Responding to and Recovering from a Body-Related Threat: An Application of Social Self-Preservation Theory

by

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Abstract

Social self-preservation theory (SSPT) suggests that when faced with social-evaluative threat, a set of psychological and physiological responses are elicited concurrently (Dickerson, Gruenewald, & Kemeny, 2004; Kemeny, Gruenewald, & Dickerson, 2004). A series of studies examined the applicability of SSPT to the examination of social-evaluative body-related threats. In the first study, interviews were conducted to identify and describe uncomfortable body-related situations, and typical responses to such situations. Findings provided preliminary evidence of the applicability of SSPT to everyday body-related threats of young adult women – the threats, context of those threats, and responses to such threats were consistent with SSPT. The second study examined psychobiological responses to, and recovery from, a social-evaluative body-related threat. Findings from this study showed that the social-evaluative body-related threat elicited a psychobiological response consistent with SSPT; women in the threat group reported higher social physique anxiety and had higher cortisol following the threat. The third study sought to extend the applicability of SSPT to examine the psychobiological responses to, and
recovery from, an anticipated social-evaluative body-related threat. In addition, the potential moderating effect of appearance investment on responses to a threat was examined. Findings from this study showed that women in the threat group reported higher shame and social physique anxiety after anticipating a social-evaluative body-related threat than following a quiet rest period for women in the control group. Results also indicated that both groups showed an index of decrease for cortisol, with the control group showing a significantly greater overall decrease than the threat group. Appearance investment did not moderate cortisol responses to a threat. Findings from the third study provide partial support for SSPT’s applicability to the anticipation of a social-evaluative body-related threat. Together findings from all three studies provide converging evidence for the use of SSPT in understanding the psychobiology of body image.
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General Introduction and Review of Literature

Body Image Concerns

Body image can be defined as an individual’s internal representation of his or her outer self (Cash, 1994; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). It is a multidimensional construct that includes one’s perceptions and attitudes about his or her body as well as the importance placed on one’s body (Cash & Pruzinsky, 1990, 2002; Thompson et al., 1999). Although appearance is central to one’s body image, other factors such as fitness or body functioning can play a role (Grogan, 2008). Body image concerns are prevalent in Western society so that it is considered normal for young women to have a negative body image (Cash & Henry, 1995; Rodin, Silberstein, & Striegel-Moore, 1985).

Not only are body image concerns widespread in North America, but they have been shown to be associated with a number of psychological and behavioural health-related outcomes, including: lower self-esteem, increased risk of depression, social anxiety, eating pathologies, diet pill use, smoking, avoidance of social situations, and both exercise participation and inactivity (Cepeda-Benito & Reig-Ferrer, 2000; Diehl, Johnson, Rogers, & Petrie, 1998; Kostanski & Gullone, 1998; Kruger, Lee, Ainsworth, & Macera, 2008; Levine & Smolak, 2002; Martin & Hausenblas, 1998; McCaulay, Mintz, & Glenn, 1988; Russell & Cox, 2003; Stice, 2002; Ward, Klesges, Zbikowski, Bliss, & Garvey, 1997). In an aim to gain a more complete understanding of body image concerns, researchers have recently incorporated physiological measures into their studies with cortisol being the most prevalent in the recent literature (Anderson, Shapiro, Lundgren, Sataro, & Frye, 2002; Heatherton, Herman, Polivy, King, & McGree, 1988; McLean, Barr, & Prior, 2001; Putteman & Linden, 2006; Sabiston, Castonguay, Barnett, O’Loughlin, & Lambert, 2009; Martin Ginis, Strong, Arent, & Bray, 2012).

Cortisol
Cortisol, a “stress hormone,” is an indicator of hypothalamic-pituitary-adrenal axis activation (Sapolsky, 2003). During a response to a stressor (physical or psychological), the hypothalamus releases corticotrophin-releasing hormone. This hormone then prompts the pituitary gland to release andrenocorticotropin hormone, which in turn, activates the adrenal gland to release glucocorticoids (cortisol) to mobilize energy necessary for the body to meet the physiological demands of stress. The glucocorticoids then turn off the stress response by inhibiting the release of corticotrophin-releasing hormone from the hypothalamus. However, if the stressor continues, the hypothalamus releases more corticotrophin-releasing hormone which initiates the response again (Sapolsky, 2003). Although deemed an important part of the stress response, chronically elevated or unregulated cortisol levels have been linked to the initiation and progression of a number of health-related conditions such as diabetes, cardiovascular disease, rheumatoid arthritis, depression, cancer, hyperglycemia, muscle breakdown, and is related to decreased immune function, bone health, and impaired memory (Charney, 2004; Haglund, Nestadt, Cooper, Southwick, & Charney, 2007; Kronfol & Remick, 2000; McEwen, 1998, 2004; Miller & Blackwell, 2006).

Although research examining the relationship between body image concerns and physiological outcomes such as cortisol is in its infancy, initial studies have found support for the relationship between body image-related variables and resting cortisol. For example, a number of studies have found a positive relationship between resting cortisol and restrained eating, an outcome variable which is thought to reflect a struggle and concern to maintain control over food intake and weight (Anderson et al., 2002; Cooley & Toray, 2001; Charles & Kerr, 1986; Grogan, 2008; Heatherton et al., 1988; Keery, van der Berg, & Thompson, 2004; Lowe, 1993; McLean et al., 2001; Putterman & Linden, 2006; Stice, 2002). Thus, body image concerns may have physiological consequences that can contribute to the initiation and progression of several serious health conditions.
Situations of Heightened Body Image Concerns

Given the psychological, behavioural, and physiological health-related implications of body image concerns, identifying situations in which such concerns arise is important. Social-evaluative body-related threats are those situations characterized by other people judging or evaluating one’s body (e.g., being seen in a bathing suit, exercising, being next to someone with a good physique, receiving hurtful comments about one’s weight and shape from others, or having body composition assessed by a trained technician; Bain, Wilson, & Chaikind, 1989; Carron & Prapavessis, 1997; Gammage, Martin Ginis, & Hall, 2004; Hart, Leary, & Rejeski, 1989; Leary, 1992; Myers & Rosen, 1999; Van Raalte, Cunningham, Cornelius, & Brewer, 2004). These types of situations arguably occur frequently, if not daily, for most young adult women. Researchers in the area of body image have either sought to identify specific situations in which participants feel uncomfortable regarding the appearance of their body (Carron & Prapavessis, 1997; Myers & Rosen, 1999), or have measured what occurs in researcher-identified situations hypothesized to elicit body image concerns (Gammage et al., 2004; Hart et al., 1989; Martin Ginis et al., 2012; Myers & Rosen, 1999; Van Raalte et al., 2004). In general, this area of research has indicated that social-evaluative body-related situations have been described by participants as situations in which body image concerns are elicited (Bain et al., 1989; Carron & Prapavessis, 1997; Myers & Rosen, 1999). Further, studies examining responses to researcher-identified social-evaluative body-related situations have generally found these types of situations do elicit body image concerns (Gammage et al., 2004; Hart et al., 1989; Martin Ginis et al., 2012; Van Raalte et al., 2004).

Examining only psychological responses to such situations provides an incomplete understanding of body image. One recently published investigation examined physiological responses to the anticipation of a social-evaluative body-related threat in a series of two experiments (Martin Ginis et al., 2012). In the first experiment, it was found that women who
thought they would be exercising in a high social-evaluative threatening setting (in a public, mirrored exercise facility while wearing revealing exercise attire) reported higher anxiety about the evaluation of their bodies by others and had higher cortisol levels than those who thought they would be exercising in a non-social-evaluative threatening setting (alone, in a private, non-mirrored room while wearing non-revealing exercise attire). In the second experiment, participants were asked to go behind a screen into a changing area to try on exercise clothing and complete a questionnaire containing items related to thoughts and feeling about the exercise clothing (e.g., rating colour, fabric, how likely participants would buy the clothing). In the experimental (threat) condition, participants were led to believe that after completing the questionnaire and indicating to the researcher that they were ready, a video camera would record the participant in the clothing so that an independent panel could evaluate how well the clothing fit at a later date. Participants in the control group were instructed to change into the exercise clothing behind the screen and complete the same questionnaire package as those in the threat group; however, they were told that no one would see them. It is important to note that no actual evaluation occurred for those in the threat group. The results indicated that cortisol levels were higher post-manipulation for those in the threat group versus the control group. Together, these findings provide preliminary evidence that social-evaluative body-related situations may elicit physiological responses that may have serious health implications.

**Theoretical Framework: Social Self-Preservation Theory**

Martin Ginis et al.’s (2012) series of two experiments was the first to experimentally test social self-preservation theory (SSPT; Dickerson, Gruenewald, & Kemeny, 2004; Kemeny, Gruenewald, & Dickerson, 2004) related to evaluation of the body rather than performance. Thus, SSPT may be useful to examine body image as it relates to social-evaluative situations. This theory may also be particularly useful in the examination of the impact of poor body image on health-related outcomes as it attempts to link psychological and physiological responses from
social-evaluative situations to health. With a few exceptions (i.e., Lehman & Conley, 2010; Rohleder, Beulen, Chen, Wolf, & Kirschbaum, 2007), SSPT has mainly been applied in a laboratory setting to examine the psychobiological responses to social-evaluative non-body-related settings (i.e., Trier Social Stress Test [TSST] in which participants deliver a speech and perform arithmetic in front of an evaluative audience; Kirschbaum, Pirke, & Hellhammer, 1993).

The underlying assumption of SSPT is that humans are driven to monitor their environments for threats to their social-esteem, value, acceptance, and status to preserve their social selves. This drive is associated with our fundamental need to belong and be accepted by others to maintain social relationships (Baumeister & Leary, 1995; Dickerson, Gruenewald, & Kemeny, 2009; Gruenewald, Dickerson, Kemeny, 2007; Leary, 1992, 1995; Leary & Kowalski, 1990). Since positive social status is associated with access to higher status mating partners and more harmonious and supportive relationships (Feingold, 1992; Leary, 1995), social self-preservation ultimately has implications for mental, physical, and social well-being. Social self-preservation theory states that social-evaluative threat occurs when there is a potential loss of social-esteem, standing, or acceptance from others in situations where social exclusion or rejection is possible. These potential negative evaluations from others call into question one’s value, character, ability, or standing (Baumeister & Leary, 1995; Gruenewald et al., 2007). Social self-preservation theory states that when faced with social-evaluative threat, a set of psychological and physiological responses are elicited concurrently. This psychobiological response is thought to initiate changes that support appeasement, behavioural disengagement, or withdrawal from the social-evaluative threat. These behaviours are designed to protect the social self and prevent further loss of social standing and acceptance in the face of negative social-evaluative threat (real or imagined), behaviours thought to be essential for maintaining one’s mental, physical, and social well-being (Dickerson, Gruenewald et al., 2009; Gruenewald et al., 2007).
SSPT and Psychological Outcomes

To date, there is strong evidence to support SSPT with respect to psychological outcomes. In general, findings suggest that, compared to non-social-evaluative threats (e.g., giving a speech alone), social-evaluative threats (e.g., giving a speech in front of an evaluative audience) consistently result in negative psychological outcomes such as shame, embarrassment, humiliation, low self-esteem, low social self-esteem, anxiety, and fear (Bosch et al., 2009; Dickerson, Mycek, & Zaldivar, 2008; Gruenewald, Kemeny, Aziz, & Fahey, 2004). For example, in a series of experiments, Leary, Haupt, Strausser, and Chokel (1998) and Leary, Tambor, Terdal, and Downs (1995) examined the effects of situations characterized by exclusion/rejection (social-evaluative threats) and inclusion/acceptance on psychological outcomes. These authors found that situations characterized by exclusion/rejection were associated with negative psychological outcomes such as social anxiety, loneliness, jealousy, depression, and low self-esteem.

SSPT and Physiological Outcomes

There is also strong evidence to support SSPT with respect to physiological outcomes. Social self-preservation theory-related researchers have focused on two specific health-related outcomes: cortisol and immune function indicators (i.e., proinflammatory cytokine activity; Dickerson, 2008; Dickerson, Gruenewald et al., 2004; Dickerson, Gruenewald et al., 2009; Dickerson & Kemeny, 2004). Research has generally found that when faced with acute laboratory social-evaluative threats, there is an increase in cortisol and proinflammatory cytokine activity (Dickerson, 2008; Dickerson, Gable, Irwin, Aziz, & Kemeny, 2009; Dickerson, Gruenewald et al., 2004; Dickerson, Gruenewald et al., 2009; Dickerson & Kemeny, 2004; Dickerson et al., 2008; Gruenewald et al., 2004; Jönsson et al., 2010; Kirschbaum et al., 1993; Wadiwalla et al., 2010). More recently, Het, Rohleder, Schoofs, Kirschbaum, and Wolf (2009) evaluated a placebo condition of the TSST and demonstrated that, in the case of the TSST, the
elicitation of cortisol secretion was caused by characteristics of social-evaluative threat and not by the physical demands of delivering the speech while standing or the cognitive demands of calculating. There is also evidence, albeit limited, that physiological responses are elicited in response to real-life and naturally occurring social-evaluative threats (Lehman & Conley, 2010; Rohleder et al., 2007).

A meta-analysis reviewing 208 acute laboratory stressor experiments showed that social-evaluative threats were associated with greater increases in cortisol levels post-threat versus pre-threat, and slower recovery of cortisol to baseline levels compared to stressful situations without social-evaluative threat (Dickerson & Kemeny, 2004). The authors concluded that social-evaluative threats are related to strong, persistent changes in cortisol levels (Dickerson & Kemeny, 2004). More specifically, situations that contained a social-evaluative component demonstrated a higher cortisol response than those without social-evaluation; this response was associated with a medium effect size based on Cohen’s conventions ($d = 0.67$; Cohen, 1992). Also, social-evaluative situations were associated with a slower recovery of cortisol to baseline levels compared to non-social-evaluative situations; recovery from social-evaluative situations was associated with a medium effect size ($d = 0.74$ at 21-40 minutes post-threat; Cohen, 1992).

Although the majority of research using SSPT as a guiding framework has investigated the effects of social-evaluative threat on cortisol and immune function, others have provided evidence of other physiological changes in response to social-evaluative threat (i.e., parameters of the sympathetic nervous system, cardiovascular system; Bosch et al., 2009; Kirschbaum et al., 1993; Kudielka, Schommer, Hellhammer, & Kirschbaum, 2004; Lehman & Conley, 2010). For example, in their experiment to evaluate a standardized method of inducing psychosocial stress in a laboratory setting, Kirschbaum et al. (1993) found that the TSST elicited changes in several hormones including adrenocorticotropin, cortisol (serum and saliva), growth hormone, and prolactin, in addition to changes in heart rate. Bosch et al. (2009) specifically compared changes
in cortisol secretion, heart rate, sympathetic cardiac activation, and vagal tone in response to social-evaluative threat. The authors found that social-evaluative threat compared to no threat elicited increases in cortisol secretion, in addition to (and at approximately the same effect size as) indicators of cardiac and autonomic responses. Bosch et al. (2009) suggested that social-evaluative threat elicits a general, as opposed to specific, physiological reaction. This general response to social-evaluative threat may contribute to the broad range of health conditions to which such stress is related as outlined by SSPT (Bosch et al., 2009).

The Psychological and Physiological Link in SSPT

Although there is support for social-evaluative threats eliciting psychological and physiological responses separately as outlined by SSPT, the relationship between them is less clear. It is argued that self-conscious emotions (i.e., shame, embarrassment, humiliation) and self-relevant cognitions (i.e., self-consciousness, social self-esteem) with a self-presentational basis are consistently influenced when faced with social-evaluative threats (Dickerson, 2008; Leary et al., 1995, 1998). Further, it is hypothesized that this set of emotions and cognitions are more strongly associated with changes in physiological outcomes such as cortisol secretion under social-evaluative threat (Dickerson, 2008; Dickerson, Gruenewald et al., 2004; Dickerson, Kemeny, Aziz, Kim, & Fahey, 2004; Dickerson et al., 2008; Gruenewald et al., 2004, 2007; Kemeny, 2003; Lewis & Ramsay, 2002). For example, Dickerson et al. (2008) found that only self-conscious cognitions and emotions (i.e., shame, embarrassment, and humiliation) were related to cortisol increases in the social-evaluative condition; there was no relationship found between cortisol and other more general emotions (i.e., joy, sadness, anger, vigor, and fear). These findings are consistent with other studies demonstrating the link between self-conscious emotions and cognitions and elevations in physiological outcomes such as cortisol under social-evaluative versus non-social-evaluative threats (Dickerson, Kemeny et al., 2004; Gruenewald et al., 2004; Lewis & Ramsay, 2002). It has also been demonstrated that those who report higher
levels of self-conscious cognitions and emotions show greater increases in physiological outcomes including cortisol (Dickerson, Kemeny et al., 2004; Dickerson et al., 2008; Gruenewald et al., 2004). Similarly, Ford and Collins (2010) examined the relationship between self-esteem and cortisol reactivity in response to an interpersonal rejection. These authors found that participants with lower self-esteem responded to the rejection with more negative self-appraisals and had higher cortisol reactivity than those with higher self-esteem.

