first BSE was significantly associated with the corresponding negative affect reported during that BSE ($r = .65, p < .001$) and the correlation between body shame and negative affect closely approached statistical significance ($r = .34, p = .059$); however, negative affect was not significantly associated with any of the other study variables. Thus, more physical discomfort during a BSE and higher levels of body shame are associated with more negative affect experienced during that BSE. Positive affect during the first BSE was significantly associated with body avoidance ($r = -.39, p = .029$);
however, positive affect was not associated with any of the other study variables. Thus, higher levels of body avoidance are associated with less positive affect during the performance of a BSE. Finally, physical discomfort reported during one’s first BSE was significantly associated with body shame ($r = .49$, $p = .004$) and body avoidance ($r = .39$, $p = .030$). Thus, higher levels of body shame and body avoidance are associated with more physical discomfort during BSE.

To further test research questions 1 and 2 by examining the unique effect of body shame and body avoidance on negative and positive affect during BSE after controlling for physical discomfort, four regression analyses were conducted. In the first analysis, physical discomfort during one’s first BSE was entered at block one as a control variable, body shame was entered at block two as a predictor, and negative affect at one’s first BSE was the dependent variable. The overall model was statistically significant, $F(2, 29) = 10.41, p < .001$, and explained 41.8% of variance in the dependent variable ($R^2 = .418$). After controlling for physical discomfort ($B = 1.39, SE = .358, \beta = .633, t(31) = 3.89, p = .001$), the main effect for body shame was not statistically significant ($B = .058, SE = .358, \beta = .026, t(31) = .163, p = .872$). In the second analysis, physical discomfort during one’s first BSE was entered at block one as a control variable, body avoidance was entered at block two as a predictor, and negative affect at one’s first BSE was the dependent variable. The overall model was statistically significant, $F(2, 29) = 10.55, p < .001$, and explained 42.1% of variance in the dependent variable ($R^2 = .421$). After controlling for physical discomfort ($B = 1.48, SE = .337, \beta = .672, t(31) = 4.39, p < .001$),
the main effect for body avoidance was not statistically significant ($B = -.147, SE = .337, β = -.067, t(31) = -.436, p = .666$).

In the third analysis, physical discomfort during one’s first BSE was entered at block one as a control variable, body shame was entered at block two as a predictor, and positive affect at one’s first BSE was the dependent variable. The overall model was not statistically significant, $F(2, 29) = 1.35, p = .274$, and explained 8.5% of variance in the dependent variable ($R^2 = .085$). After controlling for physical discomfort ($B = -.700, SE = 1.76, β = -.081, t(31) = -.398, p = .693$), the main effect for body shame was not statistically significant ($B = -2.10, SE = 1.76, β = -.243, t(31) = -1.19, p = .242$). In the fourth analysis, physical discomfort during one’s first BSE was entered at block one as a control variable, body avoidance was entered at block two as a predictor, and positive affect at one’s first BSE was the dependent variable. The overall model was not statistically significant, $F(2, 29) = 2.61, p = .091$, and explained 15.3% of variance in the dependent variable ($R^2 = .153$). After controlling for physical discomfort ($B = -.530, SE = 1.60, β = -.061, t(31) = -.332, p = .742$), the main effect for body avoidance approached statistical significance ($B = -3.13, SE = 1.60, β = -.363, t(31) = -1.96, p = .060$) and explained an additional 11.2% of variance in the dependent variable ($R^2Δ = .112$).

In response to the reactivity item assessing whether participating in a study about BSE prompted participants to engage in more BSE than they normally would, out of the 45 participants with valid follow-up data, 10 participants (22.2%) responded “not at all”, 16 participants (35.6%) responded “somewhat”, 4 participants (8.9%) responded
“moderately”, 14 participants (31.1%) responded “definitely”, and 1 participant (2.2%) did not provide a response on this item. The mean reactivity score was 1.50 ($SD = 1.17$).

**Post Hoc Analyses**

Given the lack of support for the primary study hypotheses and recent research suggesting that these relationships may differ across age groups and that breast cancer risk is more salient for older women (i.e., Bryan, 2001), several post hoc analyses were conducted to determine whether the study hypotheses were supported when only the older women in the sample were considered. A large percentage of the sample ($n = 49, 40.8\%$) fell at the minimum age limit for the study of 21 years of age; thus, to prepare the dataset for post hoc analyses, only women ages 22 and older were selected. The total sample for post hoc analyses consisted of 71 women with ages ranging from 22 to 40 ($M = 26.31, SD = 5.22$). A series of independent sample $t$-tests were conducted to assess mean differences between the excluded participants ($n = 49$) and the post-hoc sample ($n = 71$). Dependent variables included both of the predictors, body shame and body avoidance, both moderators, health anxiety and risk perception, both measures of BSE frequency, past year BSE and BSE intentions, and two relevant descriptive variables, BMI and health literacy. Significant group differences emerged on BMI, $t(117) = -2.23, p = .028$, body shame, $t(117) = -1.97, p = .052$, and body avoidance, $t(117) = -2.12, p = .017$. The post hoc sample, on average, had a higher BMI ($M = 25.70, SD = 6.38$), more body shame ($M = 24.90, SD = 10.21$), and more body avoidance ($M = 32.41, SD = 13.71$) than the excluded group ($M_{BMI} = 23.35, SD = 4.41; M_{body shame} = 21.47, SD = 8.07; M_{body avoidance} = 26.73, SD = 10.92$). No significant group differences emerged on health anxiety,
risk perception, health literacy, past year BSE frequency, or BSE intentions for the coming year.

All four primary study hypotheses were repeated with this subsample of participants. As with the primary analyses, square root transformations were applied to both outcome variables, BSE in the past year (skewness = 3.88, kurtosis = 17.36) and BSE intentions (skewness = 2.80, kurtosis = 9.48), which were also non-normal in this subsample. Doing so resulted in skewness and kurtosis values within normal limits (skewness = 1.49, kurtosis = 2.93; skewness = 0.89, kurtosis = 1.61) for BSE in the past year and BSE intentions for the coming year respectively. BMI was retained as a block one covariate in all post hoc regression analyses; however, age was dropped as a covariate from the models due to the lack of a significant correlation with the outcome variables in this subsample. As in previous analyses, one participant was excluded from analyses via listwise deletion due to a missing BMI value.

In the two post hoc analyses examining the main effects of body avoidance (hypothesis 1; see Table 3), body avoidance did not emerge as a statistically significant predictor of BSE in the past year, but did significantly predict BSE intentions in the coming year. In the first analysis, BMI was entered at block one as a control variable, body avoidance was entered at block two as the predictor, and BSE in the past year was the dependent variable. The overall model was not significant, $F(2, 67) = 2.55, p = .086$, and explained 7.1% of variance in the dependent variable ($R^2 = .071$). After controlling for BMI ($B = .468, SE = .207, \beta = .296, t(69) = 2.26, p = .027$), the main effect for body
avoidance was not statistically significant ($B = -.214, SE = .211, \beta = -.133, t(69) = -1.02, p = .313$).

In the second analysis, BMI was entered at block one as a control variable, body avoidance was entered at block two as the predictor, and BSE intentions for the coming year was the dependent variable. The overall model was not significant, $F(2, 67) = 2.31, p = .107$, and explained 6.5% of variance in the dependent variable ($R^2 = .065$). After controlling for BMI ($B = .290, SE = .198, \beta = .193, t(69) = 1.47, p = .148$), the main effect for body avoidance was statistically significant ($B = -.414, SE = .201, \beta = -.271, t(69) = -2.06, p = .044$) and explained an additional 5.9% of variance in the dependent variable ($R^2\Delta = .059$). The addition of the main effect for body avoidance significantly improved model fit, $F\Delta(1, 67) = 4.23, p = .044$, and had a small effect, $f^2 = .06$ (Cohen, 1992). Thus, a negative relationship exists between body avoidance and BSE intentions in the coming year such that women experiencing greater body avoidance intend to perform fewer BSEs in the coming year.

In the two post hoc analyses examining the main effects of body shame (hypothesis 2; see Table 3), body shame emerged as a statistically significant predictor of both BSE in the past year and BSE intentions for the coming year. In the first analysis, BMI was entered at block one as a control variable, body shame was entered at block two as the predictor, and BSE in the past year was the dependent variable. Results showed that the overall model was significant, $F(2, 67) = 4.39, p = .016$, and explained 11.6% of variance in the dependent variable ($R^2 = .116$). After controlling for BMI ($B = .472, SE = .187, \beta = .299, t(69) = 2.52, p = .014$), the main effect for body shame was statistically
significant ($B = -.395, SE = .186, \beta = -.252, t(69) = -2.12, p = .037$) and explained an additional 6.0% of variance in the dependent variable ($R^2\Delta = .060$). The addition of the main effect for body shame significantly improved model fit, $F\Delta(1, 67) = 4.51, p = .037$, and had a small effect, $f^2 = .07$ (Cohen, 1992). Thus, a negative relationship exists between body shame and self-reported frequency of BSE in the past year such women experiencing greater body shame report less frequent BSE in the past year.