One reason that self-conscious emotions and cognitions compared to more general negative emotions and cognitions are selectively elicited under social-evaluative threat is that such self-conscious psychological outcomes arise from beliefs that others are negatively evaluating one’s self or judging one’s social acceptability (i.e., heightened self-presentational concerns; Leary, 2007). Therefore, examining situations in which self-presentational concerns are high may provide insight into the link between psychological and physiological outcomes that are elicited under social-evaluative threat.

**Presentation of Audience**

In addition to investigating psychological and physiological responses to actual social-evaluative threats (TSST) in a laboratory or real-life setting, psychobiological responses have also been investigated following imagined or virtual social-evaluative threats. For example, Dickerson, Kemeny et al. (2004) examined the impact of imagined social-evaluative threat on shame and cortisol responses. The authors found that participants asked to write about a situation of self-blame (designed to induce shame) reported higher shame than participants asked to write about their daily schedule; however, no changes in cortisol were found. Other researchers have compared responses to a condition characterized by actual or explicit social-evaluation and the mere presence of others, a virtual audience, or an actual audience unseen to the participant (Dickerson et al., 2008; Jönsson et al., 2010; Kelly, Matheson, Martinez, Merali, & Anisman, 2007; Wadiwalla et al., 2010). For example, Jönsson et al. (2010) showed that participants
performing the TSST in front of a virtual audience displayed a similar pattern of cortisol responses as seen in participants performing the TSST in front of a real evaluative audience; that is, cortisol increased in response to performing the TSST in front of a virtual audience. It should be noted that Jönsson et al. (2010) did not specifically compare two groups (TSST with a real versus a virtual audience); but rather they compared the pattern of cortisol responses to the pattern found in existing literature.

Kelly et al. (2007) and Wadiwalla et al. (2010) extended Jönsson et al.’s (2010) findings by comparing responses to the TSST (in front of an actual evaluative audience) to performing the TSST in front of a virtual audience (Kelly et al., 2007) or an audience not visible to the participant (Wadiwalla et al., 2010). The results demonstrated that performing the TSST in front of a virtual audience elicited a significant cortisol response of the same magnitude as performing the same task in front of an audience not visible to the participant (i.e., imagined audience), but less in magnitude than performing the TSST in front of an actual evaluative audience (Kelly et al., 2007). Similarly, Wadiwalla et al. (2010) found that cortisol responses were highest in participants performing the TSST in front of an actual evaluative audience inside the laboratory versus outside the laboratory.

The findings that responses can occur in situations where the audience is imagined (or virtual) is consistent with SSPT. Shame (a self-conscious emotion) is highlighted as a key signalling emotion that is elicited to alert the individual that a threat to their social standing, acceptance, or esteem is present (Dickerson, Gruenewald et al., 2004; Kemeny et al., 2004). Shame can be elicited in situations of real or imagined social evaluation (Lewis, 1971; Tangney, 1995). However, empirical evidence suggests that, although psychobiological (shame and cortisol) responses may occur in the presence of imagined (or virtual) social evaluation (Dickerson, Kemeny et al., 2004; Jönsson et al., 2010; Kelly et al., 2007; Wadiwalla et al., 2010), responses appear to be the highest under explicit social evaluation (Dickerson, Kemeny et al.;
Dickerson et al., 2008; Kelly et al., 2007; Wadiwalla et al., 2010). Martin Ginis et al.’s (2012) findings with respect to social evaluation of the body further support this contention. They found that the significant group-by-time interaction for cortisol was due to the control group having lower cortisol levels pre- to post-manipulation; there was no change in cortisol levels from pre- to post-manipulation in the threat group. Thus, the anticipation of a threat did not necessarily elicit a cortisol response consistent with SSPT.

**Characteristics of the Social-Evaluative Threats**

In addition to simply comparing responses to the presence and absence of social evaluation, SSPT-related research has identified conditions under which perceptions of, and responses to, social-evaluative threatening situations are most likely to occur (Leary et al., 1995; Rohleder et al., 2007). These characteristics of the threat are arguably thought to selectively elicit self-conscious emotions and cognitions because these conditions have a self-presentational basis. The conditions identified include: the presence of a central goal, situations which require an individual to display an attribute or skill that the individual values (domain importance), evaluation of an attribute or skill by others, loss of social status or acceptance as a result of negative evaluation, and situations that are uncontrollable (i.e., achieving the goal may be influenced by factors other than one’s own performance).

Through a series of experiments, Rohleder et al. (2007) sought to examine cortisol responses to a real-life social-evaluative situation (i.e., competitive ballroom dancing) specifically based on the conditions thought to elicit a robust psychobiological response (Leary et al., 1995; Rohleder et al., 2007). Their results indicated that competitive ballroom dancers had significantly higher cortisol levels on a competition day (6, 4, and 2 hours before competition, immediately before and after competition) compared to the control day at the same time of day. Moreover, increases in cortisol were not due to the physical strain of dancing and were higher than those found during a standardized laboratory acute social-evaluative stressor. In addition,
responses did not habituate over time. These results provide empirical support for characteristics of the social-evaluative threat thought to be required for a response in a real-life setting. First, for these competitors, responses were greater when faced with a social-evaluative threat displaying an attribute of importance (domain importance) as responses were greater in response to ballroom dancing competition compared to an acute laboratory stressor. Second, competitive ballroom dancing is characterized by social evaluation; a poor performance may be rated negatively by the judges, and may lead to a loss in social standing as a competitive dancer, especially for the top-ranked dancers. Third, it could be argued that for these competitors, the central goal would be to dance well, if not win the competition, and that achieving this goal could potentially be prevented by uncontrollable factors (i.e., competitors cannot control how well other competitors perform or have judges score them). Together, this series of experiments provide support for characteristics of the social-evaluative situation likely to elicit cortisol responses consistent with SSPT, and also provides evidence that SSPT applies to a real-life social-evaluative threat. Further, it could be argued that these same characteristics describe social-evaluative body-related threats in young women; body image is a domain of importance, negative evaluations by others could lead to a loss in social standing, and others’ evaluations are uncontrollable.

**SSPT and Health**

Individuals arguably face social-evaluative threats every day, and therefore will experience some degree of psychobiological response consistent with SSPT; however, it should be noted that the response itself is not detrimental to health. Quick, efficient responses to social-evaluative threat, which are elicited when needed and turned off when the threat is no longer present, are thought to have adaptive benefits as outlined by SSPT (e.g., behavioural disengagement to protect the social self from further harm). Adaptive physiological responses are thought to provide the individual with the necessary resources to deal with the threat (Linden,
Earle, Gerin, & Christenfeld, 1997; Sapolsky, Romero, & Munck, 2000). However, it has been suggested that there are liabilities of responses which are unregulated or uncoordinated (Dickerson, 2008; Dickerson, Gruenewald et al., 2009, McEwen, 2003, 2004). For example, responses that are exaggerated (i.e., too strong) under situations of acute social-evaluative threat may expose the individual to many physiological changes. Further, failure to shut off the response once the threat is no longer present (i.e., slow recovery) increases an individual’s exposure to physiological products. Taken together, an exaggerated, prolonged response may overexpose an individual to physiological products such as cortisol. Similarly, activating responses under ambiguous or non-threatening situations (i.e., if individuals believe social evaluation is present when it is not) may also overexpose individuals to physiological products that may be detrimental to health.

It has been suggested that chronic and repeated social-evaluative experiences increase the chances of shifting the balance from a potentially adaptive response, one that is quick and efficient, to an uncoordinated, unregulated response (Dickerson, Gruenewald et al., 2009). Unregulated, uncoordinated responses to chronic experiences of social-evaluative threats may be even more detrimental to health. Chronic overexposure to physiological parameters, including cortisol, is thought to lead to the incidence and progression of a number of health conditions such as metabolic syndrome, diabetes, heart disease, depression, chronic inflammatory disease, autoimmune disease, poor bone health (Black, 2003; Danesh, Collins, Appleby, & Peto, 1998; Feldmann, Brennan, & Maini, 1996; Harris et al., 1999; Kedzierksa, Crowe, Turville, & Cunningham, 2003; Kronfol & Remick, 2000; Maes, 1999; McEwen, 1998, 2004; Miller & Blackwell, 2006; Nickols-Richardson, Beiseigel, & Gwazdauskas, 2006).

Similarly, acute psychological reactions that accompany the adaptive physiological responses to social-evaluative threats may have a beneficial effect. For example, it is thought that shame is a key signalling emotion to make the individual aware that a social-evaluative threat
exists, and therefore alerts the individual to protect the social self (e.g., withdraw from the situation; Gruenewald et al., 2007). However, repeated experiences of social-evaluative threat may lead to chronic negative psychological states (e.g., chronic shame). These states may have serious health-related effects (i.e., anxiety disorder, depression). For example, it is believed that shame is a key component of depression (Gilbert, 1997; Lewis, 1971), and it has been linked to the maintenance of depressive symptoms (Tangney, Wagner, & Gramzow, 1992).

One study has examined the relationship between chronic negative psychological states and physiological outcomes using SSPT as a guiding theoretical framework (Rohleder, Chen, Wolf, & Miller, 2008). More specifically, these authors examined chronic experiences of shame and their relationship to indicators of hypothalamic-pituitary-adrenal axis, sympathetic nervous system, and inflammation activity. In a sample of young women (aged 15 to 19 years) at high risk of developing an initial episode of major depression, the authors found chronic shame to be related to higher sympathetic nervous system activity and higher levels of inflammation. This study provides preliminary evidence to support SSPT in the explanation of psychobiological responses to chronic experiences of shame and their relationship to health-related physiological indicators.

**Application of SSPT to a Body Image Context**

Strong, Martin Ginis, Arent, and Bray’s conference abstract (2008) first suggested SSPT may be applicable to a body image setting. Social self-preservation theory, over other commonly applied body image-related theories (e.g., sociocultural theory [Thompson et al., 1999] or self-objectification theory [Fredrickson & Roberts, 1997]) may be appropriate to guide this research program for several reasons. First, no theory applied to body image settings has accounted for both psychological and physiological outcomes reported in the body image literature: SSPT is a psychobiological theory, thus, it is able to account for psychobiological responses elicited by body image-related threats. Second, evidence from the body image literature suggests that the
most threatening situations for body image are those characterized by social evaluation (Carron & Prapavessis, 1997; Fredrickson, Noll, Roberts, Quinn, & Twenge, 1998; Gammage et al., 2004; Hart et al., 1989; Myers & Rosen, 1999; Martin Ginis et al., 2012). In addition, there is evidence that psychological responses to such situations are elicited when these threats are imagined (Carron & Prapavessis, 1997; Myers & Rosen, 1999), anticipated (Gammage et al., 2004; Martin Ginis et al., 2012) or real (Hart et al., 1989). According to SSPT, the strongest psychobiological responses are those that occur in the presence of explicit social evaluation, but they may also occur in imagined settings. Also, characteristics that have been identified by SSPT researchers as being crucial for eliciting psychobiological responses to social-evaluative situations, including domain importance, risk of a loss of social status or acceptance, and uncontrollability in which performance may not affect others’ evaluations (Leary et al., 1995; Rohleder et al., 2007) arguably also characterize body image threats that people encounter almost every day. One important difference between SSPT and other commonly applied theories in the body image literature is that it suggests that responses to social-evaluative threats are not inherently negative. According to SSPT, a quick and efficient response (i.e., quick recovery) is adaptive for social self-preservation. The current perspective in the body image literature is that any response is negative. Social self-preservation theory would argue that it is difficult to make such conclusions without examining the quality of the response. However, to date, only one investigation published in 2012 has used SSPT to examine body image threats (Martin Ginis et al., 2012).

**Rationale for Sample**

Although body image concerns occur across the lifespan and can have a significant impact on health regardless of age, young adult women (aged 17 to 25 years) attending university were the population investigated in all three studies. This sample was chosen for four reasons. First, body image concerns are especially relevant to this sample of women, who are
persistently concerned with weight and shape. Heatherton, Mahamed, Striepe, Field, and Keel (1997) found that 82% of young female college students stated they wanted to lose weight, although very few were actually overweight (1.4%). In fact, colleges have been described as “breeding grounds” for body image concerns (Streigel-Moore & Franko, 2002, p. 189). Second, a wide variety of measures to assess body image concerns have been developed and validated for use in this particular sample. Thompson (2004) stated that it is critical in body image research to use measures with established validity and reliability, specifically in the population of interest. Third, this dissertation will be among the first to investigate the applicability of SSPT to a body image context. Being able to draw on a large body of past research on body image in this particular sample will be beneficial when drawing conclusions. Investigating the applicability of SSPT in a healthy, “typical” sample will provide a reference point to compare “high-risk” groups. Finally, this sample was a convenience sample. Given these four reasons, young adult women attending university will be the population used in this research.

**Overall Purpose of Dissertation**

The overall purpose of this dissertation was to further examine the applicability of SSPT to social-evaluative body-related threats in young adult women. This overall purpose was addressed through a series of studies. The first study (Lamarche, Kerr, Faulkner, Gammage, & Klentrou, 2012) sought to provide initial support for the tenets of SSPT as they apply to the examination of everyday body image threats of young women with the specific objective to examine the context of body image threats, the responses to such threats, and the coping strategies used to deal with everyday body image threats.

The second study (Chapter III) sought to determine if the pattern of psychobiological responses to, and recovery from, a social-evaluative body image threat are consistent with SSPT. The threat used and responses measured were based on SSPT and findings from the first study.
The third study (Chapter IV) examined the moderating effects of appearance investment (the importance one places on physical appearance; Cash, 2005) on the psychobiological responses to an anticipated social-evaluative body image threat in a laboratory setting. Appearance investment is arguably an indicator of domain importance, a characteristic of social-evaluative threat that is believed to increase the likelihood of a psychobiological response to a situation of social evaluation (Rohleder et al., 2007).

**Dissertation Format**

The studies presented were written as independent articles, with each article including a brief literature review, description of purpose, hypotheses, methods, results, and conclusion. The contribution to the literature on SSPT and body image of each study is also discussed separately. However, a final discussion provides an overall perspective on the three studies and describes their overall contribution to the existing body of literature empirically and theoretically.

**Potential Impact of Dissertation**

Overall, this dissertation systematically examines the applicability of SSPT to a specific area of research, body image. This dissertation will be among the first to examine body image through a psychobiological lens. By investigating body image experiences through SSPT, much information can be gained about the psychobiology of body image experiences, and how such experiences may have implications for health. Body image threats may be one subset of social-evaluative threats described by SSPT as eliciting a response-recovery profile that has health consequences. The information gained through the dissertation may highlight the importance of taking a psychobiological approach to investigate body image, as SSPT outlines that some response-recovery profiles are detrimental to health, while others may have qualities that allow individuals to deal with such threats.

This dissertation also has two potential practical applications as they relate to research that should be highlighted. First, methodology developed through this dissertation may provide a
standardized social-evaluative body-related threat used to test SSPT, similar to the development of the TSST. Further, it may also be used to evaluate the effectiveness of interventions designed to improve body image or to develop adaptive coping mechanisms to deal with body image concerns. Second, the basic descriptive data this dissertation will provide has the potential to be the reference point to which other researchers will compare their sample.

In summary, this dissertation has the potential to: (1) broaden the present theoretical perspective and approach in the examination of body image, (2) provide the foundation for future researchers taking a psychobiological approach to investigate body image experiences, including descriptive statistics of responses and recovery profiles and standard laboratory protocol for eliciting a psychobiological response to a social-evaluative body-related threat, (3) provide evidence to support the psychobiology of body image by highlighting the role of cortisol in body image experiences and its relationship to body image outcomes, and (4) extend the literature on SSPT by providing support of its use in a body image context.
References


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Chapter II

A Qualitative Examination of Body Image Threats Using Social Self-Preservation Theory


Abstract

This study sought to identify and describe comfortable and uncomfortable body-related situations of young women, their responses to such situations, and strategies they used to cope with body-related threats, using social self-preservation theory (SSPT) as a guiding framework. Interviews were conducted with young adult women (N = 23). A theoretical thematic analysis approach was taken to identify, code, and report themes. In general, participants found it difficult to identify specific comfortable situations and responses in those situations. Comfortable situations were characterized by the presence of supportive others and feelings of general calmness and lowered body awareness or self-presentational concerns. Findings regarding uncomfortable body-related situations indicated that the context (e.g., presence of others, body exposure), responses (e.g., embarrassment, inadequacy, awareness of others’ evaluations, faster heart rate), and coping strategies (e.g., avoidance, concealing behaviours) described by participants were consistent with SSPT.

Keywords: body image threats, social evaluation, social physique anxiety, social self-preservation theory, college women, qualitative research
A Qualitative Examination of Body Image Threats Using Social Self-Preservation Theory

Young women are arguably exposed to a range of body-related threats in their everyday life. Identifying the common sources of these threats and describing responses and coping strategies to such threats are important given the evidence of an association between body image concerns and such negative health-related outcomes as lower self-esteem, increased risk of depression, eating pathologies, and exercise participation (Cooley & Toray, 2001; Lantz, Hardy, & Ainsworth, 1997; Levine & Smolak, 2002; Stice, 2002). We suggest that social self-preservation theory (SSPT; Dickerson, Gruenewald, & Kemeny, 2004; Gruenewald, Dickerson, & Kemeny, 2007) provides one framework for examining these issues. According to SSPT, social-evaluative threat occurs when there is a potential loss of social-esteem or acceptance from others in situations where social rejection is possible. These potentially negative evaluations from others call into question one’s value, character, or ability (Baumeister & Leary, 1995; Gruenewald et al., 2007). Consistent with our fundamental need to be accepted by others to maintain social relationships (Baumeister & Leary, 1995; Dickerson, Gruenewald, & Kemeny, 2009; Feingold, 1992; Gruenewald et al., 2007; Leary, 1995), SSPT assumes that humans are driven to monitor their environments for threats to their social-esteem and acceptance in order to preserve their social selves. A primary focus of the present study was to examine the applicability of SSPT to a body image context.

When faced with social-evaluative threat, SSPT states that a set of psychological and physiological (psychobiological) responses are elicited concurrently. In general, this tenet of SSPT has been supported empirically in laboratory-based research. Findings with respect to psychological outcomes suggest that, compared to non-social-evaluative threats (e.g., giving a

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speech alone), social-evaluative threats (e.g., giving a speech in front of an evaluative audience) consistently result in negative psychological outcomes (e.g., shame, embarrassment, low social self-esteem, anxiety, fear; Dickerson, Mycek, & Zaldivar, 2008; Gruenewald, Kemeny, Aziz, & Fahey, 2004). In particular, self-conscious emotions (e.g., shame, embarrassment) and cognitions (e.g., self-consciousness, social self-esteem) with a self-presentational basis are consistently influenced when faced with social-evaluative threats compared to general, more primary emotions and cognitions such as anger, sadness, and fear (Dickerson, 2008; Leary, Haupt, Strasser, & Chokel, 1998; Leary, Tambor, Terdal, & Downs, 1995). Body image research mirrors findings of SSPT-related research, as body image is threatened most in situations with the potential for social evaluation (e.g., in public, with others) where the body is emphasized (Carron & Prapavessis, 1997; Gammage, Martin Ginis, & Hall, 2004; Hart, Leary, & Rejeski, 1989; Van Raalte, Cunningham, Cornelius, & Brewer, 2004). Such situations have been shown to negatively impact psychological outcomes, especially those that are self-conscious in nature (e.g., social physique anxiety).

Social self-preservation theory states that physiological outcomes are also elicited when faced with a social-evaluative threat, with health-related physiological outcomes such as cortisol (a stress hormone released with hypothalamic-pituitary-adrenal axis activation) and indicators of immune function (e.g., proinflammatory cytokine activity) consistently higher following such threats (Dickerson & Kemeny, 2004). Quantitative, laboratory-based research has also found that self-conscious emotions and cognitions in particular are more strongly associated with changes in physiological outcomes under social-evaluative threat (Dickerson, 2008; Dickerson, Gruenewald, et al., 2004; Dickerson, Kemeny, Aziz, Kim, & Fahey, 2004; Dickerson et al., 2008; Gruenewald et al., 2007; Gruenewald et al., 2004). In the body image literature, there is also preliminary evidence showing that settings with the potential for body-related social
evaluation increase cortisol secretion (Strong, Martin Ginis, Arent, & Bray, 2008). Thus, body-related situations that are social-evaluative in nature elicit negative psychological body-related outcomes and physiological outcomes consistent with SSPT.

According to SSPT, the psychobiological responses are thought to initiate changes that support appeasement, behavioural disengagement, or withdrawal from the threat, which are designed to protect the social self and prevent further loss of social standing. Findings from body image research related to coping also appear to be consistent with this contention. These behaviours are thought to be essential for maintaining one’s well-being (Dickerson et al., 2009; Gruenewald et al., 2007). Although research on coping and body image is relatively limited (Cash, 2002; Cash, Santos, & Williams, 2005; Smith-Jackson, Reel, & Thackeray, 2011), there is evidence that coping strategies for body image threats are consistent with SSPT. For example, Cash (2002) suggested body-related self-regulatory processes may include three broad coping strategies (avoidance, appearance fixing, and positive rational acceptance), which serve to maintain body image attitudes and allow individuals to escape, reduce, or regulate body image concerns temporarily (Cash, 2002; Cash et al., 2005; Kowalski, Mack, Crocker, Niefer, & Fleming, 2006; Myers & Rosen, 1999; Puhl & Brownell, 2006).

Social self-preservation theory suggests that psychobiological responses are most likely to occur when negative social evaluation may lead to a potential loss of social status or acceptance (Dickerson & Kemeny, 2004). Negative evaluations about the body by others can have negative social consequences. For example, those that are considered attractive are viewed as possessing more desirable characteristics than less attractive people (e.g., more intelligent, socially skilled, and adjusted; Feingold, 1992). Further, SSPT suggests psychobiological responses are most likely when the threat is related to a domain of importance (Leary et al., 1995; Rohleder, Beilen, Chen, Wolf, & Kirschbaum, 2007). Most people, especially women,
place at least some importance on their body appearance (Muth & Cash, 1997). These key characteristics of social-evaluative threats likely to elicit psychological responses as outlined by SSPT may also characterize body-related threats women face daily.

Although findings from individual studies suggest that SSPT may be applied to the examination of body-related threats, support for this contention does not currently exist as SSPT has not been specifically used as a guiding framework in the body image literature. Therefore, the overall objective of this study was to examine the potential applicability of SSPT in examining body image threats experienced by young adult women through a qualitative research design. Findings from this study also will extend the current SSPT literature by applying SSPT to a body image context; to date, SSPT has primarily been laboratory-based. Specifically, this study aimed to identify and describe the body image threats of women, the cognitive and emotional responses to such threats, and strategies used by women to cope with these body-related threats. Further, because the examination of the protective nature of positive body image or the positive effects of “good” body image experiences has been generally neglected in the literature (Cash, 2002; Frisén & Holmqvist, 2010; Wood-Barcalow, Tylka, & Augustus-Horvath, 2010), we also sought to identify and describe body image situations that are comfortable for women.

Method

Study Design

Although a list of specific social-evaluative body-related threats that prompt participants to feel uncomfortable about their bodies can be determined from past research (Bain, Wilson, & Chaikind, 1989; Carron & Prapavessis, 1997; Hart et al., 1989; Myers & Rosen, 1999; Puhl & Brownell, 2006; Van Raalte et al., 2004), the context of these situations, individual’s thoughts and feelings, and coping strategies in these situations are missed through the use of the typical quantitative research designs characteristic of these studies. In addition, given this is the first
study to assess the potential applicability of SSPT to a body image context, a qualitative approach would likely provide rich information missed through quantitative designs. Providing preliminary evidence through a qualitative approach may be helpful prior to theory testing in a laboratory. Therefore, a qualitative approach was used to identify specific situations that increase body image concerns in young adult women and to hear in their own words about the context of these situations (positive and negative) and coping responses to such threats. Specifically, this study took a thematic analysis approach, which is used to identify, code, and report themes within the data. Since it was planned to code the data around the SSPT framework, a theoretical (rather than inductive) thematic approach was used (Braun & Clarke, 2006). Coding of the data in this approach was done with a focus on SSPT’s tenets regarding the contexts of threats, responses to these threats, and coping strategies used to deal with the threats. When coding information regarding comfortable body-related situations, a more flexible coding process was used as such situations are not described by SSPT. Interviews are often used in this approach for data collection. Moustakas (1994) recommends posing two broad, general questions: (a) “What have you experienced in terms of the phenomenon (comfortable and uncomfortable body-related experiences)?” and (b) “What situational factors or contexts have influenced the experience of the phenomenon?” Other open-ended questions may also be asked; however, these two broad, general questions provide the necessary description (i.e., textual and structural description) for understanding common experiences.

**Description of the Research Team**

At the time of study, I (the interviewer) was a 29-year-old female doctoral student. I was 66 inches tall, weighed 155 lbs (body mass index = 25.02), and had an athletic build. I have experience investigating body image and self-presentational concerns across the lifespan and in special populations (e.g., breast cancer survivors, women with osteoporosis), using both
quantitative and qualitative research designs. I developed the interview guide with feedback provided by the other members of the research team. Prior to conducting the interviews for the present study, I was given practice sessions with the interview guide. I conducted, transcribed, and coded all interviews. During all interviews I wore loose-fitting shorts and a t-shirt.

The remainder of the research team, who contributed to the development of the interview guide, coding and challenging the themes, and discussion of the results, consisted of members of my supervisory committee. Dr. Kerr’s (51 years of age) research focuses on harassment and emotional abuse in youth sport. She has extensive experience using qualitative research designs. Dr. Faulkner’s (41 years of age) research investigates the relationship between physical activity participation and psychological well-being, with an emphasis on physical activity promotion in the community and rehabilitation settings. He is also an expert in qualitative research designs. Dr. Faulkner was responsible for coding 50% of the transcripts. Dr. Gammage’s (40 years of age) research examines body image and self-presentational concerns across the lifespan. She has expertise investigating the impact of these variables on psychological states and health behaviours, using quantitative and qualitative approaches. Dr. Klentrou (48 years of age) is an applied exercise physiologist whose research focuses on exercise and musculo-skeletal development. In collaboration with exercise and health psychologists, she has examined the impact of physical activity on both physical and psychological outcomes, including body image and self-presentational concerns. Dr. Faulkner and I were responsible for the coding and challenging of themes.

**Participants**

The sample consisted of 23 young adult women who were attending university. We sought to interview young women for three reasons. First, body image concerns are especially relevant to young adult women who are often concerned with weight and shape. Heatherton,
Mahamedi, Striepe, Field, and Keel (1997) found that 82% of college women stated they wanted to lose weight, although very few were actually overweight (1.4%). In fact, colleges have been described as “breeding grounds” for body image concerns (Striegel-Moore & Franko, 2002, p. 189). Second, qualitative studies examining uncomfortable body-related situations have typically involved samples of overweight individuals (Bain et al., 1989; Myers & Rosen, 1999) and may not generalize to college women, many of whom may be normal weight. Third, much of our understanding of body image stems from research on college women (Thompson, 2004). Given this study is the first to use SSPT to frame body image concerns, it was advantageous to have a breadth of existing research to draw from regarding our potential findings.

Exclusion criteria included diagnosis of or treatment for an eating disorder (as self-reported) in order to generalize to the typical female university-aged student. The sample had a mean age of 20.91 years ($SD = 1.95$), mean height of 66.48 inches ($SD = 3.10$), mean weight of 151.47 lbs ($SD = 29.65$), and a mean body mass index in the healthy range for this age group ($M = 24.01$, $SD = 4.02$). Demographic characteristics for each participant are summarized in Table 1.

**Measures**

Participants completed demographic information (age, height, weight, and university major) in addition to a measure of trait social physique anxiety (See Appendix A: Questionnaire Package for Study 1).

**Social physique anxiety.** A measure of social physique anxiety was included to establish variability in the sample. We sought to have a sample comprised of women with high and women with low social physique anxiety in order to explore differences in responses based on this trait measure of self-presentational concerns related to the body. The 9-item Social Physique Anxiety Scale (SPAS; Martin, Rejeski, Leary, McAuley, & Bane, 1997) was used to assess
anxiety associated with others’ evaluations of one’s body. A sample item is “when it comes to displaying my physique/figure, I feel shy.” Items are measured on a 5-point scale ranging from 1 (not at all characteristic of me) to 5 (extremely characteristic of me). Evidence of validity and reliability of the SPAS in past research with samples of college women has been presented (Hart et al., 1989; Martin et al., 1997). For the present sample, internal consistency was adequate (α = .92). Previous research has classified women with a mean score of 4 or higher (out of a possible 5) to have high social physique anxiety (Focht & Hausenblas, 2003). Participants in the present study were classified into high (SPAS score ≥ 4.00; n = 5), moderate (SPAS score 2.50-3.99 [inclusive]; n = 11), and low (SPAS score < 2.50; n = 7) social physique anxiety groups.

Interview. Semi-structured interviews were used for data collection. Questions were posed to gain textual and structural descriptions of participants’ experiences with body-related threats (Moustakas, 1994). A general question was included to compose a list of situations in which participants felt uncomfortable about their bodies and also comfortable or confident about their bodies. Other open-ended questions were asked to gain information about the context of these experiences and how participants cope with such situations. Participants were asked about their own experiences (i.e., specific situations in which they felt comfortable or uncomfortable about their bodies, responses to such situations, and coping mechanisms used in these situations), in addition to what they thought other young adult women experience with respect to their bodies, to allow for greater discussion of potentially sensitive information. See the appendix (at the end of this chapter) for the interview guide.

Procedures

Upon university ethics clearance (See Appendix B: Ethics Clearance for Study 1), participants were recruited through posters placed around the university campus and announcements made in undergraduate classes (See Appendix C: Recruitment Materials for
Study 1). Participants were invited to participate in an interview describing their body experiences. Interested participants contacted the research team, and a mutually convenient time for participation was set. Upon arrival at the laboratory, participants provided informed consent prior to the completion of demographic information and the SPAS. Participants then completed a 20-minute interview which was audiotaped. All interviews took place in the same private meeting room. Upon completion of the interview participants were offered $10.00 or research participation credit for a course as compensation.

Sample Size Considerations

Data collection was terminated after the twenty-third interview, when it was determined that saturation was achieved, insofar as no new threats, responses or coping strategies were emerging (Glaser & Strauss, 1967; Guest, Bunce, & Johnson, 2006). It is important to note that saturation was achieved within each social physique anxiety group that was created. Guest et al. suggested that for studies with narrow objectives using a fairly homogeneous sample, such as the present study, 12 participants is likely sufficient. After the twenty-third interview it was clear that few differences existed between the social physique anxiety groups, especially related to uncomfortable body-related situations.

Data Analysis

Audio-recordings were first transcribed verbatim by myself, where pseudonyms were assigned to each participant to ensure confidentiality. A simple frequency count was completed to determine the most common comfortable and uncomfortable body-related situations. Next, a theoretical thematic analysis was conducted to identify themes within the interviews following procedures recommended by Braun and Clark (2006). The transcribed data were first read and re-read. Once familiar, the data were categorized into first-level themes by identification of recurring or underlying ideas relevant to each purpose of the current study. Following the coding
of first-level themes, sub-themes were identified, reflecting the meaning of a group of text or properties that described a concept in similar ways. The next step was to challenge the categories by asking whether the data were central to one of the research questions. As recommended by Braun and Clarke (2006), the process remained flexible, meaning that themes could be modified and refined until the most reasonable reconstruction of the data was completed. Over the course of this process, transcripts were re-read to ensure that the final thematic structure was applicable across all the transcripts with an additional emphasis in exploring potential differences in responses among women self-reporting high or low social physique anxiety.

**Trustworthiness**

Two steps were taken to enhance the trustworthiness of the findings (Lincoln & Guba, 1985). First, the coding process was conducted by myself. A second coder (Dr. Faulkner) then read and coded 50% of the transcripts. This was done in order to challenge the themes identified by myself and their connections in a form of peer debriefing (Lincoln & Guba, 1985). No discrepancies in coding or interpretation were found. Second, one week following the interview, a member checking process was conducted, in which respondents reviewed summary reports and provided feedback and verification on the accuracy of interpretations (Creswell, 2007). A summary of the interview was completed by the interviewer and sent via email to the participant. Participants were asked to read the summary and note any parts that did not accurately represent what they had intended to convey during their interview. They were then allowed to clarify these points. All participants responded to the email, and each noted that no clarifications were needed; all summaries were deemed to accurately represent what they had intended to convey during the interview.

**Results and Discussion**
The results are presented in two sections: comfortable body-related situations and uncomfortable body-related situations. Each section describes results related to the present study’s specific research objectives: identifying specific situations, the context of the situations, and responses to the situations. Results regarding the frequency of comfortable and uncomfortable situations and coping mechanisms are also described. Where appropriate, differences between women with high, moderate, and low social physique anxiety are described.

It should be noted that in the majority of themes where differences based on social physique anxiety were found, differences were generally found between women with low social physique anxiety versus the other two groups, while there were no meaningful differences between those with high and moderate social physique anxiety. We have presented and interpreted the results noting theoretical and empirical evidence to more clearly highlight our findings and provide a context surrounding our decisions regarding the interpretations of the results (see Table 2 for an overview of the thematic map with specific examples corresponding to each theme which emerged from the data). We have highlighted the contributions of this study to literature on the development of SSPT and body image separately before the conclusion.

**Comfortable Body-Related Situations**

A frequency count showed that the most common comfortable body-related situations were everyday life locations \((n = 13)\), particularly being at home. Working out or playing sports \((n = 11)\) were also reported by a number of participants as situations in which they thought fellow young adult women felt comfortable or confident about their bodies. It should be noted that many participants found it difficult to pinpoint specific comfortable situations and describe the last time they felt comfortable or confident about their body, regardless of level of social physique anxiety. Most women required prompting, took more time to answer, and tended to identify situations other young adult women found comfortable rather than their own
comfortable situations. Participants’ responses were limited to more general situations such as everyday life locations (e.g., home, library, school) rather than specific situations that had occurred in their life.