In the second analysis, BMI was entered at block one as a control variable, body shame was entered at block two as the predictor, and BSE intentions for the coming year was entered as the outcome variable. The overall model approached statistical significance, $F(2, 67) = 3.06, p = .054$, and explained 8.4% of variance in the dependent variable ($R^2 = .084$). After controlling for BMI ($B = .216, SE = .181, \beta = .144, t(69) = 1.19, p = .237$), the main effect for body shame was statistically significant ($B = -.431, SE = .180, \beta = -.288, t(69) = -2.39, p = .020$) and explained an additional 7.8% of variance in the outcome variable ($R^2\Delta = .078$). The addition of the main effect for body shame significantly improved model fit, $F\Delta(1, 67) = 5.72, p = .020$, and had a small effect, $f^2 = .09$ (Cohen, 1992). Thus, a negative relationship exists between body shame and self-reported intentions for BSE in the coming year such that women experiencing greater body shame intend to perform fewer BSEs in the coming year.

In the two post hoc analyses examining health anxiety as a moderator of the relationship between both body shame and body avoidance and the dependent variable, BSE in the past year (hypothesis 3; see Table 4), no support was found for moderation; however, a main effect for body shame approached statistical significance. In the first
analysis, BMI was entered at block one as a control variable, body avoidance and health anxiety were entered at block two, the interaction between body avoidance and health anxiety was entered at block three, and BSE in the past year was the dependent variable. The overall model was not significant, $F(4, 64) = .947, p = .443$, and explained 5.6% of variance in the dependent variable ($R^2 = .056$). After controlling for BMI ($B = .336, SE = .196, \beta = .236, t(68) = 1.71, p = .091$), the main effects for body avoidance ($B = -.206, SE = .202, \beta = -.144, t(68) = -1.02, p = .311$) and health anxiety ($B = .128, SE = .183, \beta = .088, t(68) = .700, p = .487$) were not significant, nor was the interaction between body avoidance and health anxiety ($B = .091, SE = .187, \beta = .062, t(68) = .484, p = .630$).

In the second analysis, BMI was entered at block one as a control variable, body shame and health anxiety were entered at block two, the interaction between body shame and health anxiety was entered at block three, and BSE in the past year was the dependent variable. The overall model was not significant, $F(4, 64) = 1.66, p = .170$, and explained 9.4% of variance in the outcome variable ($R^2 = .094$). After controlling for BMI ($B = .328, SE = .177, \beta = .230, t(68) = 1.85, p = .068$), the main effect for body shame closely approached statistical significance ($B = -.341, SE = .174, \beta = -.244, t(68) = -1.96, p = .055$); however, the main effect for health anxiety ($B = .163, SE = .180, \beta = .112, t(68) = .905, p = .369$) and the interaction between body shame and health anxiety ($B = .012, SE = .166, \beta = .009, t(68) = .070, p = .944$) were not significant.

In the two post hoc analyses examining risk perception as a moderator (hypothesis 4; Table 5), no support was found for moderation; however, statistically significant main effects for body shame and risk perception did emerge. In the first analysis, BMI was
entered at block one as a control variable, body avoidance and risk perception were entered at block two, the interaction term between body avoidance and risk perception was entered at block three, and BSE in the past year was the dependent variable. The overall model was significant, $F(4, 65) = 2.53, p = .049$, and explained 13.5% of variance in the dependent variable ($R^2 = .135$). After controlling for BMI ($B = .433, SE = .204, \beta = .274, t(69) = 2.12, p = .037$), the main effect for risk perception was statistically significant ($B = .401, SE = .190, \beta = .255, t(69) = 2.12, p = .038$); however, the main effect for body avoidance ($B = -.195, SE = .210, \beta = -.122, t(69) = -.929, p = .356$) was not significant; the addition of the main effects explained an additional 6.2% of variance in the dependent variable ($R^2\Delta = .062$) but did not significantly improve model fit, $F\Delta(2, 66) = 2.32, p = .106$, and had a small effect, $f^2 = .07$ (Cohen, 1992). Thus, a positive relationship exists between risk perception for breast cancer and BSE in the past year such that women who perceive themselves to be at a higher risk for breast cancer report more frequent past year BSEs. The interaction between body avoidance and risk perception ($B = -.214, SE = .193, \beta = -.135, t(69) = -1.11, p = .273$) was not significant.

In the second analysis, BMI was entered at block one as a control variable, body shame and risk perception were entered at block two, the interaction term between body shame and risk perception was entered at block three, and BSE in the past year was the dependent variable. The overall model was significant, $F(4, 65) = 3.64, p = .010$, and explained 18.3% of the variance in the dependent variable ($R^2 = .183$). After controlling for BMI ($B = .451, SE = .183, \beta = .285, t(69) = 2.46, p = .017$), the main effects for body shame ($B = -.443, SE = .183, \beta = -.282, t(69) = -2.42, p = .018$) and risk perception ($B =
.439, $SE = .190$, $\beta = .279$, $t(69) = 2.31$, $p = .024$) were both statistically significant and explained an additional 12% of variance in the outcome variable ($R^2_A = .120$). The addition of the main effects significantly improved model fit, $F_A(2, 66) = 4.83$, $p = .011$ and had a small effect, $f^2 = .07$ (Cohen, 1992). Thus, a negative relationship exists between body shame and BSE in the past year such that at higher levels of body shame, self-reported frequency of BSE in the past year is lower. Furthermore, a positive relationship exists between risk perception and BSE in the past year such that women who perceive themselves to be at a higher risk for breast cancer report engaging in more frequent past year BSE. However, the interaction between body shame and risk perception was not significant ($B = -.124$, $SE = .174$, $\beta = -.085$, $t(69) = -.710$, $p = .481$).

Given these post hoc findings that risk perception is consistently associated with past year BSE for a sample in which women 21 years of age are excluded, age may be best characterized as a moderator of the relationship between risk perception and past year BSE as it has been in previous research (e.g., Bryan, 2001). To test this assertion, one final post hoc regression analysis was run with the overall sample of 120 participants. In this analysis, BMI was entered at block one as a control variable, risk perception and age were entered at block two, the interaction between risk perception and age was entered at block three, and BSE in the past year was the dependent variable. The overall model was significant, $F(4, 114) = 3.16$, $p = .017$, and explained 10% of variance in the outcome variable ($R^2 = .100$). After controlling for BMI ($B = .132$, $SE = .148$, $\beta = .085$, $t(118) = .895$, $p = .373$), the main effect for risk perception was not significant ($B = .150$, $SE = .139$, $\beta = .097$, $t(118) = 1.09$, $p = .280$) and the main effect for age approached
statistical significance ($B = .284, SE = .148, \beta = .182, t(118) = 1.92, p = .058$). The main effects explained an additional 3.6% of variance in the outcome variable ($R^2_A = .036$). The interaction term between risk perception and age was statistically significant ($B = .290, SE = .136, \beta = .192, t(118) = 2.14, p = .035$) and explained an additional 3.6% of variance in the outcome variable ($R^2_A = .036$; see Table 6). The addition of the interaction term significantly improved model fit, $F_A (1, 114) = 4.57, p = .035$, and had a small effect, $f^2 = .04$ (Cohen, 1992).

Table 6

*Age as a Moderator of the Relationship between Risk Perception and Past Year BSE*

<table>
<thead>
<tr>
<th>Variable</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
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<th>SE</th>
<th>$\beta$</th>
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*Note.* BSE = breast self-examination; BMI = body mass index; Risk = risk perception for breast cancer.

To decompose this higher-order interaction and, thus, determine whether the slope of risk perception on BSE frequency in the past year was significantly different from zero for those who were older versus those who were younger, the simple slopes of the interaction were examined (Preacher, Curran, & Bauer, 2006). Results were significant for those who were older, slope = .044, $t(114) = 2.39$, $p = .018$, but not for those who
were younger, slope = -0.14, \( t(114) = -0.685, p = .495 \) (see Figure 1). Thus, age moderated the relationship between risk perception and past year BSE frequency such that for older women, higher levels of risk perception are associated with more frequent past year BSE.