**Context of comfortable situations.** It was also challenging for participants to describe the context of comfortable situations as these were typically common, everyday situations. However, two main themes were identified with respect to the context of comfortable situations. First, reference was made to the influence of the *social environment* in determining whether a situation was comfortable or uncomfortable. Regardless of level of social physique anxiety, the context of their most comfortable situation often included the presence of friends and/or family. Participants indicated that the presence of friends or family lessened the likelihood of judgment by others and reduced their concern to be perceived positively by others (i.e., level of impression motivation; Leary, 1995). Jane stated that, “it helps if I’m not trying to impress someone.” Family and friends were described as supportive rather than judgmental. When asked what is it about her situation that makes her feel comfortable, Janet answered, “having someone there who like, that won’t judge you no matter what your body is because they love you for who you are.”

This finding is consistent with empirical research demonstrating that individuals have lower self-presentational motives when interacting with familiar others (e.g., friends) than unfamiliar others (Leary, Nezlek, Downs, Radford-Devonport, Martin, & McMullen, 1994), likely because the potential for negative evaluation from supportive others may be lower. In addition, there is evidence that women who surround themselves with others who unconditionally accept their body experience positive body image, perhaps because these important others promote increased positive source information (Avalos & Tylka, 2006; Wood-Barcalow et al., 2010). Therefore, women may have identified supportive others as an element of comfortable body-related situations because they believed these others would be unlikely to judge them negatively, and
because they are more likely to process positive information in an environment characterized by body acceptance.

Clothing emerged as the second key contextual element of comfortable situations; however, unlike the social environment, the nature of this theme differed between women with higher and lower social physique anxiety. For women with moderate to high social physique anxiety, participants described comfortable situations as those involving non-form fitting clothes (e.g., sweat pants and sweatshirt). For these participants, a low level of impression motivation, in addition to their choice of clothing, made a situation comfortable with respect to their body. For example, when describing her last comfortable situation, Leah stated “we [her roommate] go home and we get into like sweats and a t-shirt and it’s just fine and we’re comfortable and you’re not trying to put on a front for anyone.” For participants like Leah, the context of comfortable situations included supportive people and the absence of the expectation to “dress to impress.”

By contrast, women low in social physique anxiety described comfortable situations as those involving “nice” clothing or relatively more formal clothing, but with the emphasis that it fit their body type well such that it was not overly revealing (“…nothing too form-fitting or showing too much skin” [Melissa]) and highlighted attractive features. For these women, the presence of supportive friends or family was still an element of their comfortable situations; however, wearing more formal or “nice” clothing was described. When describing her comfortable situation, Olivia stated, “when you’re going out a lot of times when you dress up you feel nice, you put on all your fancy clothes and you know you feel comfortable because you’re going out and you’re excited to go out with all your friends.” This type of situation, going out with friends and wearing clothing different from everyday clothing, was not described by those with moderate to high social physique anxiety. It may not be surprising that clothing emerged as a key contextual factor for comfortable situations, as evidence suggests that clothing
choices (an appearance fixing strategy) are a coping mechanism young women use to deal with uncomfortable body-related situations (Cash et al., 2005). Although the type of clothing chosen by women with moderate to high social physique anxiety (i.e., non-revealing) differed from that of women with low social physique anxiety (i.e., relatively more formal clothing), the essence of their choices may be deemed similar such that “unattractive” body features were concealed or attractive features highlighted. This point is highlighted by Samantha, a participant with low social physique anxiety, who stated having brought a sweater in anticipation of needing to wear it to hide her arms.

**Responses to comfortable situations.** Most participants, regardless of level of social physique anxiety, found it difficult to identify or describe specific thoughts and feelings experienced during comfortable situations. Consistent with the identification of specific comfortable situations, many of the descriptions were vague in nature. Responses to comfortable situations were grouped into three themes: general, body-related, and self-presentational responses. Participants described a *general positive feeling* or calmness in response to comfortable situations. Also, a general sense of self-confidence was described. For example, when describing the last situation in which she felt comfortable or confident, Quinn said it [referring to a body-related compliment from a friend] made her feel “really happy… definitely it was a confidence-booster.”

Participants also described specific *body-related thoughts and feelings* such as feeling fit, attractive, skinny, or strong. Further, many participants stated that during comfortable body-related situations, they were not thinking specifically about their body. Rachel stated that in comfortable situations, “I don’t feel like my flaws [with respect to her body] are highlighted.” Several participants suggested that the situation was comfortable because they were not focused on their bodies. Brittany’s statement most accurately summarizes this point; “if I’m comfortable,
I’m not thinking about it [her body].” It appears that participants refer to a lack of body awareness as a “positive” response. Melissa portrays this point by stating, “I felt definitely more relaxed, more umm myself, I wasn’t constantly consumed by the thought of what I looked like.” This finding supports the relief women have when they do not self-objectify (Fredrickson & Roberts, 1997). Western culture often encourages women to self-objectify, or view themselves from a third person perspective as if they were an object to be used or evaluated by others. Self-objectification is associated with monitoring of the body, and leads to increased shame, appearance anxiety, and diminished mental performance (Fredrickson, Roberts, Noll, Quinn, & Twenge, 1998). By not focusing on the body, women may attend to non-appearance-related thoughts and feelings (Fredrickson et al., 1998), avoiding these potential negative outcomes.

Non-self-presentational responses were also described by participants, including a general lack of awareness of others’ evaluations of their body. For example, Pam stated, “I wasn’t worried about what others were saying about me or like if people were saying anything about me.” The general lack of both body awareness and self-presentational concerns is consistent with research that compares a control group to an experimental group. In control groups, environmental manipulations designed to minimize self-presentational concerns have been related to lower body image concerns than experimental conditions (e.g., Gammage et al., 2004; Van Raalte et al., 2004; Strong et al., 2008). These control conditions did not explicitly emphasize the body, likely leading participants to remain unfocused on their appearance.

It should be noted that participants could not identify any physical responses experienced in comfortable body-related situations beyond feeling relaxed or calm. This finding could be attributed to participants’ general lack of focus on the body (by themselves and others) during comfortable situations. It may be difficult for participants to describe physical responses in
comfortable body-related situations because such situations, and accompanying sensations, are less common and less intense.

**Uncomfortable Body-Related Situations**

Unlike comfortable situations, participants, regardless of level of social physique anxiety, found it relatively easier to list uncomfortable situations and identify their last uncomfortable situation specifically. A frequency count showed that the most common uncomfortable body-related situations were wearing a bathing suit \((n = 17)\), followed by trying on clothes or wearing unflattering clothes \((n = 7)\). The majority of participants reported that wearing a bathing suit was their most uncomfortable body-related situation.

The frequency with which participants experienced uncomfortable body-related situations ranged greatly from everyday to not very often. Women with moderate to high social physique anxiety tended to experience uncomfortable situations daily, with a few participants stating that these situations occur more than once a day. Women with low social physique anxiety tended to report less frequent occurrence of uncomfortable situations (e.g., once or twice per month or week), although some women with low social physique anxiety reported a daily occurrence of uncomfortable situations. Women had different opinions as to what was considered a regular occurrence. For example, a weekly occurrence of uncomfortable body-related situations was described by most of the women as “not very often.” By contrast, one participant with low social physique anxiety (Amy) reported experiencing uncomfortable situations daily, if not more than once per day, yet described this frequency as “not very often.” The frequency with which uncomfortable body-related situations occur and the ease at specifically identifying these threats seems to be congruent with the idea of “normative discontent” (Rodin, Silberstein, & Striegel-Moore, 1985). However, objectification theory (Fredrickson & Roberts, 1997) may also equally explain this point. Fredrickson and Roberts (1997) posit that women live in a culture infused
with an objectifying gaze; images sexualizing women are unavoidable in North American culture and likely affect most girls and women to some degree. In the present study, participants’ ease at identifying body-related threats may reflect the culture in which they live rather than their level of body dissatisfaction per se, especially since some participants, if asked, may not have reported body dissatisfaction.

**Context of uncomfortable situations.** Participants also found it easier to describe the context of uncomfortable situations relative to comfortable situations. Two main themes were identified by women with respect to the context of uncomfortable situations, regardless of their level of social physique anxiety. The first theme reflects the *social environment*. First, the presence of an ideal comparison target (i.e., an individual who was perceived to be fitter, thinner, or more attractive), was a common element of uncomfortable situations. The subsequent social comparison process (to an ideal) may create an uncomfortable situation as it may make participants aware of their body flaws or how they do not measure up to society’s body-related standards. For example, when describing her most uncomfortable situation, Jessica stated, “being at the beach…it pretty much seems that every single girl has a better body than me so I was a little uncomfortable.” Jodie described a similar situation, “I was on my friend’s boat… there was a few people our age on the boat and I was the biggest one, like not huge but compared to them I was bigger so I was a little self-conscious.” The presence of an ideal other was also perceived to make evaluation or judgment by others more likely, and this tended to make participants feel aware and concerned about the impressions they made on others with respect to their bodies. Negative outcomes such as body dissatisfaction and social physique anxiety occur when individuals perceive their body is less physically attractive in comparison to someone else (Martin Ginis, Prapavessis, & Haase, 2008); therefore, it may not be surprising that the presence of an ideal other would be a contextual factor described by participants.
However, even the presence of others who are not necessarily ideal was described as contributing to uncomfortable situations. When answering the question regarding her most uncomfortable situation, Jodie responded, “no matter who I’m with, if I’m swimming with someone, the whole bathing suit thing.” In such situations, feelings of discomfort may arise from feelings of being judged by others.

These findings highlight the gap between researcher-driven versus participant-driven research on body image. Findings from researcher-driven studies (in which researchers themselves identify and test potentially uncomfortable situations, as well as the specific responses) may miss important information regarding body-related experiences (i.e., context of situations, the reasons why individuals behave the way they do, and decisions made by participants facing such situations). Participant-driven research (where participants are not limited to responding to standardized questionnaires and laboratory-based situations constructed by the researcher to manipulate psychological states) provides information that contextualizes body-related experiences not captured by researcher-driven research. For example, past research has investigated whether characteristics of observers (e.g., gender, familiarity) may impact concerns over the impressions one is making on others (Carron, Estabrooks, Horton, Prapavessis, & Hausenblas, 1999; Carron & Prapavessis, 1997; Kruisselbrink, Dodge, Swanberg, & MacLeod, 2004; Leary et al., 1994). However, these factors were not described within our interviews when discussing uncomfortable body-related situations. Participants’ concerns depended more on the presence of others in general, especially ideal others, and not necessarily on other characteristics of the observers that researchers hypothesize to be influential. This gap has been further highlighted by Smith-Jackson et al. (2011) who argued that qualitative research designs may provide opportunities for participants to articulate their body experiences without being restricted by items listed on quantitative measures.
The second theme that emerged was *body exposure*. Contexts involving exposure of the body, such as wearing a bathing suit or during intimacy, were described as uncomfortable by all participants regardless of level of social physique anxiety. Body exposure seemed to exacerbate the effects of the presence of others. For example, when describing her responses to her most uncomfortable situation, Jennifer stated, “I wish I didn’t have to be so exposed, umm, I hope nobody is looking at me in a negative way.” When asked why her most uncomfortable situation was swimming, Kelly said, “I chose swimming because you’re so openly showing your body.” Pam described the last time she wore a bathing suit as her most uncomfortable situation; “I felt like everybody was looking at me. I couldn’t kind of just disappear. I was kind of standing out and I don’t like to personally stand out incredibly too much. I kind of like to be more reserved and you know blend in a little bit and in that situation, I felt like I was really standing out and all eyes were on me and that made me feel really uncomfortable.”

Often, as part of the experimental design, researchers manipulate the level of body exposure to elicit body image or self-presentational concerns to examine its impact on certain outcomes (Hart et al., 1989; Gammage et al., 2004; Strong et al., 2008). Body exposure may be one contextual factor that is likely to make opportunities for evaluations by others possible because the body is visibly on display. This theme is consistent with objectification theory (Fredrickson & Roberts, 1997), which suggests that situations (real or imagined) that highlight how others may view or evaluate one’s body are likely to increase self-objectification (as evidenced through increased body surveillance), and in turn, shame and appearance anxiety (Fredrickson et al., 1998).

Although body exposure was an element of uncomfortable situations for all participants regardless of social physique anxiety level, the amount of body exposure seemed especially problematic for women with high social physique anxiety. For these women, situations requiring body exposure created conflict with their desired coping mechanisms (e.g., hiding their body
with clothing, avoiding the situation altogether). For women with high social physique anxiety, situations of body exposure that were perceived as unavoidable or out of their control, such as swimming, being intimate, and changing in change rooms, were the most uncomfortable. Rachel stated that, “situations where you’re expected to show more of your body, like going to the beach or something, you can’t really wear a t-shirt in the pool, people look at you more…it’s hard when you know, there’s no clothes to work with.” Even when participants attempted to cope with feeling exposed in such situations, it was still uncomfortable. This is exemplified when Kelly, a participant with high social physique anxiety, described the last situation in which she felt uncomfortable: “I wanted to go swimming … umm, so it was like a big pool and everything, and I pumped myself up for a week like ‘I’m going to go swimming this time’ but then I have very low self-esteem and stuff so I wasn’t going to wear like a normal swimsuit so I bought this ridiculous bodysuit, like it was a whole suit, it looks like a scuba thing, it was so stupid, and I was like ‘I’m going to go in’ but I didn’t and I just went and I took it off. I was so uncomfortable because it showed off the shape of my body too much.”

**Responses to uncomfortable situations.** Uncomfortable situations elicited a number of different thoughts, emotions, and physical sensations. Although the content of these themes was similar regardless of level of social physique anxiety, differences in the magnitude of responses were reflected through the manner in which the questions were answered. Women with moderate to high social physique anxiety were quicker to list responses, needed fewer probes, and seemed to find it easier to identify specific responses than women with low social physique anxiety. Further, women with moderate to high social physique anxiety were more likely to report feelings of body dissatisfaction in uncomfortable situations than women with low social physique anxiety. These differences in the magnitude of responses are consistent with past research showing that women with high versus low social physique anxiety have greater negative
responses (e.g., state anxiety, negative body-related thoughts, stress) to social-evaluative body-related threats (Focht & Hausenblas, 2003, 2004; Hart et al., 1989).

Similar responses were grouped together and classified into four themes: general, body-related, self-presentational, and physical responses. General self-conscious emotions and cognitions were described as responses to situations in which participants felt uncomfortable or not confident about their body. Regardless of social physique anxiety level, general feelings of nervousness, self-consciousness, embarrassment, and inadequacy (“not feeling good enough” [Melissa]) were reported.

A second theme included more specific body-related thoughts and feelings, such as negative attitudes toward body parts, heightened body awareness or consciousness, overall body dissatisfaction and unattractiveness, shame, and thoughts of inadequacy with respect to their body. The contention that uncomfortable body-related situations may decrease body acceptance becomes apparent when examining responses to uncomfortable body-related situations. When describing responses she felt in her most uncomfortable situation, Jennifer stated that, “I felt kind of ashamed because like, if they’re [her friends] judging me I should be doing something better for myself.” This was especially true for situations involving the presence of others, specifically ideal others, and body exposure (e.g., bathing suit situations). For example, Jodie stated being aware if her stomach was sticking out. Teresa stated, “when I feel like other people are judging and evaluating me, then I tend to evaluate myself as well.” These general and body-related responses described by participants are consistent with experimental research examining responses to high social-evaluative body-related threats (i.e., state anxiety, negative body-related thoughts, stress, social anxiety; body dissatisfaction; Carron & Prapavessis, 1997; Gammage et al., 2004; Hart et al., 1989; Strong et al., 2008).
A third theme included responses related to the presence of others such as *self-presentational* concerns and social comparison tendencies. Self-presentational concerns included concerns related to participants’ perceptions of others’ evaluations of their body. Quinn listed the statements that went through her head in her uncomfortable situation; “What is she thinking about me?”, “Does she think I’m fat?” Participants also reported making social comparisons highlighting their shortcomings in comparison to others. For example, in her uncomfortable situation, Olivia thought, “maybe I’m not as, you know, fit as I originally thought.” Suzanne also described social comparison tendencies, “I wanted to look good, but beside this person I may not look as good or something like that.” Again, these types of self-presentational responses are consistent with research indicating that social physique anxiety is higher in a social-evaluative body-related situation (Carron & Prapavessis, 1997; Gammage et al., 2004; Strong et al., 2008; Van Raalte et al., 2004).

A final theme in response to uncomfortable situations was named *physical sensations*. Examples included sweating [Janet, Suzanne], blushing [Chantel], having a faster heart rate [Brittany, Pam], or shallow breathing [Samantha]. Chantel described her physical responses to her most uncomfortable situation as part of the stress response, “I feel like the adrenaline like, like I just want to run away. I guess the flight or fight reaction, that kind of stress response.” Similarly, Pam described physical symptoms related to a panic attack when facing her most uncomfortable body-related situation: “pain in your heart because like you lose your breath a bit and just you’re kind of umm hyping yourself up to more than what the situation really is and almost like an anxiety attack you know kind of breathing heavy and you know your chest is hurting a bit.” These physical sensations may reflect hypothalamic-pituitary-adrenal-axis activation and are consistent with Strong et al.’s (2008) findings, superseded by their recent paper (Martin Ginis, Strong, Arent & Bray, 2012), of higher cortisol levels, indicative of a stress
response, in women faced with a high social-evaluative body-related situation. Although examples of physical sensations were described by participants, caution should be taken regarding the interpretation of such results given that participants’ actual physiological responses were not measured in the present study.

**Coping with uncomfortable situations.** Participants described coping mechanisms used to deal with these uncomfortable body-related situations and subsequent responses. Popular methods of coping included hiding unattractive body parts with *clothing* or dressing in clothes that are comfortable or fit well for one’s body type. Participants also commonly reported using clothing as a means to cover body flaws, or even to reduce body exposure; Pam stated, “I don’t like to show my legs, so I’ll wear dresses that are maybe longer.” Similarly, Jennifer reported in bathing suit situations she would, “cower under a towel for awhile… hide my body.” Coping also included *avoidance* strategies such as leaving the situation, avoiding the situation altogether, ignoring it and focusing on other things, shying away, or keeping to oneself. The present findings regarding avoidant-type behaviour are consistent with and extend empirical research on coping with body-related situations, a poorly understood and understudied area in body image research.

Our findings regarding coping strategies also contribute to the current literature on coping with body-related situations. For example, participants reported using humor as a coping strategy, specifically “self-deprecating jokes” [Leah]. Humor may be indicative of “fat talk” whereby references to weight are exchanged within peer groups (Nichter & Vukovic, 1994). Nichter (2000) suggests an individual may use “fat talk” as a means to defend against others’ opinions. Women may use humor to defend against others’ opinions and be the first to publicly point out their body flaws. The use of humor has been identified in past research. For example, in a study to examine body image-related coping strategies in adolescents, this strategy was identified as a behavioural strategy (Kowalski et al., 2006). The use of humor has also been
identified as a common means of coping in individuals who are overweight and experience weight stigma situations (Myers & Rosen, 1999; Puhl & Brownell, 2006). Our findings suggest that young adult women attending university, many of whom are normal weight, also use humor to cope with uncomfortable body-related situations.

Positive self-talk was another common method of coping with uncomfortable situations. Rachel said in her uncomfortable body-related situation she tries to, “take a step back and really survey like not everybody is stick thin and it’s ok and just try to you know have a positive mindset.” This strategy is an example of positive rational acceptance (Cash et al., 2005), which includes strategies that focus on acceptance of the challenging situation and positive or realistic self-talk regarding one’s physical appearance. In their study validating a body image-related coping questionnaire, Cash et al. (2005) identified specific examples of positive rational acceptance such as “I remind myself that I will feel better after awhile” and “I tell myself that I’m just being irrational about things,” consistent with those reported by participants.

Exercise and diet were the most commonly reported long term coping strategies, as approaches to improve the body’s appearance (e.g., by toning, losing weight), bringing one’s body more in line with the thin ideal, to attain a body that is desired by society (i.e., appeasement). This strategy is consistent with past research showing exercise and diet are among the most commonly cited ways to improve the body’s appearance, specifically weight and shape (Markey & Markey, 2005; McCracken, Jiles, & Blanck, 2007). It should be noted that these strategies were mostly described as strategies other young adult women used and not necessarily what participants themselves used. This type of response (i.e., describing other people’s approaches to uncomfortable body-related situations) was also noted in interviews examining coping with “bad body image days” (Smith-Jackson et al., 2011).

Support for the Use of SSPT from the Present Study
The primary objective of this study was to examine the potential applicability of SSPT in examining body image threats experienced by young adult women in a university setting. In general, the specific body image threats identified, the nature of those threats, and the responses to those threats are consistent with SSPT. With regards to specific body image threats and the context of those threats, the most threatening situations for body image concerns were those involving the potential for social evaluation (e.g., the presence of others, specifically an ideal other) and were characterized by body exposure (e.g., being in a bathing suit). It should be noted that participants’ most threatening situation was not simply wearing a bathing suit, but being seen by others in a bathing suit, emphasizing the importance of the social-evaluative environment. Evaluation of an attribute (in this case, the body’s appearance) by others is a characteristic of situations believed to elicit psychobiological responses consistent with SSPT (Leary et al., 1995; Rohleder et al., 2007). Further, the presence of ideal others and body exposure may increase the possibility of social evaluation by others and the potential loss of acceptability with regard to the body. According to SSPT, the risk of a loss of social status or acceptance is one characteristic of situations likely to elicit a robust psychobiological response consistent with SSPT (Leary et al., 1995; Rohleder et al., 2007). This potential loss was highlighted by Jessica’s and Jodie’s comments regarding their feelings of not ‘measuring up’ to the body standards that surrounded them. Both participants added that this discrepancy between their body and the ideal made them feel self-conscious.

The responses to such threats described by participants were also consistent with SSPT, as the responses were typically negative and self-conscious in nature with a self-presentational basis. For example, participants reported feelings of embarrassment, body consciousness, and shame in social-evaluative settings. According to SSPT, self-conscious emotions and cognitions over other, primary emotions and cognitions (e.g., anger, fear, sadness, joy) are selectively
elicited in social-evaluative situations (Dickerson, 2008; Dickerson, Gruenewald, et al., 2004; Dickerson, Kemeny, et al., 2004; Dickerson et al., 2008; Gruenewald et al., 2007, 2004; Leary et al., 1995, 1998). In addition to psychological responses, the described physical responses (e.g., sweating, faster heart rate) were consistent with a stress response and likely accompany hypothalamic-pituitary-adrenal-axis activation, as outlined by SSPT.

Finally, the ways in which participants coped with such threats were also found to be consistent with SSPT, as the majority of strategies involved some form of avoidance. According to SSPT, behaviours such as disengagement (e.g., avoiding the situation altogether), withdrawal (e.g., concealing the body with clothing, shying away or staying in the background), or appeasement (e.g., using diet and exercise to shape the body closer to society’s ideal) are designed to prevent further loss of social standing or acceptance in the face of negative social evaluation (Dickerson, Gruenewald, et al., 2004; Kemeny, Gruenewald, & Dickerson, 2004). Participants in the current study described similar coping responses to body-related threats.

**Contributions to SSPT and Body Image Literature**

This study provides preliminary support for the application of SSPT to a body image setting. Using a theoretical thematic analysis approach was particularly useful to address the main focus of this study, as it allowed us to target specific tenets of SSPT. We found preliminary evidence that SSPT may help to guide research examining responses to body-related threats, and expand our knowledge on responses and coping mechanisms as they relate to body image. Future research is needed to experimentally test the contentions of SSPT to provide more evidence of its applicability to a body image context. For example, laboratory-based research could manipulate key tenets of SSPT (e.g., domain importance, potential loss of acceptance) through alterations of the social environment or comparing specific sub-populations (e.g., individuals with an eating
disorder versus healthy controls) to examine its impact on coping mechanisms and body image outcomes, specifically those that are self-conscious in nature.

The present findings also extend the body image literature in several ways. First, much of what we know about the context of situations that heighten body image concerns in young women is from studies examining responses to situations identified by the researcher. Qualitative studies identifying body image threats and the context of those threats have generally involved samples of overweight individuals (Bain et al., 1989; Myers & Rosen, 1999; Puhl & Brownell, 2006) and may not generalize to young adult women. The present study addresses these limitations by providing information regarding the specific situations in which young adult women feel uncomfortable about their bodies and details on the context of such situations. This information can be used to create an uncomfortable body-related situation in a laboratory in order to quantitatively measure the responses to such a situation.

Second, our findings extend the current literature on coping with body-related situations. Findings from the present study are consistent with past research on adolescents (Kowalski et al., 1999), individuals who are overweight (Myers & Rosen, 1999; Puhl & Brownell, 2006), and university students (Cash et al., 2005; Smith-Jackson et al., 2011). The reported use of humor specifically contributes to the literature on coping with body-related situations as it has identified that young adult women, many of whom are normal weight, use this strategy. Third, the present findings also provide some insight into positive body image, an understudied area of body image. The overall difficulty for participants in identifying and describing situations in which they felt comfortable or confident about their bodies is consistent with researchers’ general lack of understanding of positive body image, or the protective nature of positive body image (Cash, 2002; Frisén & Holmqvist, 2010; Wood-Barcalow et al., 2010). This difficulty could be attributed to the less frequent occurrence of positive body image experiences, as well as the
general tendency to think negatively about the body. Future research should examine the protective nature of positive body image experiences against other negative psychological outcomes (e.g., low self-esteem, depression), and examine interventions designed to enhance such positive experiences.

Limitations and Future Directions

There are several limitations to the current study that should be acknowledged. First, findings generalize only to healthy young adult women. Responses may be different in other groups (e.g., those with an eating disorder or men). For example, it is likely that specific situations deemed comfortable or uncomfortable may be different for men than for women. It should also be acknowledged that participants volunteering for this study likely had some level of comfort in discussing their body-related experiences, such that self-selection may have influenced the results. However, it should be noted that we did interview five women with high social physique anxiety, women who likely are more uncomfortable talking about their body-related experiences given their concern over other people’s evaluations of their body. Also, it should be noted that completing the SPAS prior to the interview may have potentially primed participants on the nature of the questions. Certain demographic variables such as age, race, socioeconomic status, or sexual orientation (which we did not examine explicitly) may also be important factors that influence individuals’ body-related experiences. Finally, although trustworthiness was enhanced through member checking and using a second coder, these techniques are not without their limitations. For example, the content of the member check is presented by the researcher for a certain audience (i.e., the participant) and will therefore be different from the account of the individual participant because of their different roles in the research process (Mays & Pope, 2000). Future research should assess the potential applicability of SSPT in diverse samples; using a qualitative research design and theoretical thematic analysis
approach may provide preliminary insight into its use in examining body-related experiences in such groups. Finally, although we interpreted our findings within the context of SSPT, it is apparent that there are also links with objectification theory (Fredrickson & Roberts, 1997) that should be further investigated.

**Conclusion**

The present findings provide preliminary evidence of the utility of SSPT in examining body image in a sample of young adult women attending university. To our knowledge, this is the first study to specifically apply SSPT to a body image context. Social self-preservation theory may provide a novel approach to understanding body image and new insight into the body experiences of women. Assessing the applicability of SSPT to a body image context may further develop this relatively new theory and expand its use.

**Acknowledgements**

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References


Table 1

Demographic Characteristics for each Participant

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<tr>
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<td>130</td>
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<td></td>
<td>10:25</td>
<td>Low</td>
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<tr>
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<td>160</td>
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<td>145</td>
<td>67</td>
<td>22.71</td>
<td>9:02</td>
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<tr>
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<td>129</td>
<td>65</td>
<td>21.60</td>
<td>18:26</td>
<td>Moderate</td>
</tr>
<tr>
<td>Rachel</td>
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<td>68</td>
<td>22.05</td>
<td>13:59</td>
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<tr>
<td>Pam</td>
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<td>173</td>
<td>65.5</td>
<td>28.35</td>
<td>15:41</td>
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<tr>
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<td>74</td>
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<tr>
<td>Kelly</td>
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<td>26.63</td>
<td>13:25</td>
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</tr>
<tr>
<td>Jennifer</td>
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<td>71</td>
<td>23.99</td>
<td>12:23</td>
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<td>Amy</td>
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<td>22:41</td>
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<td>Lisa</td>
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<td>68</td>
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<td>13:26</td>
<td>Low</td>
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<td>Leah</td>
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<td>105</td>
<td>64</td>
<td>18.02</td>
<td>16:08</td>
<td>Moderate</td>
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<td>19</td>
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<td>29.18</td>
<td>16:09</td>
<td>High</td>
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<td>20.98</td>
<td>13:18</td>
<td>Moderate</td>
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<tr>
<td>Quinn</td>
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<td>165</td>
<td>69</td>
<td>24.37</td>
<td>14:43</td>
<td>Low</td>
</tr>
</tbody>
</table>

Note. Weight in lbs.; Height in inches; BMI = body mass index; Length of interview = minutes:seconds; SPA = social physique anxiety; SPA ranges 1-5; High = SPA ≥ 4.00, Moderate = SPA 2.50-3.99 [inclusive], Low = SPA < 2.50; Missing = fields not completed by participant.
Table 2

**Thematic Map Outlining Themes for Comfortable and Uncomfortable Situations**

<table>
<thead>
<tr>
<th>Content of Question</th>
<th>Comfortable Situations</th>
<th>Uncomfortable Situations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Context</strong></td>
<td>Social environment</td>
<td>Social environment</td>
</tr>
<tr>
<td></td>
<td>Presence of friends/family</td>
<td>Presence of others, ideal target</td>
</tr>
<tr>
<td></td>
<td>Clothing</td>
<td>Bodysuit exposure</td>
</tr>
<tr>
<td></td>
<td>Non-form fitting (high to moderate SPA groups); Formal clothing (low SPA group)</td>
<td>Wearing bathing suit, intimacy, exacerbated effects of presence of others</td>
</tr>
<tr>
<td><strong>Responses</strong></td>
<td>General</td>
<td>General</td>
</tr>
<tr>
<td></td>
<td>Positive, calm, self-confidence</td>
<td>Nervous, self-conscious, embarrassment</td>
</tr>
<tr>
<td></td>
<td>Body-related</td>
<td>Body-related</td>
</tr>
<tr>
<td></td>
<td>Fit, strong, attractive</td>
<td>Dissatisfaction, negative attitudes toward certain parts</td>
</tr>
<tr>
<td></td>
<td>Self-presentation</td>
<td>Self-presentation</td>
</tr>
<tr>
<td></td>
<td>Unaware of other people’s evaluations</td>
<td>Aware of how body may appear to others</td>
</tr>
<tr>
<td><strong>Coping Strategies</strong></td>
<td>Not Applicable</td>
<td>Clothing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Avoidance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Self-talk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exercise, diet</td>
</tr>
</tbody>
</table>

*Note. SPA = social physique anxiety; themes are underlined; information under themes relates to specific examples that emerged from participants’ responses.*
Appendix: Interview Guide

1. What specific situations can you identify in which college women may feel confident or comfortable with their bodies? What specific situations can you identify in which you feel confident or comfortable with your body?

3. Think about the last time you felt comfortable about your body. Describe the context (or the details) of that situation. Think about the time you felt most comfortable about your body and describe the context.

4. What were you thinking and feeling in those comfortable situations?

5. What specific situations can you identify in which college women feel uncomfortable about their bodies? In what specific situations do you feel uncomfortable about your body?

6. Think about the last time you felt uncomfortable about your body and describe the context of that situation. Think about the time when you have felt most uncomfortable about your body and describe that situation.

7. What were you thinking and feeling (emotions and physical sensations) in those uncomfortable situations?

8. How do you think college women cope when faced with uncomfortable situations? Think about the last situation in which you felt uncomfortable about your body. How did you cope with that situation? Think about the time when you felt most uncomfortable about your body. How did you cope?
Chapter III

Examining Psychobiological Responses to an Actual Body Image Threat in Women: An
Application of Social Self-Preservation Theory
Abstract

Social self-preservation theory (SSPT) states that social-evaluative threats elicit a set of psychobiological responses. The present study examined the psychobiological responses to, and recovery from, a social-evaluative body-related threat. Young adult women ($N = 64$) were randomized into either a control (quiet rest) or threat group (completed a body composition assessment while wearing a two-piece bathing suit). Participants completed measures of body shame, social physique anxiety, body-esteem and body dissatisfaction, and provided a sample of saliva (to assess cortisol levels as an indicator of physiological stress) at baseline, immediately following their condition, and twenty minutes following termination of their condition. The results indicated that in the threat group social physique anxiety was significantly higher immediately following the threat in comparison to both baseline levels and recovery levels. Also, cortisol was significantly higher immediately following the threat in comparison to baseline levels while cortisol was lower at recovery than baseline and response time points in the control group. No significant group-by-time interaction effects were found for body shame, body-esteem, or body dissatisfaction. Findings provide support for SSPT’s applicability to a body image context.

Keywords: body image, social anxiety, cortisol, body evaluation, women, social self-preservation theory
Examining Psychobiological Responses to an Actual Body Image Threat in Women: An Application of Social Self-Preservation Theory

Body image can be defined as an individual’s internal representation of his or her outer self (Cash, 1994; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). It includes one’s perceptions and attitudes about his or her body as well as the importance placed on the body’s appearance (Cash & Pruzinsky, 2002; Thompson et al., 1999). Body image concerns are associated with a number of negative psychological and behavioural outcomes including lower self-esteem, increased risk of depression, social anxiety, eating pathologies, and both physical activity and inactivity (Kostanski & Gullone, 1998; Kruger, Lee, Ainsworth, & Macera, 2008; Levine & Smolak, 2002; Martin & Hausenblas, 1998; McCaulay, Mintz, & Glenn, 1988; Stice, 2002).