*Figure 1.* Age as a moderator of the relationship between risk perception and past year breast self-examination. \( Y \) = frequency of breast self-examination in the past year.
CHAPTER IV

DISCUSSION

The primary aim of the current study was to examine the relationship between body image disturbances and BSE among women as well as previously unexplored moderators of this relationship. A secondary aim was to explore the relationship between body image disturbances and the experience of affect during BSE. When the entire sample was considered, none of the original hypotheses were supported; neither body shame nor body avoidance were significantly associated with past year BSE or BSE intentions and neither health anxiety nor risk perception for breast cancer emerged as moderators. However, when only women ages 22 to 40 years old were considered, body shame significantly predicted past year BSE and both body shame and body avoidance significantly predicted BSE intentions. Neither risk perception for breast cancer nor health anxiety emerged as moderators in post hoc analyses; however, significant main effects emerged as risk perception significantly predicted past year BSE. An additional post hoc analysis driven by this finding revealed that age moderated the relationship between risk perception and past year BSE when the entire sample was considered. Follow-up data revealed that neither body avoidance nor body shame significantly predicted levels of affect during BSE in the naturalistic environment after controlling for physical discomfort.
Body Shame and Body Avoidance as Predictors of BSE

Given that some research has demonstrated a relationship between body image disturbances and several body-focused cancer screening behaviors, including BSEs (Chait et al., 2009; Clark et al., 2009; Fish & Wilkinson, 2003; Jensen & Moriarty, 2008; Oscarsson et al., 2008; Risica et al., 2008; Thomas & Usher, 2009), it was somewhat surprising that none of the original hypotheses regarding the impact of body shame and body avoidance on BSE were supported. These null findings may be explained in a variety of different ways. First of all, given that the main effects for body shame on both BSE frequency and BSE intentions approached statistical significance in the primary analyses, sample size may have contributed to the null findings in the primary analyses. However, the fact that significant results were detected in post hoc analyses suggests that the sample size was adequate and is, thus, not the most likely explanation. Second, the lack of support for the primary hypotheses may suggest that there truly is no relationship between body image disturbances and BSE in a sample of women representing a wide age range. Indeed, the only previous study to utilize an empirically validated measure of disturbed body image to examine the relationship between body image disturbances and cancer screening behaviors found that disturbed body image predicted less frequent skin self-examination but did not predict BSE frequency or intentions in a sample of women with ages ranging from 28 to 82 years (Chait et al., 2008). It is possible that the relationship between body image disturbances and BSE may be unique to a specific subsample of women. Thus, perhaps the most likely explanation for these null findings,
given the results of post hoc analyses, is that the relationship between body image disturbances and BSE differs by age.

Interestingly, when the youngest participants in the sample, the 21 year-old women, were excluded from post hoc analyses, several significant effects emerged such that higher levels of body shame predicted less frequent past year BSE and higher levels of both body shame and body avoidance predicted decreased BSE intentions. The fact that these significant results emerged only after excluding the youngest participants points to key differences between these participants and the 22 to 40 year-old women in the sample. Although there were no mean differences between the excluded participants and the post hoc sample on frequency of past year BSE or BSE intentions, significant differences did emerge in terms of rates of body image disturbances. The post hoc sample (i.e., women 22-40 years old) had significantly higher levels of body shame and body avoidance than the 21 year-old women. These differences related to body image are somewhat surprising given that body image disturbances have been found to be relatively stable across the lifespan (Tiggemann, 2004) with similar rates of weight dissatisfaction as well as dissatisfaction with specific body parts (i.e., stomach, hips, and thighs) in both young and middle aged women (Grogan, 2011). These higher rates of body image disturbances in the post hoc sample may be due, in part, to the fact that this group also had a significantly higher average BMI, which is highly correlated with body image disturbances (Sarwer et al., 2011; Saules et al., 2009; Striegel-Moore & Franko, 2002), than the 21 year-old women. However, the relative impact of BMI on body shame and body avoidance may differ for younger versus older women. While a low level of body
image disturbance is normative among women (Rodin et al., 1984), these normative amounts of body image disturbances may not be as impactful as levels in the higher, more pathological, range. Thus, excluding the 21 year-old women, who evidenced lower, less salient levels of body image disturbances, may have strengthened the relationship between body image disturbances and BSE.

Furthermore, there is some evidence that specific facets of body image disturbance, particularly body shame, may be more salient for older women than younger women. Body shame has been found to be more strongly related to maladaptive eating behaviors among older women than among younger women (Augustus-Horvath & Tylka, 2009); thus, body shame may also be more strongly related to behaviors like BSE as age increases. Additionally, the specific domains of appearance that encompass body shame may change with age. Body shame is defined as feelings of inferiority and self-consciousness regarding aspects of one’s appearance perceived to be culturally unacceptable (Bessenoff & Snow, 2006; Fredrickson & Roberts, 1997; Goss & Gilbert, 2002). Young women may focus more on weight-related aspects of their appearance while older women place less emphasis on thinness (Grogan, 2011). Thus, the appearance of one’s breasts may be more relevant to body shame for older women. Changes in the appearance of one’s breasts associated with childbirth, menopause, or aging (i.e., loss of fullness, firmness, or elasticity), may be highlighted by the visual and manual inspection of one’s breasts during BSE (ACS, 2012a). Weight, a facet of physical appearance that is more relevant to the experience of body shame among younger women, is perhaps not as salient during BSE given that BSE does not involve a full-body examination (ACS,
Thus, body shame may be more predictive of BSE for older women than younger women. A similar effect may exist for body avoidance, such that younger women may be more likely to avoid body-focused situations that highlight their weight while older women may be more likely to avoid body-focused situations, like BSE, that highlight age-related physical changes.

The fact that body shame and body avoidance were associated with BSE in the post hoc sample is consistent with previous research on these constructs. Given that body shame is associated with more discomfort during and avoidance of sexual encounters during which one’s body is exposed (Ackard et al., 2000; Schooler et al., 2005) and that body avoidance includes behaviors such as avoiding examining one’s reflection in mirrors (Fairburn, 2008; Trautmann et al., 2007), it is not surprising that these indicators of body image disturbance are also associated with poor adherence to BSE recommendations. These findings provide support for the current study’s characterization of BSE as a body-focused behavior that is relevant to the body image literature. However, body avoidance was associated only with BSE intentions and not past year BSE while body shame was predictive of both past year BSE and BSE intentions. These differential results may be due to the fact that body shame and body avoidance each represent a distinct facet of disturbed body image and, thus, impact BSE behaviors differently. Body avoidance is a behavioral indicator of body image disturbance that tends to be interspersed with other behavioral indicators, most frequently, body checking behaviors (Shafran et al., 2004). While a woman with a disturbed body image may often actively avoid looking at her weight or body shape, at other times she may experience extreme preoccupation with her
weight and body shape and engage in frequent body checking. This lack of constancy in body avoidance behaviors may explain why body avoidance did not predict past year BSE. While one may have a high current level of body avoidance, these behaviors may have waxed and waned over the past year. However, body shame may be more constant across time contributing to its relationship with both past year BSE and BSE intentions. These differential findings may also point to the relative strength of cognitive-affective components of body image disturbance in predicting health behaviors.

Of note, the results of the post hoc analyses are not consistent with those of a recent study using similar methodology (Chait et al., 2008). Like the current study, Chait and colleagues (2008) utilized empirically-supported measures of body image disturbances to assess the relationship between disturbed body image and BSE. However, unlike the current study, Chait and colleagues did not find a significant relationship between body image disturbances and either past BSE behaviors or BSE intentions. This lack of consistency may be due to two primary factors. First of all, the post hoc sample utilized in the current study was much younger on average ($M = 26.31$) and represented a narrower age range (Range = 22-40) than the Chait et al. sample ($M = 56.9$; Range = 28-82). Women over the age of 40 are likely engaging in mammography, and mammography tests results impact the performance of BSE such that women receiving normal mammogram results conduct less frequent BSEs post-mammogram than women receiving false positive or abnormal results (Lampic et al., 2003; Lerman et al., 1991). Thus, the inclusion of women over the age of 40 by Chait and colleagues may partially explain their failure to detect a significant relationship between body image disturbances
and BSE as BSE frequency may be more strongly associated with factors other than body image disturbances among women over 40. Secondly, the current study utilized different measures of body image disturbances. While Chait and colleagues utilized general measures of appearance satisfaction and investment, the current study measured specific facets of body image disturbances (i.e., body shame and body avoidance), which may be more relevant to BSE. Thus, factors including sample selection and measurement issues are of paramount importance in detecting the relationship between body image disturbances and BSE.

**Moderators: Risk Perception, Health Anxiety, and Age**

The current study offered no support for the hypothesized moderating effect of health anxiety on the relationship between body image disturbances and past year BSE behaviors in either the primary or post hoc analyses. Thus, health anxiety does not significantly change the direction or strength of the relationship between body image disturbances and past year BSE. This finding is particularly relevant as it pertains to the post hoc main effect of body shame on past year BSE; although moderate levels of health anxiety have been found to be adaptive in terms of promoting more frequent health behaviors (e.g., McCaul et al., 1996), in the current study, being concerned or anxious about one’s health does not seem to be protective against the deleterious effects of body shame. One potential explanation for this finding is that body image disturbances, particularly body shame, may be so impactful in terms of influencing decisions about BSE that even high levels of health anxiety, which normally impact health behaviors (Barsky et al., 2001; Conroy et al., 1999), have no influence on BSE. In fact, body image
disturbances are associated with an overvaluation of weight and shape (Cash & Smolak, 2011) such that concerns about physical appearance are often valued much more highly than other aspects of life. It is possible that women with body image disturbances prioritize the avoidance of body-focused situations, even at the potential expense of their physical health. Another potential explanation for the lack of moderation is that general health anxiety may predict health care utilization in general, but may be less salient in women’s decisions regarding preventive health behaviors like BSEs. Anxiety specific to breast cancer has previously been linked to more frequent breast screening behaviors (Diefenbach et al., 1999; Erblich et al., 2000; Hailey et al., 2000; Hay et al., 2006; McCaul et al., 1996; Moser et al., 2007) and may be more likely to moderate the relationship between body image disturbances and BSE than general health anxiety.

Similarly, risk perception for breast cancer did not moderate the relationship between body image disturbances and BSE in either the primary or post hoc analyses. Thus, risk perception does not significantly change the direction or strength of the relationship between body image disturbances and past year BSE. Again, this finding is particularly relevant to the main effect of body shame on past year BSE; regardless of how much a woman perceives herself to be at risk for breast cancer, higher levels of body shame are still significantly associated with less frequent BSE. Again, the desire to avoid BSE due to body shame may be so salient for women that even a high perceived breast cancer risk cannot ameliorate this effect. Despite the lack of moderation, significant main effects for risk perception emerged during post hoc analyses such that for the older women, feeling more at risk for breast cancer was associated with more frequent past
year BSE; however, these main effects were not found when the entire sample, including the 21 year-old women, was considered. These results may shed some light on important motivators of BSE behaviors. The differential impact of risk perception on BSE behaviors for the older post hoc sample versus the entire sample is not due to any age differences in perceived risk perception for breast cancer as the older women (i.e., ages 22-40) and the 21 year-old women did not significantly differ on average level of perceived risk for breast cancer. Furthermore, this difference is likely not accounted for by any age difference in knowledge regarding how to respond to one’s risk for breast cancer as average health literacy also did not significantly differ between the two age groups. In the absence of age differences on subjective risk or knowledge, it appears that the way women respond to breast cancer risk may differ as a function of age.

Providing further support for this interpretation were post hoc findings demonstrating that age moderated the relationship between risk perception and past year BSE. In other words, as age increased, a higher risk perception for breast cancer was associated with more frequent BSE over the past year; however, for younger women, there was no statistically significant relationship between risk perception and frequency of past year BSE. In fact, based on the post hoc analyses, it would appear that the young women with high levels of risk perception in the current study engaged in BSE no more frequently than the young women with low levels of risk perception. Thus, this study replicates previous research on the impact of age on one’s response to breast cancer risk perception (Bryan, 2001) and suggests that risk perception is a more salient predictor of BSE behaviors for older women. This increasing salience of breast cancer risk with age is
not particularly surprising given that objective risk for breast cancer does, in fact, increase with age (ACS, 2012a). As women get older and their objective risk for breast cancer increases, they may focus more on this risk and respond behaviorally to it more frequently. For younger women, an increase in risk perception may not trigger a behavioral response because while young women may understand that they are at risk for developing breast cancer sometime during their lifetime, they may not believe it is important to initiate regular BSE until they are older. This belief may be impacted both by an accurate perception that objective breast cancer risk increases with age (ACS, 2012a) as well as by a more inaccurate belief that they are immune from such negative health consequences, despite their risk factors. In fact, research suggests that individuals often underestimate their risk for the development of negative health consequences despite having known risk factors for those consequences (Absetz et al., 2000; Baker et al., 2001; Clarke et al., 1997; Weinstein, 1980, 1982, 1987).

Another potential explanation is that young women in their early twenties are on the cusp of the age group for which BSE is recommended (ACS, 2012a), and as a result, may not have received as many physician recommendations for BSE to date as older women. The majority of the sample reported that they had been instructed or encouraged to engage in BSE by medical personnel, but information was not collected on the frequency of these recommendations. However, it is likely that breast cancer risk becomes more salient for older women, who likely have a longer history of receiving recommendations for BSE from physicians, family members, and peers; without these experiences, younger women may be less likely to regularly think about their risk factors.
Furthermore, given that young women may have engaged in less dialogue with others regarding BSE, they may have less self-efficacy regarding the performance of BSE than older women, and self-efficacy regarding BSE has been linked to the performance of more frequent BSE (Carpenter & Colwell, 1995; Rimal & Juon, 2010). Thus, even those young women with a high perceived risk for breast cancer may fail to engage in more frequent BSE because they fear performing the behavior incorrectly. While it is laudable that older women are responding appropriately to their subjective risk for breast cancer by engaging in more frequent BSE, the failure of the younger women to behave similarly may be problematic given that breast cancer can occur, albeit less frequently, in young women under the age of 30 (e.g., Tabbane et al., 1985).

Follow-Up Data

The return rate for the follow-up questionnaires was low (37.7%) and may have been due to high participant burden in the follow-up portion of the study (i.e., completing questionnaires for 3 months). Furthermore, the response rate may have been associated with level of body image disturbance. Specifically, those participants who returned their questionnaires had less body shame on average than those participants who failed to return their questionnaires. This may suggest that having more body shame discouraged participants from completing the follow-up questionnaires, perhaps due to a desire to avoid engaging in or discussing BSE behaviors. These findings are consistent with the results of the initial analyses that link body shame to fewer intended BSE. Perhaps those women with higher levels of body shame did not anticipate completing regular BSE over the next few months, and thus, did not feel it was worthwhile to participate in the follow-
up portion of the study. Although the follow-up portion of the study was not an intervention designed to motivate participants to engage in BSE, participants were encouraged to engage in at least one BSE over the three month period; these findings suggest that, even with prompting, it may be difficult to motivate women with body shame to complete BSE.

Further illustrating the impact of body shame is the fact that among those women who completed the follow-up questionnaires, those who reported completing at least one BSE had lower average levels of body shame than those who reported completing no BSE; furthermore higher levels of body shame were associated with less frequent total BSE across the three month period. Thus, even among those women who were motivated to complete the follow-up, having more body shame may have discouraged them from completing BSE at all, or as frequently, as women with less body shame. Given that body shame is associated with discomfort with body-focused situations (Ackard et al., 2000; Schooler et al., 2005), some women with higher levels of body shame perhaps completed the follow-up questionnaires for the purposes of compliance but were uncomfortable with the notion of following through with the study recommendation to engage in at least one BSE. However, the fact that when BMI was statistically controlled, the relationship between body shame and frequency of BSE was no longer significant may suggest that BMI, and not body shame, accounts for this effect. In fact, higher BMI has been shown to be associated with less frequent mammography and cervical cancer screenings (e.g., Cohen et al., 2008), and thus, may also be associated with less frequent BSE.
The primary findings from the data collected during the 3 month follow-up period were contrary to expectations. Of particular interest was the fact that after statistically controlling for the effects of physical discomfort during BSE, the positive correlations between body shame and negative affect during BSE as well as the negative association between body avoidance and positive affect during BSE were no longer significant. It was surprising that physical discomfort during BSE explained so much of this effect; however, it is possible that physical discomfort occurred much more frequently during BSE than anticipated due to factors such as breast tenderness or incorrect performance of BSE, and was associated with more negative mood. Alternatively, it is also possible that given the potentially vague wording of the item assessing physical discomfort during BSE, participants, particularly those with body image disturbances, may have interpreted this item as referring to discomfort with regards to touching their own bodies as opposed to referring to physical pain as was intended, contributing to the significant correlations between both body shame and body avoidance and the physical discomfort variable.

A third potential explanation for the lack of a significant relationship between body image disturbances and the experience of more negative affect and less positive affect during BSE after controlling for physical discomfort is the small and self-selected sample in the follow-up portion of the study. A higher return rate for follow-up may have yielded more statistical power and significant findings, particularly in regards to the main effect of body avoidance on positive affect, which closely approached statistical significance. Additionally, given that those who completed follow-up had significantly less body shame than those who did not complete follow-up, and those who completed at
least one BSE during follow-up had significantly less body shame than those who
completed no BSE, the correlation between body shame and both negative and positive
affect may have been attenuated due to a restricted range on body shame. Including
women with a wider range of body image disturbances in the follow-up portion of the
study may have strengthened the association between body image disturbances and
affect.

Limitations

The current study had several limitations. First of all, the sample consisted
primarily of young adult Caucasian women. While body image disturbance is a salient
construct to study in this population given the high rates of such disturbances among
young women, the inclusion of more women in the age range of 30-40 would likely have
strengthened the findings given the results of the post hoc analyses. Furthermore, the
findings of the current study cannot be generalized to women of other ethnicities. Given
that previous research has found differing relationships between BMI and cancer
screening frequency for Caucasian women versus women of different ethnicities, it is
likely that future research will also find similar differences for the relationship between
body image disturbances and BSE. Secondly, the sample size for the current study was
smaller than desired; however, the fact that significant results were found despite the
small sample highlights the strengths of the examined relationships. Third, the variables
in this study were measured using self-report methodology, which may have introduced
biases, particularly in regards to the assessment of BSE. A bias related to retrospective
recall may have been introduced as participants may have had difficulty recalling their
past BSE behaviors. Furthermore, a social desirability bias may have resulted in participants presenting themselves as overly compliant in their BSE intentions. However, self-report was the most efficient way to collect information about BSE in this study. A final limitation to this study was the low return rate of the follow-up questionnaires, perhaps due in part to the length of the follow-up period; however, analyses yielded interesting findings in need of further investigation.