Given the potential implications of body image concerns, identifying situations in which these concerns arise is important. Social-evaluative body-related threats are those situations characterized by the perception (real or imagined) of other people judging (or evaluating) one’s body. Examples of social-evaluative body-related situations that have been identified by participants in research studies, or specifically used by researchers as a way to induce body image concerns in a laboratory setting, include being seen in a bathing suit (Carron & Prapavessis, 1997; Lamarche, Kerr, Faulkner, Gammage, & Klentrou, 2012), being next to someone with a good physique (Carron & Prapavessis, 1997), or having body composition assessed by a trained technician (Hart, Leary, & Rejeski, 1989). These types of situations arguably occur frequently, if not daily, for most young women.

Although the identification of social-evaluative body-related situations is important, examining how an individual responds to such situations is possibly more important. Of the limited research measuring body image responses to social-evaluative body-related threats,
situations that include the potential for social evaluation or that maximize social evaluation of one’s body have been shown to exacerbate body image concerns (Gammage, Martin Ginis, & Hall, 2004; Hart et al., 1989; Martin Ginis, Strong, Arent, & Bray, 2012; Van Raalte, Cunningham, Cornelius, & Brewer, 2004).

One recent published investigation sought to gain a more complete understanding of responses to a social-evaluative body-related threat in a series of two experiments by examining physiological outcomes of these threats (Martin Ginis et al., 2012). In both the first and second experiments, the authors found that women in a high social-evaluative threat condition had higher cortisol levels than those in the non-social-evaluative threat condition. Together, these studies provide preliminary evidence that physiological responses occur in social-evaluative body-related settings. In addition, these authors were the first to experimentally test the applicability of social self-preservation theory (SSPT; Dickerson, Gruenewald, & Kemeny, 2004; Kemeny, Gruenewald, & Dickerson, 2004) in a body image context.

**Theoretical Framework**

Social self-preservation theory suggests that a social-evaluative threat occurs when there is a potential loss of social-esteem, status, or acceptance from others in situations where social exclusion or rejection is possible. Further, when faced with a social-evaluative threat, a set of psychological and physiological responses are elicited concurrently. This psychobiological response is thought to initiate changes that support appeasement, behavioural disengagement, or withdrawal from the social-evaluative threat in order to protect one’s social image. Researchers using this theory as a guiding framework do not claim that the psychobiological response itself is detrimental to health. For example, quick, efficient responses to a social-evaluative threat, which are elicited when needed and turned off when the threat is no longer present, are thought to have adaptive benefits (Dickerson, Gruenewald, & Kemeny, 2009; Sapolsky, Romero, & Munck,
However, there are liabilities to responses which are exaggerated (i.e., too strong), occur under ambiguous or non-threatening situations, or fail to shut off when the threat is no longer present (i.e., slow recovery). Such exaggerated, prolonged responses may overexpose an individual to physiological products or chronic psychological states and ultimately have a negative impact on overall health and well-being (Black, 2003; Dickerson et al., 2009; McEwen, 1998, 2003, 2004; Miller & Blackwell, 2006; Nickols-Richardson, Beiseigel, & Gwazdauskas, 2006; Tangney, Wagner, & Gramzow, 1992).

**Empirical Support for SSPT**

Laboratory-based findings support SSPT. This area of research has generally used the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993) as the social-evaluative threat. In this test, participants are asked to deliver a 5-minute free speech and perform an arithmetic task aloud, lasting 5 minutes, in front of three evaluative judges. Participants are provided 10 minutes to prepare (anticipation period) prior to being evaluated. Evidence supporting SSPT in laboratory-based studies using such a design (i.e., TSST) have found that individuals faced with a social-evaluative threat consistently report negative psychological emotions and cognitions, specifically those considered self-conscious in nature (i.e., shame, low social self-esteem). In addition, physiological outcomes such as cortisol (a stress hormone thought to represent hypothalamic-pituitary-adrenal axis activation) are elicited concurrently (Dickerson & Kemeny, 2004). Importantly, this physiological response has a stronger correlation to self-conscious emotions and cognitions compared to more general or primary emotions and cognitions (e.g., anger, fear; Dickerson, 2008; Dickerson, Kemeny, Aziz, Kim, & Fahey, 2004; Dickerson, Mycek, & Zaldivar, 2008; Gruenewald, Kemeny, Aziz, & Fahey, 2004).
Social self-preservation theory has also been applied to a more real-life social-evaluative threat. In their series of studies examining cortisol responses in competitive ballroom dancers, Rohleder, Beulen, Chen, Wolf, and Kirschbaum (2007) provided evidence for SSPT as a paradigm for investigating real-life social-evaluative threat. Together, the results indicated that competitive ballroom dancers had significantly higher cortisol levels on a competition day (6, 4, and 2 hours before competition, immediately before and after competition) compared to the control day at the same time of day. Moreover, increases in cortisol were not due to the physical strain of dancing and were higher than those found during the TSST. In addition, responses did not habituate over time.

Not only did Rohleder et al. (2007) provide support for the applicability of SSPT to real-life threats, the findings also provide support for characteristics hypothesized to elicit a robust psychobiological response (Dickerson & Kemeny, 2004; Leary, Tambor, Terdal, & Downs, 1995). The conditions identified to most likely elicit psychobiological responses include: the presence of a central goal, situations which require an individual to display an attribute or skill that the individual values (domain importance), evaluation of an attribute or skill by others, loss of social status or acceptance as a result of negative evaluation, and situations that are uncontrollable (i.e., achieving the goal may be influenced by factors other than one’s own performance).

**Applying SSPT to a Body Image Context**

To our knowledge, only two published investigations have examined the applicability of SSPT to a body image context. First, in their qualitative study examining body experiences in young adult women, Lamarche and colleagues (2012; see Chapter II) found that the threats, responses, and coping mechanisms described by participants were consistent with SSPT. The participants also described body-related experiences characterized by contextual elements
identified by SSPT researchers as being crucial for eliciting psychobiological responses to social-evaluative situations (i.e., domain importance, potential loss of acceptance, uncontrollability). Second, Martin Ginis et al. (2012) experimentally tested the applicability of SSPT in a laboratory-based setting. Their findings support the notion that there are group differences in cortisol secretion between women anticipating a social-evaluative body-related threat and those in a control condition.

To extend our understanding of the applicability of SSPT to a body image context, the purpose of the current study was to track and compare the time course of psychobiological responses to undergoing an actual social-evaluative body-related threat versus a control condition (i.e., quiet rest) in young adult women. This study addresses four limitations of the existing literature. First, SSPT has been mainly used to examine responses to laboratory-based social-evaluative threats with one exception (Rohleder et al., 2007). Findings from this study will further highlight the applicability of SSPT to investigate other types of social-evaluative threats (i.e., body-related threats). Second, both psychological and physiological outcomes will be assessed. The vast majority of body image research focuses on psychological outcomes. Only one prior investigation (Martin Ginis et al., 2012) measured both psychological and physiological outcomes; however, Martin Ginis et al. (2012) measured only social physique anxiety in response to a body-related threat – other psychological outcomes may be sensitive to social-evaluative body-related threats. Findings from the present study will further our understanding of psychobiological responses to social-evaluative body-related threats by investigating the sensitivity of self-conscious versus non-self-conscious body-related outcomes, in addition to cortisol responses to a threat. Third, although Martin Ginis et al. (2012) provided preliminary quantitative evidence of a psychobiological response to a body-related threat, this was to an anticipated threat and not an actual threat. These authors noted the need to test
responses to an actual social-evaluative body-related threat – this study will be the first to do so. Also, to our knowledge, no research on the psychobiological recovery from this type of threat has been conducted. Measuring variables at pre- and post-manipulation provides only information regarding the immediate response to the social-evaluative body-related threat, with no consideration of the recovery phase. It has been suggested that not only is the change in variables from baseline to peak of response important (the response), but also the change in variables from peak of response to recovery (the recovery; Dickerson & Kemeny, 2004). The current study addressed this limitation by measuring both the psychobiological responses to (baseline to immediately following the threat), and recovery from (i.e., immediately following the threat to after a recovery period), a social-evaluative body-related threat.

Based on past research using SSPT and Martin Ginis et al.’s (2012) research, the following hypotheses were examined:

1. Participants who experience the social-evaluative body-related threat would report higher negative body image, especially in variables that are self-conscious in nature, in response to the threat (response time point). Also, these variables would not fully return to baseline levels after a period of quiet rest (recovery time point). Control participants would report no differences in body image variables across the three time points (baseline, response, or recovery).

2. Participants who experience the social-evaluative body-related threat would have higher levels of cortisol secretion in response to a social-evaluative body-related threat (response time point). Also, cortisol would not fully return to baseline levels after a period of quiet rest (recovery time point). Control participants would show no difference in cortisol levels.

Method
Participants

Upon institutional ethics clearance (See Appendix D: Ethics Clearance for Study 2), participants were recruited through posters placed around a university campus and announcements made in undergraduate classes (See Appendix E: Recruitment Materials for Study 2). After data screening, the final sample consisted of 64 healthy, young adult women who were attending university. Participants had a mean age of 19.92 ($SD = 2.10$) years, mean body mass of 63.34 ($SD = 11.35$) kg, mean height of 1.66 ($SD = 0.06$) m, and mean percent body fat (BF) of 23.01 ($SD = 5.40$). On average, they reported exercising 3.17 ($SD = 1.52$) times per week in a typical week. The most common physical activity reported was cardiovascular in nature such as walking or jogging. Varsity athletes, smokers, individuals with a history of a clinical eating disorder, or those who were on medications that influence cortisol secretion (e.g., corticosteroids, anti-depressants) were excluded from participation. Participants were also excluded if they did not follow study requirements (no eating, drinking, or physical activity participation one hour prior to testing). All participants indicated meeting study requirements.

Measures

Participants completed demographic information including age, frequency of exercise, type of physical activities normally engaged in, and university major, as well as a manipulation check regarding exclusion criteria and a series of questions ensuring that they had complied with study requirements with respect to food, drink, and physical activity participation.

A series of body image questionnaires was then administered. These questionnaires included negative body-related self-conscious and non-self-conscious emotions and cognitions. For all questionnaires, participants were instructed to respond to questions indicating how they felt at that moment. See Appendix F: Questionnaire Package for Study 2 for a description of all measures.
**Body shame.** The body shame subscale from the Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996) was used to assess body shame, a self-conscious body-related emotion. Each participant rated eight items to assess her belief that she was a bad person for not fulfilling cultural expectations for her body. Items were rated on a 7-point scale ranging from 1 (*strongly agree*) to 7 (*strongly disagree*), with a mid-point of *neither agree nor disagree*. Participants also had the option to select *not applicable*. Items were subsequently rescored so that higher scores represented higher levels of body shame. The OBCS has demonstrated adequate validity and reliability in young adult women (McKinley & Hyde, 1996). Internal consistency in the present study for all time points was deemed adequate (α’s ranged from .83 to .85).

**Social physique anxiety.** The Social Physique Anxiety Scale (SPAS; Hart et al., 1989) was used to assess anxiety associated with others’ evaluations of one’s body (self-conscious body-related emotion). Originally twelve items, the SPAS was reduced to 9 items because it was found to be more psychometrically sound (Martin, Rejeski, Leary, McAuley, & Bane, 1997). Subsequently, a state version of the SPAS was designed and was used in this study (Kruisselbrink, Dodge, Swanburg, & MacLeod, 2004). The items were measured on a 5-point scale ranging from 1 (*not at all characteristic of me*) to 5 (*extremely characteristic of me*). The state version of the SPAS has demonstrated acceptable validity and reliability in young adult women (Kruisselbrink et al., 2004; Martin Ginis, Murru, Conlin, & Strong, 2011). Internal consistency for all time points was deemed adequate in the present study (α’s ranged from .87 to .93).

**Body-esteem.** The Body Esteem Scale (BES; Franzoi & Shields, 1984) was used to assess body-esteem, a non-self-conscious positive body-related cognition. The BES measures attitudes toward different dimensions of the body. Participants rated 35 individual body parts
(e.g., waist, lips, arms, hips) and functions (e.g., reflexes, agility, physical condition) on a 5-point scale ranging from 1 (*having strong negative feelings*) to 5 (*having strong positive feelings*). The female version of the BES has 3 subscales that measure sexual attractiveness, weight concern, and physical condition. The BES has demonstrated satisfactory validity and reliability in young adult women (Franzoi, 1994; Franzoi & Herzog, 1986; Franzoi & Shields, 1984; Thomas & Freeman, 1990). Internal consistency for all time points was deemed adequate in the present study (α’s ranged from .90 to .91).

**Body dissatisfaction.** The body dissatisfaction subscale of the Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983) was used to assess body dissatisfaction, a non-self-conscious body-related cognition. Nine items assessed body dissatisfaction with separate body parts (stomach, thighs, buttocks, hips) on a 6-point scale ranging from 1 (*always*) to 6 (*never*). Items were subsequently rescored so that higher scores represented higher levels of body dissatisfaction. The EDI has demonstrated adequate validity and reliability in healthy young adult women (Garner et al., 1983). Internal consistency for all time points was deemed adequate for the present study (α’s ranged from .86 to .90).

**Salivary cortisol.** Measuring cortisol in saliva is a reliable, stress-free, non-invasive technique that does not require a trained technician (Vinning, McGinley, Maksvytis, & Ho, 1983). A number of studies have used salivary cortisol in their protocols (Dickerson & Kemeny, 2004; Rohleder et al., 2007; Martin Ginis et al., 2012). Approximately one milliliter of saliva was collected using salivettes specific for cortisol measurement (Sarstedt, Germany). Participants placed the dental cotton in their mouths and gently chewed or left it in their mouths for one minute, then placed the cotton back into the test tube and sealed it. Samples were centrifuged immediately and then placed in a -80°C freezer until being assayed. Salivary cortisol concentration was measured in duplicate by commercial enzyme-linked immunosorbent assay
(ELISA) kits according to the manufacture’s instructions (Salimetrics, PA). The inter-assay and intra-assay coefficients of variability were calculated and deemed acceptable (<15% and <10% respectively; Salimetrics, no date).

**Procedures**

Interested participants contacted the principal investigator, and a mutually convenient time for participation was set. Once a test session was confirmed, participants were randomly assigned to one of two groups: the control or threat group. This was done by drawing a number out of a hat. Participants randomly assigned to the control group were asked to bring shorts and a t-shirt to their visit while participants in the threat group were asked to bring a two-piece bathing suit to the session. Participants in both groups were told that this type of clothing was standard laboratory protocol for the accurate assessment of anthropometric measurements, which the researcher would be completing during their testing session. Upon arrival at the laboratory, participants provided informed consent and completed demographic information. Next, participants completed a series of questionnaires which were counterbalanced to avoid order effects (see Measures section above for description). This time served as a baseline rest period (approximately 15 minutes) prior to cortisol collection. Participants then provided a baseline saliva sample (see Measures section for salivary sampling above).

Upon completion of the baseline saliva sample, participants completed the threat/control condition, depending on their group assignment. Participants in the control condition were asked to sit quietly alone for 15 minutes. Quiet rest served as a control condition to be consistent with past SSPT-related research (e.g., Kirschbaum et al., 1993; Nater et al., 2006, 2007). Those in the threat condition faced the social-evaluative body-related threat (see description below). Participants were then asked to sit while they completed the same series of questionnaires and provided another saliva sample (response measures). The response saliva sample was completed
approximately 25 minutes after the onset of the threat/quiet rest, capturing the peak cortisol response. As suggested by Dickerson and Kemeny (2004), peak cortisol response occurs 21-40 minutes from the onset of the stressor. Participants then sat quietly for 15 more minutes, and then completed the same series of questionnaires followed by a final saliva sample (recovery measures). The recovery saliva sample was completed approximately 50 minutes following the onset of the threat/quiet rest. Timing of procedures was based on previous work examining psychological and cortisol responses to, and recovery from, a laboratory-based social-evaluative threat (Dickerson & Kemeny, 2004; Kirschbaum et al., 1993). Given the circadian rhythm of cortisol, all data collection took place at the same time of day (15:00-18:00) when levels are relatively constant (Dickerson & Kemeny, 2004; Vinning et al., 1983). Upon completion of all questionnaires and saliva samples, objective measures of height, weight, and body composition assessment were then taken for participants in the control group. Participants were debriefed as to the true purpose of the study and given $10.00 as compensation for their time. See Table 1 for a timeline of the protocol for each group.

Social-evaluative body-related threat. A body composition assessment completed while participants wore a two-piece bathing suit was selected as the social-evaluative body-related threat. Specifically, a standard 3-site (triceps, iliac crest, thigh) skinfold measurement was performed by the same trained technician to assess percent BF (Jackson, Pollack, & Ward, 1980). The same technician read measurements aloud to the same research assistant, who verbally repeated each value, then recorded it. The presence of the assistant ensured there was an evaluative audience, aside from the researcher, increasing the likelihood that a threat would be induced. This threat and the specific manner in which it was conducted was selected based on characteristics of social-evaluative threats identified as eliciting robust psychological and physiological responses (Carron & Prapavessis, 1997; Lamarche et al., 2012; Leary et al., 1995;
In addition, a body composition assessment through skinfold method is commonly used in research settings, which makes it acceptable to the university research ethics board. The assessment took approximately 10 minutes to complete.

**Results**

It is important to note that of the initial 95 potential participants, 13 did not respond to the initial email after randomization to the threat condition and of these, 11 participants dropped out (i.e., stated they were too uncomfortable or did not show up to their testing appointment). All participants randomized to the control condition completed participation in the study. Of the 71 participants who completed the study, 5 participants were removed for not complying with study requirements pertaining to food and drink intake or feeling unwell on the day of the testing appointment. Independent t-tests showed no significant differences between participants removed and the final sample on key variables (all ps > .05). Next, the data were screened to check for the assumptions underlying the data analyses (e.g., normality, homogeneity of variance, sphericity). As a result, 2 participants were removed due to abnormal cortisol levels.

Also, data screening showed that the data for cortisol were positively skewed. Thus, the cortisol values were log-transformed. The data then met assumptions for the data analyses.

Descriptive statistics are shown in Table 2 for the final sample (n = 64). Some research has demonstrated a relationship between measures of body composition (i.e., percent BF and body mass index) and body image outcomes (Hart et al., 1989), thus it was decided a priori to conduct bivariate correlations to examine percent BF as a potential covariate of the dependent measures. Percent BF was significantly related to baseline sexual attractiveness ($r = .29, p = .02$); thus, percent BF was used as a covariate in the analysis for body-esteem. To investigate baseline group differences on demographic variables (age, exercise frequency, percent BF, weight, height) and study dependent variables (body shame, social physique anxiety, body-esteem, body
dissatisfaction, and cortisol), a series of *t*-tests were conducted. The results indicated no significant between-group differences on demographic variables or baseline variables (all *p*s > .05).

**Psychological Variables**

To track and compare the time course of the response to, and recovery from, a social-evaluative body-related threat, two separate 2 (group: control, threat) x 3 (time: baseline, response, recovery) repeated-measures ANOVAs were conducted for social physique anxiety and body shame, the two self-conscious outcomes. For social physique anxiety, there was a significant group-by-time interaction (*F*(2, 61) = 4.36, *p* = .02, η² = .13; see Figure 1a). To examine the nature of the time effects within each group, three sets of paired *t*-tests were conducted (baseline versus response, response versus recovery, baseline versus recovery). A Bonferroni correction factor was applied for follow-up analyses. No differences between time points were found within the control group (all *p*s > .017). Comparisons made within the threat group showed that the level of social physique anxiety at response was significantly higher than both the baseline (*t*(30) = -3.64, *p* = .001) and recovery levels (*t*(30) = 3.70, *p* = .001). Levels of social physique anxiety were not different between baseline and recovery time points (*t*(30) = -1.27, *p* = .22). There were no significant time or group main effects for social physique anxiety (main time effect: *F*(2, 61) = 2.14, *p* = .13, η² = .07; main group effect: *F*(1, 62) = .36, *p* = .55, η² = .01). For body shame, there were no significant interaction or main effects (interaction: *F*(2, 60) = .98, *p* = .38, η² = .03; main time effect: *F*(2, 60) = 2.28, *p* = .11, η² = .07; main effect for group: *F*(1, 61) = .80, *p* = .38, η² = .01).

To track and compare the time course of the response to, and recovery from, a social-evaluative body-related threat on non-self-conscious outcomes (body-esteem and body dissatisfaction), two separate analyses were conducted. A Bonferroni correction factor was
applied for follow-up analyses. Since percent BF was significantly related to body-esteeom (sexual attractiveness), a 2 (group: control, threat) x 3 (time: baseline, response, recovery) repeated-measures MANCOVA was conducted for body-esteeom (sexual attractiveness, weight concern, and physical condition), using percent BF as a covariate. The Mauchly’s test of sphericity was significant (sexual attractiveness: $W = .87, \chi^2 (2) = 8.32, p = .02$; weight concern: $W = .30, \chi^2 (2) = 73.34, p < .001$; physical condition: $W = .77, \chi^2 (2) = 15.71, p < .001$); therefore the Huynh-Feldt correction for degrees of freedom (sexual attractiveness: $\varepsilon = .94$; weight concern: $\varepsilon = .61$; physical condition: $\varepsilon = .86$) is reported. There were no interaction (sexual attractiveness: $F(2, 115) = 1.49, p = .23, \eta^2 = .02$; weight concern: $F(1, 74) = 1.60, p = .21, \eta^2 = .03$; physical condition: $F(2, 105) = .06, p = .92, \eta^2 = .001$) or main time (sexual attractiveness: $F(2, 115) = .04, p = .96, \eta^2 = .001$; weight concern: $F(1, 74) = .19, p = .72, \eta^2 < .001$; physical condition: $F(2, 105) = 3.02, p = .06, \eta^2 = .05$) or group (sexual attractiveness: $F(1, 61) = .15, p = .70, \eta^2 < .01$; weight concern: $F(1, 61) = .19, p = .66, \eta^2 < .01$; physical condition: $F(1, 61) = .45, p = .50, \eta^2 < .01$) effects. Percent BF was a significant covariate ($F(3, 59) = 3.97, p = .01, \eta^2 = .17$).

For body dissatisfaction, a 2 (group: control, threat) x 3 (time: baseline, response, recovery) repeated-measures ANOVA was conducted. The Mauchly’s test of sphericity was significant ($W = .88, \chi^2 (2) = 7.50, p = .02$); therefore the Huynh-Feldt correction for degrees of freedom ($\varepsilon = .94$) is reported. The results indicated that there was no significant interaction effect ($F(2, 116) = .88, p = .41, \eta^2 = .01$) or group effect ($F(1, 62) = .68, p = .41, \eta^2 = .01$). There was a significant main effect for time ($F(2, 116) = 4.64, p = .01, \eta^2 = .07$). Pairwise comparisons showed that all participants reported higher body dissatisfaction at the response time point compared to baseline ($p = .016$); no differences were found between response and recovery time points or baseline and recovery time points (all $ps > .017$).
Cortisol

To track and compare the time course of the response to, and recovery from, a social-evaluative body-related threat, a 2 (group: control, threat) x 3 (time: baseline, response, recovery) repeated-measures ANOVA was conducted with log-transformed cortisol as the dependent variable. A Bonferroni correction factor was applied for follow-up analyses. The Mauchly’s test of sphericity was significant ($W = .80, \chi^2 (2) = 13.63, p = .001$); therefore the Huynh-Feldt correction for degrees of freedom ($\varepsilon = .87$) is reported. There was a significant group-by-time interaction ($F(2, 108) = 6.78, p < .01, \eta^2 = .10$; see Figure 1b) and no significant main effects for time ($F(2, 108) = .69, p = .49, \eta^2 = .01$) or group ($F(1, 62) = .01, p = .91, \eta^2 < .001$). To examine the nature of the time effects within each group, three sets of paired $t$-tests were conducted (baseline versus response, response versus recovery, baseline versus recovery). Comparisons made within the control group showed that there was a significant difference in levels of cortisol between baseline and recovery time points ($t(32) = 2.93, p = .006$), indicating a decrease in cortisol from baseline to recovery time points. There was no significant change in cortisol levels from baseline to response ($t(32) = 1.79, p = .08$) or response to recovery ($t(32) = 2.33, p = .03$) in the control group. In the threat group, comparisons showed that there was a significant increase in cortisol from baseline to response time point ($t(30) = -2.58, p = .015$). No differences were found in cortisol levels between response and recovery ($t(30) = -.02, p = .99$) time points or baseline and recovery ($t(30) = -1.46, p = .16$) time points.

In addition, area under the curve with respect to increase (AUCi) was also calculated for each group (Pruessner, Kirshbaum, Meinlschmid, & Hellhammer, 2003). Area under the curve with respect to increase assesses baseline-corrected cortisol responses and accounts for the difference between single measurements from each other or the change over time (Pruessener et al., 2003). It should be noted that a negative value represents an index of decrease rather than an
area under the curve. To examine whether a social-evaluative body-related threat elicited a cortisol response, a one-way ANOVA was conducted using group as the independent variable (control, threat) and AUCi as the dependent variable. The results showed a significant group difference \( F(1, 62) = 11.03, p < .01, \eta^2 = .15 \) for AUCi. Inspection of means indicated that the control group showed an overall decrease (index of decrease) of -.09 \( (SD = .22) \), while the threat group showed an overall increase in cortisol of .08 \( (SD = .18) \).

**Discussion**

The purpose of this study was to track and compare the time course of the psychobiological responses to, and recovery from, an actual social-evaluative body-related threat in young adult women. Consistent with our hypotheses we found that a body composition assessment (social-evaluative body-related threat) elicited a response consistent with SSPT for cortisol and social physique anxiety (a self-conscious emotion specifically related to the body). Also consistent with our hypotheses and SSPT, self-conscious body-related variables (social physique anxiety) as opposed to non-self-conscious body-related variables (body-esteem and body dissatisfaction) were selectively elicited in the threat group (Dickerson, 2008; Dickerson et al., 2008; Gruenewald et al., 2004). Inconsistent with our hypotheses and SSPT, body shame did not change in response to the social-evaluative body-related threat.

**Theoretical Implications: SSPT in a Social-Evaluative Body-Related Threat**

Overall, our findings provide support for the application of SSPT to social-evaluative body-related threats. First, SSPT suggests that when a social-evaluative threat is present, a psychobiological response occurs to alert the individual a threat is present (Dickerson, Gruenewald et al., 2004; Kemeny et al., 2004). In the present study, the threat elicited a cortisol response consistent with SSPT. This conclusion is supported by both the significant group-by-time interaction for cortisol and the significant group difference in AUCi. Comparisons indicated
an increase in cortisol levels in the threat group versus a decrease in cortisol levels in the control
group. The finding with respect to cortisol is consistent with SSPT and past research
demonstrating an increase in cortisol secretion in response to a social-evaluative threat
(Dickerson, Gruenewald et al., 2004; Kemeny et al., 2004).

In addition to a physiological reaction consistent with SSPT, we found support that the
social-evaluative body-related threat was psychologically threatening. Specifically, social
physique anxiety levels in the threat group were highest in response to the body composition
assessment. By contrast, the control group showed no changes in social physique anxiety.
Second, we found support for the SSPT contention that self-conscious emotions and cognitions,
such as social physique anxiety, are selectively elicited over other types of emotions and
cognitions, such as body-esteem and body dissatisfaction. This is demonstrated by the significant
group-by-time interaction that was found for social physique anxiety but not for body-esteem or
body dissatisfaction. For these non-self-conscious outcomes, participants in both groups showed
similar patterns of results; no change (body-esteem) or an increase (body dissatisfaction). Thus,
the social-evaluative body-related threat elicited a different pattern of results in self-conscious
versus non-self-conscious outcomes, consistent with SSPT.

Third, we have anecdotal evidence to support SSPT as it relates to the ultimate outcome
related to the psychobiological responses. Social self-preservation theory suggests that
psychobiological responses occur to initiate changes that support appeasement, behavioural
disengagement, or withdrawal in order to protect the social self (Dickerson, Gruenewald et al.,
2004; Kemeny et al., 2004). Our recruitment issues may highlight this application of SSPT to
social-evaluative body-related threats. It is informative some of our scheduled participants
randomly assigned to the threat condition did not complete participation, while all participants
randomly assigned to the control condition did participate. Our “no-show” rate for the threat
group and specific responses of two of those participants (stating that they would feel too uncomfortable in a swimsuit) may provide support for the ultimate purpose of psychobiological responses to social-evaluative threats as outlined by SSPT, as these individuals avoided the threatening situation altogether. It is important to note that is it likely those women who were most uncomfortable with their bodies, and presumably most likely to experience the threat as threatening, dropped out of the study. However, even in a group of individuals who were comfortable enough to participate in the study, we were able to elicit a psychobiological response. It is likely that a group of women less comfortable with their bodies may have shown even stronger responses.

Although we did find support for SSPT as it relates to a body image threat, our findings did not support one tenet of SSPT with respect to shame. Social self-preservation theory outlines that shame is one emotion to make the individuals aware that a social-evaluative threat exists. We did not find any differences in body shame in the present study. However, the non-significant group-by-time interaction for body shame may be attributed to the measure of body shame used in the present study. The body shame subscale of the Objectified Body Consciousness Scale (McKinley & Hyde, 1996) was used. Although the instructions were modified to reflect a state outcome, it may have been more indicative of a trait-like variable. Thus, it may not have captured the malleable nature of body shame we were seeking to elicit.

Contributions to Body Image Literature

The findings of the present study contribute to the body image literature in three significant ways. First, our finding that participants responded to the social-evaluative body-related threat replicates findings in past research that when there is potential for one’s body to be evaluated by other people, self-presentational concerns, specifically, social physique anxiety, are heightened (Hart et al., 1989; Martin Ginis et al., 2012; Van Raalte et al., 2004). Second, the
present findings build on those of Martin Ginis et al. (2012) with respect to cortisol responses to a body-related threat. Martin Ginis et al. (2012) found that women who anticipated a social-evaluative threat had higher cortisol levels post-manipulation than women in a non-social-evaluative threat condition. However, it is important to note in their studies that the significant group-by-time interaction was a result of the non-social-evaluative threat group having lower cortisol levels pre- to post-manipulation; there was no change in cortisol levels from pre- to post-manipulation in the high social-evaluative threat group, suggesting that the high social-evaluative manipulation did not elicit a cortisol response. These authors noted the lack of increase in cortisol may have been due to the fact they used an anticipated rather than an actual threat. They hypothesized that an actual threat may have lead to increases in cortisol. The present study supports their hypothesis; we exposed participants to an actual threat and saw increases in cortisol. In addition, the AUCi analysis showed that participants in the threat group had an average increase of cortisol versus those in the control group who had an average decrease in cortisol levels. This suggests that our social-evaluative body-related threat was more threatening than quiet rest. We would argue however, that examining responses to actual and anticipated threats is informative. The psychological responses to an anticipated threat (i.e., social physique anxiety; Martin Ginis et al., 2012) may lead to withdrawal from a situation. For example, individuals who anticipate an exercise setting will be threatening may avoid exercise altogether. Thus, the anticipation of a threat may have important consequences. More research is needed to explore the differences between thinking about or anticipating a threat and actually experiencing the threat. This may be particularly important as SSPT suggests that individuals may avoid social-evaluative threats altogether, perhaps from anticipating or thinking about the potential threat (Dickerson, Gruenewald et al., 2004; Kemeny et al., 2004).
The third contribution to the body image literature relates to our measurement of a response and a recovery phase. To our knowledge this is the first study to examine both the responses to, and recovery from, a social-evaluative body-related threat. The present study found that, when faced with a social-evaluative body-related threat, young adult women do respond (feel more concern or worry over the body evaluations made by other people), but also, perhaps more importantly, they recover relatively quickly from such a threat. This is an important and encouraging finding that extends what we currently know about situations that elicit body image concerns. For example, there is much existing research in the body image literature examining the response to, and recovery from, viewing media images of the thin ideal, a non-social-evaluative body-related threat (Groesz, Levine, & Murnen, 2002; Hausenblas, Janelle, Gardner, & Focht, 2004; Heinberg & Thompson, 1995; Myers & Biocca, 1992). The negative effects of viewing media images depicting the ideal physique have been found to persist one to two hours after viewing (Hausenblas, Janelle, Gardner, & Hagan, 2003). It appears that a social-evaluative body-related threat such as a body composition assessment is a relatively acute stressor with short term effects unlike viewing media images. Although the reasons for this difference can only be speculated, this finding could be considered positive for two reasons. First, a quick recovery from a laboratory-based threat may indicate that young women are capable of recovering from a similar threat in real-life, threats that arguably occur frequently, if not daily for many women. Second, it is believed that quick and efficient responses (both physiological and psychological) are adaptive in nature (Gruenewald, Dickerson, & Kemeny, 2007; Sapolsky et al., 2000). In the present study, the quick reactivity and recovery of social physique anxiety may have acted as a key signaling emotion to make the participant aware that a social-evaluative threat exists and then has passed. Although the finding that young women in this study recovered from a social-evaluative body-related threat quite quickly (15 minutes of quiet rest) could be
viewed in a positive light, caution should be taken in drawing any conclusion about whether this type of response is adaptive or maladaptive. Future research is needed to examine the relationship between response profile and psychological indicators of well-being and coping with body-related threats, and whether individuals habituate when faced with multiple threats or threats over time.

**Limitations**

There are several limitations that should be noted. First, results can only generalize to healthy, young adult women with a normal body composition. As some examples, results in men, individuals who are overweight, or individuals who have a clinical eating disorder may display different responses. It should also be noted that ethnicity was not recorded in the present study; thus, it is unknown whether the response-recovery profile to a social-evaluative body-related threat would vary based on ethnicity. Second, it is important to note that individuals were self-selected and volunteered to participate in the study. Although our results show that our threat elicited a cortisol response, it is likely that those who would show the greatest magnitude of psychobiological responses are those who would not volunteer to participate in the first place or those who were randomized to the threat condition and did not show for their appointment. Further, we are unable to examine if there were differences in those who dropped out compared to participants who completed the study. Future research could minimize self-selection by withholding study details in recruitment materials. Third, our group was relatively active (mean exercise frequency = 3.17 days per week). Research has provided evidence that exercisers generally have a more positive body image than non-exercisers (Hausenblas & Fallon, 2006), yet we were able to elicit a threat response including higher social physique anxiety similar to findings by Gammage et al. (2004) in a similar sample. As hypothesized by those authors,
manipulations designed to increase body image concerns may show an even more dramatic influence in a low active group. This hypothesis is likely to apply to the current study.