**Future Directions and Implications**

Future research could expand upon the current study in a variety of ways. One potentially fruitful avenue would be to examine the relationship between body image disturbances and BSE among different populations, particularly ethnic minorities and older women. An understanding of these relationships among ethnic minorities may contribute to an increased understanding of how to intervene in those populations to increase BSE compliance. Furthermore, given the current study’s findings related to age, examining these relationships in a sample of women solely from an older population would likely yield meaningful results. Next, given the lack of moderation in the current study, future research should examine other potential moderators that may impact the relationship between body image disturbances and BSE, like self-efficacy for BSE and subjective norms for breast cancer screenings. Additionally, future studies may benefit from methodological modifications. For instance, in order to obtain a larger sample of BSE behavior in the natural environment, researchers could follow up with participants for longer than 3 months (e.g., 6 months, 1 year, etc.); however, attrition may be an even more prevalent issue under these conditions. Finally, future research should examine the
impact of body image disturbances on other body-focused cancer screening behaviors, including mammograms, skin self-examinations, and cervical cancer screenings. Doing so would allow for more data collection options, including using medical records, rather than self-report.

These findings also have implications for the treatment of body image disturbances as well as women’s health promotion efforts. Cognitive behavioral treatment for body image disturbances typically addresses both cognitive-affective and behavioral manifestations of disturbed body image (Fairburn, 2008). The findings of the current study strongly reinforce the inclusion of both body shame and body avoidance as treatment targets, particularly for women between the ages of 22 and 40, given that these facets of body image can impact women’s health via their association with BSE. Despite not being predictive of BSE for younger women, body shame and body avoidance are also useful treatment targets for this population, albeit due to the association between body image disturbances and eating pathology (Cash & Smolak, 2011). Understanding the predictors of BSE may also benefit medical providers. Given that medical providers typically facilitate a woman’s first BSE by teaching the behavior, they should take care to avoid stigmatizing or body-focused comments that may maintain or exacerbate a patient’s body shame. Furthermore, given the association between risk perception and BSE for older women, medical providers should adequately counsel patients regarding their personal risk for breast cancer as inaccuracies in risk perception are common (e.g., Absetz et al., 2000).
Education regarding risk factors for breast cancer may also be an effective component of large scale public health interventions or campaigns sponsored by cancer organizations to increase breast cancer awareness and increase compliance with BSE recommendations. It may be particularly useful to specifically target younger women with salient educational mass media messages regarding rates of breast cancer in young women and relevant risk factors, including family history of early onset breast cancer, given the tendency for younger women to engage in fewer BSEs regardless of their perceived risk, perhaps due to a sense of immunity related to their youth or to a lack of sufficient contact with medical providers regarding BSE. Large scale interventions could also address body image concerns associated with BSE by working to normalize a wide range of breast shapes and sizes and body types, for instance, by creating BSE pamphlets and shower cards depicting women with various body and breast sizes. Programs encouraging women to remind friends and family members to perform monthly BSE may also help to combat the overall negative valence of BSE due to body image concerns, negative affect, and physical discomfort during BSE by providing a source of support and encouragement for completing BSEs and a feeling of accountability to other women.

**Conclusion**

The current study contributes to the small body of literature examining the association between body image disturbances and BSE. To my knowledge, this is only the second study to examine these relationships using empirically validated measures of body image disturbances and the first study to examine potential moderators of this relationship and to assess predictors and correlates of BSE as it occurs in the natural
environment. The findings of this study highlight the importance of studying women’s body image as it relates to body-focused cancer screening behaviors as a disturbed body image may eventually result in negative health consequences via the neglect of preventive health behaviors. The lack of evidence for moderation paves the way for future research by identifying variables that do not appear to be relevant to the relationship between body image disturbances and BSE. Given the dearth of research in this area, future research to inform women’s health promotion is of paramount importance and should focus on the examination of the relationship between body image disturbances and BSE among other populations of women, particularly among ethnic minorities or older women who are more at risk for breast cancer, as well as other potential moderators that may further illuminate this relationship.
APPENDIX A

CONSENT FORMS
APPENDIX A

CONSENT FORMS

Consent Form for Raffle Entries

I am interested in researching factors related to routine health screening behaviors among women. If you decide to take part in this project, you will be asked to complete various questionnaires regarding your thoughts and feelings about your body, recent health screening behaviors, and general feelings and emotions. You will be asked to complete some of these questionnaires today in the laboratory, and some at home over the next three months which you will mail back when completed. You will not need to return to the laboratory after today. At home over the next three months, you will be asked to complete one brief questionnaire per month regarding behaviors and feelings related to performing a breast cancer screening behavior. Please note that we are not asking you to change any health regimens that have been specifically prescribed by a health care provider. In fact, we would strongly encourage you to follow any recommendations made by your health care provider. We will not be able to answer any questions about individual health problems or concerns. Please contact your primary care physician directly if you have any questions or concerns about your physical health during this study.

Many of these questionnaires, both in the questionnaires today and in the questionnaires over the next three months, will ask you to disclose personal or private information about your health behaviors and the ways in which you think and feel—some of which you may or may not wish to complete. Taking part in this project is entirely up to you and no one will hold it against you if you decide not to participate. If you take part in this project, you will earn entries into a raffle for six gasoline gift cards. You will receive 2 entries into the raffle today and 3 additional entries when you mail back your at home questionnaires in three months. Even if you choose to leave these questionnaires blank, you will still receive the additional raffle entries when you mail them back. Your odds of winning are dependent on the number of entries received.

Your participation in this study will help us gain important knowledge about health maintenance among women. However, you may experience mild discomfort when asked to focus on your thoughts and feelings in this study. It is our experience that these effects tend to be small and of short duration. If you experience more than mild discomfort, we encourage you to contact the Kent State University Psychological Clinic at (330) 672-2372 or University Psychological Services at (330) 672-2487. Remember,
you are under no obligation to complete this study even if you sign this consent form—you may discontinue participation at any time.

All of the information collected in this study will remain confidential. Your name will not be associated with the information that you provide. You will be assigned a unique participant number which will be used to link your questionnaires with your name so that when you mail your at-home questionnaires in, we will know whose names to enter into the gift card raffle. Files or documents containing your mailing address or linking your name to your participant number will be destroyed after the study is completed. If you have questions about how your confidentiality will be protected, feel free to ask at this time.

If you would like more information about this research project, please feel free to contact Danielle Ridolfi at (330) 672-8888 *82413 or Dr. Janis Crowther at (330) 672-2090. This project has been approved by Kent State University. If you have questions about Kent State University’s rules for research, please call The Research Compliance Office at (330) 672-2704. You will receive a copy of this consent form.

Sincerely,

Danielle Ridolfi, M.A.
Principal Investigator

I am at least 18 years of age and I agree to take part in this project. I understand what participation in this study involves. I understand that I can stop at any time. I understand that I need to mail back the at home questionnaires whether or not they are completed to receive the maximum amount of raffle entries for participation.

____________________________________________  __________________
Participant’s Signature                               Date
Consent Form for Research Credits

I am interested in researching factors related to routine health screening behaviors among women. If you decide to take part in this project, you will be asked to complete various questionnaires regarding your thoughts and feelings about your body, recent health screening behaviors, and general feelings and emotions. You will be asked to complete some of these questionnaires today in the laboratory, and some at home over the next three months which you will mail back when completed. You will not need to return to the laboratory after today. At home over the next three months, you will be asked to complete one brief questionnaire per month regarding behaviors and feelings related to performing a breast cancer screening behavior. Please note that we are not asking you to change any health regimens that have been specifically prescribed by a health care provider. In fact, we strongly encourage you to follow any recommendations made by your health care provider. We will not be able to answer any questions about individual health problems or concerns. Please contact your primary care physician directly if you have any questions or concerns about your physical health during this study.

Many of these questionnaires, both in the questionnaires today and in the questionnaires over the next three months, will ask you to disclose personal or private information about your health behaviors and the ways in which you think and feel—some of which you may or may not wish to complete. Taking part in this project is entirely up to you and no one will hold it against you if you decide not to participate. If you take part in this project, you will earn SONA research credits. You will receive 2 credits today and 3 additional credits when you mail back your at home questionnaires in three months. Even if you choose to leave these questionnaires blank, you will still receive the additional credits when you mail them back.

Your participation in this study will help us gain important knowledge about health maintenance among women. However, you may experience mild discomfort when asked to focus on your thoughts and feelings in this study. It is our experience that these effects tend to be small and of short duration. If you experience more than mild discomfort, we encourage you to contact the Kent State University Psychological Clinic at (330) 672-2372 or University Psychological Services at (330) 672-2487. Remember, you are under no obligation to complete this study even if you sign this consent form—you may discontinue participation at any time.

All of the information collected in this study will remain confidential. Your name will not be associated with the information that you provide. You will be assigned a unique participant number which will be used to link your questionnaires with your name so that when you mail your at-home questionnaires in, we will know who to assign research credits to. Files or documents containing your mailing address or linking your name to your participant number will be destroyed after the study is completed. If you
have questions about how your confidentiality will be protected, feel free to ask at this time.

If you would like more information about this research project, please feel free to contact Danielle Ridolfi at (330) 672-8888 *82413 or Dr. Janis Crowther at (330) 672-2090. This project has been approved by Kent State University. If you have questions about Kent State University’s rules for research, please call The Research Compliance Office at (330) 672-2704. You will receive a copy of this consent form.

Sincerely,

Danielle Ridolfi, M.A.
Principle Investigator

I am at least 18 years of age and I agree to take part in this project. I understand what participation in this study involves. I understand that I can stop at any time. I understand that I need to mail back the at home questionnaires whether or not they are completed to receive the maximum amount of research credits for participation.

________________________________________________________________________
Participant’s Signature                      Date
APPENDIX B

QUESTIONNAIRE BATTERY
APPENDIX B

QUESTIONNAIRE BATTERY

Demographic Information

1.) Age _____

2.) Height _______ (In feet and inches) Weight _______(In pounds)

3.) Education level (Check highest level obtained.):
   ___ 1) less than 8th grade
   ___ 2) 8th grade
   ___ 3) some high school
   ___ 4) high school
   ___ 5) trade school
   ___ 6) some college
   ___ 7) 2-year college
   ___ 8) 4-year college
   ___ 9) Master’s level
   ___ 10) Doctoral level

4.) Are you currently a graduate student?
   ___ Yes (If yes, what program are you in? ______________________)
   ___ No

6.) Employment status (Please check one.):
   ___ 1) not currently employed
   ___ 2) employed part-time
   ___ 3) employed full-time
   ___ 4) other ____________________________

7.) Occupation/job: ________________________________
8.) Your Household’s Annual Income (Please check one.):
   ___ 1) Less than $5,000
   ___ 2) $5,000 to $9,999
   ___ 3) $10,000 to $14,999
   ___ 4) $15,000 to $24,999
   ___ 5) $25,000 to $34,999
   ___ 6) $35,000 to $49,999
   ___ 7) $50,000 to $74,999
   ___ 8) $75,000 to $99,999
   ___ 9) $100,000 to $149,999
   ___ 10) $150,000 or more

9.) How many people (including you) live in your household? _______

10.) What is your current marital status?
    ___ 1) Never married
    ___ 2) Married
    ___ 3) Separated/divorced
    ___ 4) Widowed
    ___ 5) Living with partner

11.) What is your ethnic origin (Please check one.):
     ___ 1) American Indian or Alaskan Native
     ___ 2) African American/Black
     ___ 3) Asian, Asian American, Asian Indian, or Pacific Islander
     ___ 4) Caucasian/White
     ___ 5) Hispanic/Latina
     ___ 6) Other (Please specify): ____________________________________

12.) Your nation of origin (Where you were born): ______________________

13.) Do you have children?
    ___ 1) Yes (How many? _____)
    ___ 2) No
Demographic Health Information

1.) Do you currently have breast implants?
   ___ 1) Yes (If yes, what was the month and year of your surgery?___________)
   ___ 2) No

2.) Have you ever been diagnosed with breast cancer?
   ___ 1) Yes
   ___ 2) Yes, but it was a misdiagnosis
   ___ 3) No

3.) Have you ever undergone a breast biopsy?
   ___ 1) Yes
   ___ 2) No

4.) Have you or your physician ever detected a breast lump in one of your breasts?
   ___ 1) Yes (If yes, what medical tests, did you undergo?_______________)
   ___ 2) No

5.) Have any of your first degree biological female relatives (mother, grandmother, sister, aunt) ever been diagnosed with breast cancer?
   ___ 1) Yes (If yes, please check all that apply.)
      ___ Mother
      ___ Maternal grandmother
      ___ Paternal grandmother
      ___ Paternal aunt
      ___ Maternal aunt
      ___ Sister
      ___ Other (Please specify _________________________)
   ___ 2) No

6.) Have you had a hysterectomy (surgical removal of the uterus and/or ovaries)?
   ___ 1) Yes
   ___ 2) No

6.) Have you ever been diagnosed with cervical cancer?
   ___ 1) Yes
   ___ 2) Yes, but it was a misdiagnosis
   ___ 3) No

7.) Have you ever received a cervical biopsy?
   ___ 1) Yes (What was the result?_______________________________________)
   ___ 2) No
8.) Did your physician or nurse practitioner ever suspect that you had cervical cancer?
   ____ 1) Yes (If yes, what medical tests did you undergo? ______________)
   ____ 2) No

9.) Have any of your first degree biological female relatives (mother, grandmother, sister, aunt) ever been diagnosed with cervical cancer?
   ___ 1) Yes (If yes, please check all that apply.)
       ____ Mother
       ____ Maternal grandmother
       ____ Paternal grandmother
       ____ Paternal aunt
       ____ Maternal aunt
       ____ Sister
       ____ Other (Please specify ____________________________)
   ___ 2) No

10.) Have you ever been diagnosed with skin cancer?
    ___ 1) Yes
    ___ 2) Yes, but it was a misdiagnosis
    ___ 3) No

11.) Have you ever undergone a skin biopsy?
    ___ 1) Yes (What was the result? ________________________________)
    ___ 2) No

12.) Have you or your physician ever detected a skin mole or lesion that was believed to be cancerous or pre-cancerous?
    ___ 1) Yes (If yes, what medical tests did you undergo? ______________)
    ___ 2) No

13.) Have any of your first degree biological relatives (mother, father, grandmother, grandfather, sister, brother, aunt, uncle) ever been diagnosed with skin cancer?
    ___ 1) Yes (If yes, please check all that apply.)
       ____ Mother
       ____ Father
       ____ Maternal grandmother
       ____ Maternal grandfather
       ____ Paternal grandmother
       ____ Paternal grandfather
       ____ Paternal aunt
       ____ Paternal uncle
       ____ Maternal aunt
       ____ Maternal uncle
       ____ Sister
14.) Do you currently have health insurance?
   ___ 1) Yes
   ___ 2) No (If no, how long have you been without health insurance? __________)

15.) Do you have a primary care physician or nurse practitioner?
   ___ 1) Yes (If yes, indicate their gender: ___ male; ___ female)
   ___ 2) No

16.) Do you have a gynecologist?
   ___ 1) Yes (If yes, indicate their gender: ___ male; ___ female)
   ___ 2) No

17.) Do you have a dermatologist?
   ___ 1) Yes (If yes, indicate their gender: ___ male; ___ female)
   ___ 2) No

18.) Do you have a preference for the gender of your physician?
   ___ 1) Yes, I prefer female physicians.
   ___ 2) Yes, I prefer male physicians.
   ___ 3) No, I have no gender preference.

19.) Do you have a preference for the gender of your gynecologist?
   ___ 1) Yes, I prefer female physicians.
   ___ 2) Yes, I prefer male physicians.
   ___ 3) No, I have no gender preference.

20.) Do you have a preference for the gender of your dermatologist?
   ___ 1) Yes, I prefer female physicians.
   ___ 2) Yes, I prefer male physicians.
   ___ 3) No, I have no gender preference.
The following list contains some real medical words. For example, some of the words have to do with body parts or body functions, kinds of diseases, or things that can make your health better or worse. The list also contains some items that may look or sound like medical words but that are not actually real words.

As you read through the list, put an “X” next to the items that you know are real words. You should not guess. Only put an “X” next to an item if you’re sure it’s a real word.

<table>
<thead>
<tr>
<th>Irrity</th>
<th>Diagnosis</th>
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<tr>
<td>Arthritis</td>
<td>Depression</td>
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<td>Obesity</td>
<td>Jaundice</td>
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<td>Flu</td>
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<td>Behavior</td>
<td>Miscarriage</td>
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<td>Syphilis</td>
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<td>Potassium</td>
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<td>Hormones</td>
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<td>Reaction</td>
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<td>Seizure</td>
<td>Germs</td>
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<td>Cerpes</td>
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<td>Kidney</td>
<td>Tumic</td>
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<td>Emergency</td>
<td>Fatigue</td>
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<tr>
<td>Potient</td>
<td>Osteoporosis</td>
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<tr>
<td>Menopause</td>
<td>Constipation</td>
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Health Behaviors Questionnaire

Which of the following behaviors do you engage in? (*Please place an “X” next to all that apply*)

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The following questions are meant to assess your behaviors related to engaging in cancer screenings. Please answer them as honestly and accurately as possible. If you are unsure, please give your best guess instead of leaving an item blank.

*Breast Self-Examination History*

Please refer to the following definition when answering questions 1-8: A *breast self-examination is an examination one performs at home by applying pressure to the breast tissue in a circular manner and examining the breasts for any abnormalities that may indicate breast cancer.*

1.) Have you been instructed on the correct performance of a breast self-examination by a physician, nurse practitioner, nurse, or educational pamphlet?
   
   - Yes
   - No

2.) Have you been encouraged to engage in regular breast self-examinations by a physician, nurse practitioner, or nurse?
   
   - Yes
   - No

3.) At what age should women start performing breast self-examinations? ________

4.) In general, once women start performing breast self-examinations, about how often should they perform them? ___________________________
5.) How important do you believe breast self-examinations are for the detection of breast cancer and the protection of health? (Please circle one)

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<tr>
<td></td>
<td>Very unimportant</td>
<td>Somewhat unimportant</td>
<td>Neither important nor unimportant</td>
<td>Somewhat important</td>
<td>Very important</td>
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6.) How confident do you feel in your ability to correctly perform breast self-examinations? (Please circle one)

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<tr>
<td></td>
<td>Very slightly or not at all</td>
<td>A little</td>
<td>Moderately</td>
<td>Quite a bit</td>
<td>Extremely</td>
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7.) Have you ever performed a breast self-examination before?
   _____ Yes (At what age did you perform your first examination? ______)  
   _____ No (If no, is there any particular reason why you haven't performed a breast self-examination before? __________________________________________)

8.) In the past year, approximately how many breast self-examinations did you perform? ________ (Please provide number)

9.) When was your most recent breast self-examination? ___/______ (month/year)

10.) In the coming year, would you say that you plan to perform breast self-examinations, you don't plan to perform breast self-examinations, or you're undecided? (Please circle one)

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<tr>
<td></td>
<td>Don’t plan to perform</td>
<td>Undecided</td>
<td>Plan to perform</td>
</tr>
</tbody>
</table>

11.) In the coming year, approximately how many breast self-examinations do you intend to perform? ________ (Please provide number)
The Body Shape Questionnaire

Please think about how you have been feeling about your appearance over the PAST FOUR WEEKS. Please read each question and select the appropriate number to the right. Please answer all the questions.

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Never   Rarely  Sometimes  Often  Very Often  Always

OVER THE PAST FOUR WEEKS:

___ 1. Has feeling bored made you brood about your shape?
___ 2. Have you been so worried about your shape that you have been feeling that you ought to diet?
___ 3. Have you thought that your thighs, hips, or bottom are too large for the rest of you?
___ 4. Have you been afraid that you might become fat (or fatter)?
___ 5. Have you worried about your flesh not being firm enough?
___ 6. Has feeling full (e.g., after eating a large meal) made you feel fat?
___ 7. Have you felt so bad about your shape that you have cried?
___ 8. Have you avoided running because your flesh might wobble?
___ 9. Has being with thin women made you feel self-conscious about your shape?
___ 10. Have you worried about your thighs spreading out when sitting down?
___ 11. Has eating even a small amount of food made you feel fat?
___ 12. Have you noticed the shape of other women and felt that your own shape compared unfavorably?
___ 13. Has thinking about your shape interfered with your ability to concentrate (e.g., while watching television, reading, listening to conversations)?
___ 14. Has being naked, such as when taking a bath or shower, made you feel fat?
___ 15. Have you avoided wearing clothes that make you particularly aware of the shape of your body?
___ 16. Have you imagined cutting off fleshy areas of your body?
___ 17. Has eating sweets, cakes, or other high calorie food made you feel fat?
___ 18. Have you not gone out to social occasions (e.g., parties) because you have felt bad about your shape?
___ 19. Have you felt excessively large and rounded?
___ 20. Have you felt ashamed of your body?
___ 21. Has worry about your shape made you diet?
___ 22. Have you felt happiest about your shape when your stomach has been empty (e.g., in the morning)?
___ 23. Have you thought that you are the shape you are because you lack self-control?
___ 24. Have you worried about other people seeing rolls of flesh around your waist or stomach?
___ 25. Have you felt that it is not fair that other women are thinner than you?
___ 26. Have you vomited in order to feel thinner?
___ 27. When in company, have you worried about taking up too much room (e.g., sitting on a sofa or bus seat)?
___ 28. Have you worried about your flesh being dimply?
___ 29. Has seeing your reflection (e.g., in a mirror or shop window) made you feel bad about your shape?
___ 30. Have you pinched areas of your body to see how much fat there is?
___ 31. Have you avoided situations where people could see your body (e.g., communal changing rooms or swimming pools)?
___ 32. Have you taken laxatives in order to feel thinner?
___ 33. Have you been particularly self-conscious about your shape when in the company of other people?
___ 34. Has worry about your shape made you feel you ought to exercise?
Body Image Avoidance Questionnaire

Circle the number which best describes how often you engage in these behaviors at the present time.

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Always</th>
<th>Usually</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I wear baggy clothes.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2. I wear clothes I do not like.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3. I wear darker color clothing.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4. I wear a special set of clothing, e.g., my “fat clothes”.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5. I restrict the amount of food I eat.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6. I only eat fruits, vegetables, and other low calorie foods.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7. I fast for a day or longer.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8. I do not go out socially if I will be “checked out”.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>9. I do not go out socially if the people I am with will discuss weight.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10. I do not go out socially if the people I am with are thinner than me.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>11. I do not go out socially if it involves eating.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>12. I weigh myself.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>13. I am inactive.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>14. I look at myself in the mirror.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>15. I avoid physical intimacy.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>16. I wear clothes that will divert attention from my weight.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>17. I avoid going clothes shopping.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>18. I don’t wear “revealing clothes” (e.g., bathing suits, tank tops, or shorts).</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>19. I get dressed up or made up.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Objectified Body Consciousness Scale-Body Shame Subscale

Read each item and decide whether you agree or disagree and to what extent. If you strongly agree, circle 6. If you strongly disagree, circle 1. If you feel somewhere in between, circle one of the numbers between 1 and 6.

<table>
<thead>
<tr>
<th>1 Strongly Disagree</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6 Strongly Agree</th>
</tr>
</thead>
</table>
1. When I can’t control my weight, I feel like something must be wrong with me. 1 2 3 4 5 6
2. I feel ashamed of myself when I haven’t made the effort to look my best. 1 2 3 4 5 6
3. I feel like I must be a bad person when I don’t look as good as I could. 1 2 3 4 5 6
4. I would be ashamed for people to know what I really weigh. 1 2 3 4 5 6
5. I never worry that something is wrong with me when I am not exercising as much as I should. 1 2 3 4 5 6
6. When I’m not exercising enough, I question whether I am a good enough person. 1 2 3 4 5 6
7. Even when I can’t control my weight, I think I’m an ok person. 1 2 3 4 5 6
8. When I’m not the size I think I should be, I feel ashamed. 1 2 3 4 5 6
Risk Perception

1.) How likely do you think it is that you will develop breast cancer in the future?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>Somewhat Low</td>
<td>Moderate</td>
<td>Somewhat High</td>
<td>Very High</td>
</tr>
</tbody>
</table>

2.) Compared to the average woman your age, would you say that you are more likely to get breast cancer, less likely, or about as likely?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less Likely</td>
<td>About as Likely</td>
<td>More Likely</td>
</tr>
</tbody>
</table>

3.) How often do you worry about getting breast cancer?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rarely or never</td>
<td>Sometimes</td>
<td>Often</td>
<td>All the Time</td>
</tr>
</tbody>
</table>
Illness Attitudes Scale

Read each item and decide whether the item applies to you or not, and to what extent. If the item does not apply to you at all, circle 0. If the item applies to you a great deal, circle 4. If you feel somewhere in between, circle one of the numbers between 0 and 4.

<table>
<thead>
<tr>
<th></th>
<th>0 No</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 Most of the Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) Do you worry about your health?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2.) Are you worried that you may get a serious illness in the future?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3.) Does the thought of a serious illness scare you?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4.) If you have pain, do you worry that it may be caused by a serious illness?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5.) If pain lasts for a week or more, do you see a physician?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6.) If a pain lasts a week or more, do you believe that you have a serious illness?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7.) Do you avoid habits which may be harmful to you, such as smoking?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8.) Do you avoid food which may not be healthy?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9.) Do you examine your body to find out whether there is something wrong?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10.) Do you believe that you have a physical disease, but the doctors have not diagnosed it correctly?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11.) When your doctor tells you that you have no physical disease, do you refuse to believe him/her?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12.) When you have been told by a doctor what he/she found, do you soon begin to believe that you may have developed a new illness?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13.) Are you afraid of news which reminds you of death (such as funerals, obituary notices)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14.) Does the thought of death scare you?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15.) Are you afraid that you may die soon?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16.) Are you afraid that you may have cancer?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17.) Are you afraid that you may have heart disease?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18.) Are you afraid that you may have another serious illness?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19.) When you read of or hear about an illness, do you get symptoms similar to those of the illness?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20.) When you notice a sensation in your body, do you find it difficult to think of something else?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21.) When you feel a sensation in your body, do you worry about it?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>22.) Has your doctor told you that you have an illness now?</td>
<td>Yes (If yes, what illness? )</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.) How often do you see a doctor?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>24.) How many different doctors/chiropractors, or other healers have you seen in the past year?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>25.) How often have you been treated during the past year (for example drugs, change of drugs, surgery, etc.)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>26.) What are the treatments you have received, if any? (Please list them here):</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.) Do your bodily symptoms stop you from working?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>28.) Do your bodily symptoms stop you from concentrating on what you are doing?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>29.) Do your bodily symptoms stop you from enjoying yourself?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
APPENDIX C

AT-HOME QUESTIONNAIRES
Part Two Participant Study Instructions for Participants Receiving Raffle Entries

Thank you for participating in part one of this study. Part two of this study will take place over the next three months outside of the laboratory.

The American Cancer Society recommends that women perform monthly breast self-examinations starting at age 20 to aid in the detection of breast cancer. We are asking that for the next three months, you follow your normal breast self-examination routine recommended by your physician with one exception: we would like you to perform at least one breast self-examination over the course of the next three months. Enclosed in this packet, you will find three monthly questionnaires and one post-study questionnaire. The three monthly questionnaires are identical; one should be filled out each month between the dates indicated on each form. If you choose to complete a breast self-examination in a given month, please fill out the monthly form immediately after your self-examination. If you choose to perform more than one breast self-examination in a given month, please fill out the monthly form only after the first breast self-examination you perform in that month. If you do not perform a breast self-examination in a given month, please answer only item 1 on the monthly form indicating that you did not perform a breast self-examination. At the end of the three months, please complete the two-item post-study questionnaire. You will be sent email reminders at the end of each of the three months to the email address you provided us with.

We ask that you please be honest and complete these forms as accurately as possible. You will NOT be penalized in any way if you do not perform a breast self-examination during the next three months. You will not be penalized if you choose to leave these forms blank.

On _____________ please mail the three breast self-examination affect questionnaires and the post-study questionnaire to the primary investigator using the included self-addressed, postage paid envelope. **Even if you chose to leave the forms blank or marked that you did not perform a breast self-examination, please mail them back to us.** Please DO NOT put your names on these questionnaires and DO NOT put your name or return address on the mailing envelopes.
If you lose your questionnaires and need replacements, please contact the primary investigator, Danielle Ridolfi, at dridolfi@kent.edu and replacement forms can be emailed to you.

Once the questionnaires are received, your 3 remaining raffle entries will be awarded to you. **You will not receive your remaining raffle entries if you do not return your questionnaires.** The raffle will be held when the study has ended. If you are selected as a winner, you will be contacted by phone or email and your gift card will be mailed to you at the address you supplied us with.

If we do not receive your questionnaire forms by ________________, we will assume that you have chosen not to complete the study.

Thank you for your participation.
Part Two Participant Study Instructions for Participants Receiving Research Credits

Thank you for participating in part one of this study. Part two of this study will take place over the next three months outside of the laboratory.

The American Cancer Society recommends that women perform monthly breast self-examinations starting at age 20 to aid in the detection of breast cancer. We are asking that for the next three months, you follow your normal breast self-examination routine recommended by your physician with one exception: we would like you to perform at least one breast self-examination over the course of the next three months. Enclosed in this packet, you will find three monthly questionnaires and one post-study questionnaire. The three monthly questionnaires are identical; one should be filled out each month between the dates indicated on each form. If you choose to complete a breast self-examination in a given month, please fill out the monthly form immediately after your self-examination. If you choose to perform more than one breast self-examination in a given month, please fill out the monthly form only after the first breast self-examination you perform in that month. If you do not perform a breast self-examination in a given month, please answer only item 1 on the monthly form indicating that you did not perform a breast self-examination. At the end of the three months, please complete the two-item post-study questionnaire. You will be sent email reminders at the end of each of the three months to the email address you provided us with.

We ask that you please be honest and complete these forms as accurately as possible. You will NOT be penalized in any way if you do not perform a breast self-examination during the next three months. You will not be penalized if you choose to leave these forms blank.

On ______________ please mail the three breast self-examination affect questionnaires and the post-study questionnaire to the primary investigator using the included self-addressed, postage paid envelope. **Even if you chose to leave the forms blank or marked that you did not perform a breast self-examination, please mail them back to us.** Please DO NOT put your names on these questionnaires and DO NOT put your name or return address on the mailing envelopes.

If you lose your questionnaires and need replacements, please contact the primary investigator, Danielle Ridolfi, at dridolfi@kent.edu and replacement forms can be emailed to you.

Once the questionnaires are received, you will receive 3 additional research credits. **You will not receive your research credits if you do not return your questionnaires.**

If we do not receive your questionnaire forms by ______________, we will assume that you have chosen not to complete the study.

Thank you for your participation.
Breast Self Examination Affect (Month One): ____________________________

If you perform a breast self-examination at home between the dates listed above, please complete this form immediately afterward. If you perform more than one breast self-examination between the dates listed above, base this questionnaire on your first examination of the month. If you do not perform a breast self-examination between the dates listed above, please complete only item 1 at the end of the month. Please be honest; you will not be penalized in any way if you do not complete a breast-self examination.

1.) Did you perform a breast self examination between the dates listed above?
   ___ Yes
   ___ No (Please do not complete the rest of this page)

2.) If so, how much physical discomfort did you experience during the examination?
   ___ Slight or none at all
   ___ A little
   ___ A moderate amount
   ___ Quite a bit
   ___ An extreme amount

3.) Did you detect any breast lumps or other physical abnormalities during the examination?
   ___ Yes (Contact your primary care physician or gynecologist promptly)
   ___ No

4.) This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you felt this way during the breast self examination you performed.

   Use the following scale to record your answers:
   1- Very slightly or not at all   2- A little   3- Moderately   4- Quite a bit   5- Extremely

Items from the PANAS-X were used with permission from the authors but are not included here.
Breast Self Examination Affect (Month Two):_____________________________________

If you perform a breast self-examination at home between the dates listed above, please complete this form immediately afterward. If you perform more than one breast self-examination between the dates listed above, base this questionnaire on your first examination of the month. If you do not perform a breast self-examination between the dates listed above, please complete only item 1 at the end of the month. Please be honest; you will not be penalized in any way if you do not complete a breast self-examination.

1.) Did you perform a breast self examination between the dates listed above?
   ____ Yes
   ____ No (Please do not complete the rest of this page)

2.) If so, how much physical discomfort did you experience during the examination?
   ____ Slight or none at all
   ____ A little
   ____ A moderate amount
   ____ Quite a bit
   ____ An extreme amount

3.) Did you detect any breast lumps or other physical abnormalities during the examination?
   ____ Yes (Contact your primary care physician or gynecologist promptly)
   ____ No

4.) This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you felt this way during the breast self examination you performed.

   Use the following scale to record your answers:
   1-Very slightly or not at all   2-A little   3-Moderately   4-Quite a bit   5-Extremely

Items from the PANAS-X were used with permission from the authors but are not included here.
Breast Self Examination Affect (Month Three):

If you perform a breast self-examination at home between the dates listed above, please complete this form immediately afterward. If you perform more than one breast self-examination between the dates listed above, base this questionnaire on your first examination of the month. If you do not perform a breast self-examination between the dates listed above, please complete only item 1 at the end of the month. Please be honest; you will not be penalized in any way if you do not complete a breast-self examination.

1.) Did you perform at least one breast self-exam between the dates listed above?
   ____ Yes
   ____ No (Please do not complete the rest of this page)

If so, how much physical discomfort did you experience during the examination?
   ____ Slight or none at all
   ____ A little
   ____ A moderate amount
   ____ Quite a bit
   ____ An extreme amount

2.) Did you detect any breast lumps or other physical abnormalities during the examination?
   ____ Yes (Contact your primary care physician or gynecologist promptly)
   ____ No

4.) This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you felt this way during the breast self-examination you just performed.

   Use the following scale to record your answers:
   1-Very slightly or not at all  2-A little  3-Moderately  4-Quite a bit  5-Extremely

Items from the PANAS-X were used with permission from the authors but are not included here.
Post-Study Questionnaire

1.) How many total breast self-examinations did you complete over the past three months? _____

2.) Do you believe that participating in a study about breast self-examination made you engage in these examinations more frequently than you normally would? (Please circle one)

   Not at all               Somewhat               Moderately               Definitely

3.) If you did not complete a breast self-examination each month for the past three months, what were your reasons for not completing them? (Select all that apply):
   _____ I felt uncomfortable about performing them.
   _____ I forgot to perform them.
   _____ I did not have time to perform them.
   _____ I was putting off performing them.
   _____ I did not think it was important to perform them.
   _____ Other (Please specify: _______________________________)


APPENDIX D

DEBRIEFING FORM
APPENDIX D

DEBRIEFING FORM

Women’s Bodies and Health Study: Information Sheet

The way in which we feel about our bodies can significantly impact our feelings and behaviors, specifically, behaviors related to maintaining our physical health. Because many health maintenance behaviors, particularly cancer screening behaviors, require one to examine their own body or allow a doctor to examine their body, individuals with body image concerns may feel uncomfortable performing these necessary health behaviors. You have just completed a three month study examining the ways in which body image can impact a variety of health maintenance behaviors, including the cancer screening behaviors of breast self-examination, skin self-examination, and cervical cancer screenings. We are interested to know whether body image disturbances, particularly feelings of shame about one’s body and the tendency to avoid looking at one’s body or showing one’s body to others, make women less likely to perform breast and skin self-examinations and less likely to undergo cervical cancer screenings. We are also interested in whether these body image concerns make women more likely to experience negative feelings while performing breast self-examinations. In order to study these effects, we asked you to complete questionnaires in the laboratory as well as monitor your breast self-examinations at home. By monitoring these behaviors at home over several months, we hope that you were able to give us a more accurate picture of how body image
impacts these behaviors in the real world. We hope that the knowledge we learn in this study will help us to improve women’s health and well-being.

For more information about this study or the study topics, you may contact the project coordinator, Danielle Ridolfi, via email at dridolfi@kent.edu or her faculty advisor, Dr. Janis Crowther at jcrowthe@kent.edu.
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