Another limitation that should be noted relates to the design of the control group. We used a similar control group (quiet rest) to represent a non-threatening condition, similar to past studies in the SSPT literature (e.g., Kirschbaum et al., 1993; Nater et al., 2006, 2007); however, this may not have been an adequate control condition as it is not matched on body-related content – our control group was a non-threatening condition rather than a non-social-evaluative body-related threat. Martin Ginis et al. (2012) noted the difficulty in designing an equivalent control group when examining cortisol responses to a social-evaluative body-related threat. In their second experiment, these authors had control participants believe they would try on exercise attire alone, in private. The control and experimental conditions were matched with respect to the physical demand of the task (trying on clothing) and content of the manipulation (about the body), but differed on social evaluation (alone, in private versus evaluated on fit of clothing by another person). Although this may be considered a more equivalent control group, Martin Ginis et al. (2012) noted that trying on clothing may initiate the social comparison process with societal body-related standards and therefore serve as a form of social evaluation itself (Dickerson & Kemeny, 2004). This social-evaluative threat could have triggered slight increases in cortisol responses making it difficult to detect differences between the control and threat groups. In their first experiment, control participants were told they would be exercising alone in a non-mirrored room. The authors concluded that this control condition was less threatening than the control condition of the second experiment, but the same challenges existed. Although we acknowledge this as a limitation, it should be noted that the present study did find a significant increase in cortisol, even with the control group knowing their anthropometric measurements would be taken while wearing shorts and a t-shirt during the study (i.e., a social-
evaluative body-related threat). Nevertheless, this limitation highlights the challenges for researchers to design an equivalent body-related control condition void of social evaluation in a research area with inherent tendencies for social comparison.

Conclusions

Findings from this study extend the work of Lamarche et al. (2012) and Martin Ginis et al. (2012) by examining psychobiological responses to, and recovery from, an actual laboratory-based social-evaluative body-related threat. The present findings provide partial support for the applicability of SSPT to a body image context. Findings also contribute to the body image literature by providing a more complete understanding of the psychological and physiological aspects of body image. In addition, as recommended by Martin Ginis et al. (2012), the present study provided preliminary evidence of an ethical, plausible, ecologically valid social-evaluative body-related threat which can be used in future research. Finally, our findings may be viewed as encouraging as they highlight women’s ability to recover quickly from social-evaluative body-related threats, threats that are common among young women.

Acknowledgements

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References


## Table 1

### Timeline of Protocol

<table>
<thead>
<tr>
<th>Control group</th>
<th>Duration (protocol timeline)</th>
<th>Threat group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informed consent</td>
<td>5 minutes (~0-5 minutes)</td>
<td>Informed consent Study requirements Demographic information</td>
</tr>
<tr>
<td>Study requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographic information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State questionnaires Saliva sample</td>
<td>Baseline measures Questionnaires: 10 minutes Saliva sample: 1 minute (~5-16 minutes)</td>
<td>State questionnaires Saliva sample</td>
</tr>
<tr>
<td>Will sit quietly alone, completed sitting for 15 minutes</td>
<td>Manipulation 15 minutes (~16-31 minutes)</td>
<td>Will perform a body composition assessment via skinfold (see Social-evaluative body-related threat under Method), asked to change and let researcher know when ready, performed skinfold assessment, height, weight measurements</td>
</tr>
<tr>
<td>State questionnaires Saliva sample</td>
<td>Response measures Questionnaires: 10 minutes Saliva sample: 1 minute (saliva sample completed ~ 25 minutes following stressor/condition onset) (~31-42 minutes)</td>
<td>State questionnaires Saliva sample Changed back into street clothes</td>
</tr>
<tr>
<td>Sit quietly for 15 minutes</td>
<td>Quiet rest 15 minutes (42-57 minutes)</td>
<td>Sit quietly for 15 minutes</td>
</tr>
<tr>
<td>State questionnaires Saliva sample</td>
<td>Recovery measures Questionnaires: 10 minutes Saliva sample: 1 minute (saliva sample completed ~ 50 minutes following stressor/condition onset) (57-68 minutes)</td>
<td>State questionnaires Saliva sample</td>
</tr>
<tr>
<td>Body composition assessment, height, weight measurements True purpose of study explained, compensation, re-consent</td>
<td>Debrief/Re-consent 15 minutes for control group 2 minutes for threat group</td>
<td>True purpose of study explained, compensation, re-consent</td>
</tr>
</tbody>
</table>
Table 2

Means (and Standard Deviations) by Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control ($n = 33$)</th>
<th>Threat ($n = 31$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Response</td>
</tr>
<tr>
<td>BS</td>
<td>3.41 (1.22)</td>
<td>3.46 (1.16)</td>
</tr>
<tr>
<td>BE-SA</td>
<td>3.62 (.47)</td>
<td>3.51 (.49)</td>
</tr>
<tr>
<td>BE-WC</td>
<td>3.14 (.87)</td>
<td>3.06 (.92)</td>
</tr>
<tr>
<td>BE-PC</td>
<td>3.51 (.53)</td>
<td>3.46 (.56)</td>
</tr>
<tr>
<td>SPA</td>
<td>2.60 (.86)</td>
<td>2.56 (1.01)</td>
</tr>
<tr>
<td>BD</td>
<td>3.27 (1.05)</td>
<td>3.34 (1.06)</td>
</tr>
<tr>
<td>Cortisol</td>
<td>.13 (.12)</td>
<td>.11 (.09)</td>
</tr>
</tbody>
</table>

Note. BS = body shame, ranges 1 to 7, higher scores represent higher shame; BE = body-esteem, ranges from 1 to 5, lower scores represent lower BE; SA = sexual attractiveness; WC = weight concern; PC = physical condition; SPA = social physique anxiety, ranges 1 to 5, higher scores represent higher SPA; BD = body dissatisfaction, ranges 1 to 6, higher scores represent more BD; Cortisol = untransformed cortisol values, ranges 0 to 3 μg/dL.
Figure 1a. Significant group by time interaction for social physique anxiety.

Figure 1b. Significant group by time interaction for log-transformed cortisol.
Chapter IV

Examining Psychobiological Responses to an Anticipatory Body Image Threat in Women: Testing Appearance Investment as a Moderator
Abstract

The present study sought to extend the applicability of SSPT to an anticipatory body image threat. Specifically, it examined the time course of psychobiological responses to, and recovery from, an anticipated social-evaluative body-related threat. In addition, the potential moderating effect of appearance investment (or importance) on these responses was examined. Young adult women (N = 80) were randomized into either a control (quiet rest) or threat group (anticipating having a body composition assessment). Participants completed measures of body shame, social physique anxiety, body-esteem, and body dissatisfaction, and provided a sample of saliva (to assess cortisol levels) at baseline, immediately following their condition, and 40 minutes following termination of their condition. There was a significant group-by-time interaction for body shame, social physique anxiety, body-esteem, body dissatisfaction, and cortisol. In addition, there was a significant group difference in area under the curve with respect to increase in cortisol. For the threat condition, follow-up analyses showed that body shame and social physique anxiety were significantly higher immediately following the condition in comparison to both baseline levels and recovery levels; the level of body shame and social physique anxiety at response in the threat group was significantly higher than that of the control group. Although follow-up analyses showed that the levels of body-esteem (weight concern) and body dissatisfaction were significantly more negative at response than at baseline within the threat group, these levels were not different than the levels of body-esteem and body dissatisfaction at response in the control group. Also, both groups had an overall index of decrease in cortisol levels, with the control group showing a greater overall decrease than the threat group. The moderation analysis showed that appearance investment (self-evaluative or motivational salience) did not moderate the cortisol responses to anticipating a social-evaluative body-related threat. Findings provide partial support for SSPT’s applicability to the anticipation of a social-evaluative body-related threat.
Keywords: body image, social anxiety, cortisol, appearance investment, women, social self-preservation theory
Examining Psychobiological Responses to an Anticipatory Body Image Threat in Women: Testing Appearance Investment as a Moderator

Social self-preservation theory (SSPT; Dickerson, Gruenewald, & Kemeny, 2004; Kemeny, Gruenewald, & Dickerson, 2004) states that when faced with a social-evaluative threat, a set of psychological and physiological (psychobiological) responses are elicited concurrently. This psychobiological response is believed to support appeasement, disengagement, and submissive behaviour to prevent further loss of social standing. It is argued that negative, self-conscious emotions and cognitions (i.e., shame, low social-esteem) as opposed to non-self-conscious emotions and cognitions (i.e., fear, anger) are selectively elicited in response to such threats. In addition, physiological outcomes such as cortisol (a stress hormone thought to represent hypothalamic-pituitary-adrenal axis activation) are elicited. To date, this theory has primarily been applied to examine the psychobiological responses to the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993). In this test, participants are asked to deliver a 5-minute free speech and perform an arithmetic task aloud, lasting 5 minutes, in front of three evaluative judges. This research has generally found empirical support for the tenets of SSPT (Dickerson, 2008; Dickerson & Kemeny, 2004; Dickerson, Kemeny, Aziz, Kim, & Fahey, 2004; Dickerson, Mycek, & Zaldivar, 2008; Gruenewald, Kemeny, Aziz, & Fahey, 2004; Het, Rohleder, Schoofs, Kirschbaum, & Wolf, 2009).

Few researchers have applied SSPT to a more “real-life” setting (Lehman & Conley, 2010; Rohleder, Beulen, Chen, Wolf, & Kirschbaum, 2007). Rohleder et al. (2007) conducted a series of experiments using competitive ballroom dancers as their sample. The results showed that competitive ballroom dancers had significantly higher cortisol levels on a competition day (6, 4, and 2 hours before competition, immediately before and after competition) compared to the control day (non-competition day) at the same time of day. Moreover, increases in cortisol were higher on competition days than those found during the TSST. Overall the results provided
evidence of the applicability of SSPT in a real-life social-evaluative threat. More importantly, the findings also provided support for characteristics hypothesized to elicit a robust psychobiological response (Dickerson & Kemeny, 2004; Leary, Tambor, Terdal, & Downs, 1995). These elements include: the presence of a central goal, situations which require an individual to display an attribute or skill that the individual values (domain importance), evaluation of an attribute or skill by others, loss of social status or acceptance as a result of negative evaluation, and uncontrollable situations (i.e., achieving the goal may be influenced by factors other than one’s own performance).

Social self-preservation theory has also been applied to the area of body image (see Chapter II; Lamarche, Kerr, Faulkner, Gammage, & Klentrou, 2012; Martin Ginis, Strong, Arent, & Bray, 2012). In their qualitative study, Lamarche et al. (2012) examined body experiences of young adult women to identify and describe body-related threats and responses to those threats. Findings showed that the threats, responses, and coping strategies identified and described by the participants were consistent with SSPT. The authors highlighted that the characteristics of the situations participants described as threatening resemble the elements SSPT researchers hypothesize as critical for eliciting psychobiological responses (Dickerson & Kemeny, 2004; Leary et al., 1995).

In light of the findings from their qualitative work, these authors conducted a study to examine the psychobiological responses to, and recovery from, a social-evaluative body-related threat in a laboratory setting (Chapter III). The findings provide additional support for SSPT’s applicability to a body image context. The results indicated that social physique anxiety (the anxiety related to the evaluation of one’s body by others; Hart, Leary, & Rejeski, 1989) and cortisol were significantly higher immediately following an actual social-evaluative body-related threat compared to baseline levels. There was also some evidence that self-conscious outcomes
(social physique anxiety) over non-self-conscious outcomes (body dissatisfaction, body-esteem) were selectively elicited in response to the threat.

Although SSPT states that psychobiological responses are more likely to occur in the presence of actual social evaluation (Dickerson & Kemeny, 2004), SSPT has been used to examine psychobiological responses to an imagined threat and the anticipation of the threat. Research findings suggest that the presence of an actual versus imagined social evaluation to be more critical to eliciting physiological responses than to psychological responses. For example, Dickerson, Kemeny, et al. (2004) found that participants who were asked to write about a situation of self-blame (attempting to induce shame) reported higher levels of shame compared to those in the control group (asked to write about their daily schedule). No differences in cortisol level were found between the two groups. The authors argued that differences in cortisol secretion may have occurred had participants been asked to reveal their self-blame situation to the researcher, thus creating an actual social-evaluative situation. Findings from Dickerson et al. (2008) also support the contention that cortisol changes are associated with actual social-evaluation. These authors found that mere social presence does not heighten cortisol secretion in participants performing the TSST; only participants performing this test in front of an evaluative audience had higher cortisol levels. Findings from other research examining the impact of audience presentation (i.e., visible versus not visible, virtual) on cortisol have also found that actual social evaluation elicits the largest cortisol response (Kelly, Matheson, Martinez, Merali, & Anisman, 2007; Wadiwalla et al., 2010).

Much of the body image research examining psychological responses to a social-evaluative body-related threat has measured such responses to an imagined social-evaluative threat or an anticipatory threat (i.e., have not had participants actually go through with the evaluation; Carron & Prapavessis, 1997; Gammage, Martin Ginis, & Hall, 2004; Kowalski, Mack, Crocker, Niefer, & Fleming, 2006; Myers & Rosen, 1999). Generally it is found that just
thinking about or anticipating a threat results in higher negative psychological outcomes (i.e., higher social physique anxiety and social anxiety; Gammage et al., 2004).

While Chapter III examined psychobiological responses to an actual social-evaluative body-related threat, Martin Ginis et al. (2012) examined cortisol responses to an anticipated social-evaluative body-related threat through a series of two experiments. In the first experiment, it was found that women who thought they would be exercising in a high social-evaluative threatening setting (in a public, mirrored exercise facility while wearing revealing exercise attire) reported higher anxiety about the evaluation of their bodies by others and had higher cortisol levels than those who thought they would be exercising in a non-social-evaluative threatening setting (alone, in a private, non-mirrored room while wearing non-revealing exercise attire). In the second experiment, participants in the experimental condition were led to believe that they would be asked to try on exercise clothing and would be videotaped in the clothing so that an independent panel could evaluate how well the clothing fit at a later date. Participants in the control group were instructed to change into the exercise clothing behind the screen and complete the same questionnaire package as those in the threat group; however, they were told that no one would see them. It is important to note that no actual evaluation occurred for those in the threat group. The results indicated that cortisol levels were higher post-manipulation for those in the threat group versus the control group. However, as noted by these authors, the significant group-by-time interaction for cortisol in both experiments was a result of the control group having lower cortisol levels pre- to post-manipulation while no pre- to post-manipulation difference in cortisol levels was found for the experimental group.

Taking results from both Chapter III and Martin Ginis et al. (2012) into consideration, Chapter III argued that, consistent with findings of SSPT, both situations (anticipation of, and actual experience of a body-related social-evaluative threat) lead to increases in self-conscious outcomes in response to the threat, but only experiencing a social-evaluative body-related threat
(and not simply anticipating the threat), lead to significantly higher cortisol levels pre- to post-
manipulation. To date, studies examining psychobiological responses to anticipated social-
evaluative body-related threats have used different threats than those involving responses to 
actual threats. It would be informative to investigate responses to anticipated threats for which 
there is evidence the actual threat leads to increases in cortisol and self-conscious outcomes. The 
present study examined psychobiological responses to anticipating a social-evaluative body-
related threat that has been shown to lead to increase cortisol levels when experienced (i.e., a 
body composition test while wearing revealing clothing; see Chapter III).

In addition to psychobiological responses to an anticipated social-evaluative body-related 
threat, we have also sought to examine the psychobiological recovery from such a threat. A 
limitation to the current SSPT-related and body image literature is that most research examines 
only responses to a threat, paying little attention to the recovery phase (Dickerson & Kemeny, 
2004). It has been suggested that responses that fail to shut off when the threat is no longer 
present may overexpose individuals to physiological products or chronic negative psychological 
states (Dickerson, Gruenewald, & Kemeny, 2009; Sapolsky, Romero, & Munck, 2000). However, quick and efficient responses (both physiological and psychological) are adaptive in 
nature (Gruenewald, Dickerson, & Kemeny, 2007; Sapolsky et al., 2000). Therefore, it is 
important to assess both the response to, and recovery from, social-evaluative threats, albeit little 
current research does. Chapter III showed that women responded to, and recovered quickly from, 
a social-evaluative body-related threat. It was suggested that this finding may be viewed in a 
positive light and perhaps reflects an adaptive or efficient response-recovery profile. The present 
study examined a recovery phase to more fully understand how women recover from an 
anticipatory social-evaluative threat.

The present study also sought to provide additional support for the use of SSPT in a body 
image context by testing the tenet that responses are more likely in situations in which an
individual is required to display an attribute that the individual values (domain importance).

Appearance investment is the importance one places on physical appearance (Cash, 2005). Research has shown that appearance investment is related to eating disorder symptomology, low self-esteem, body dissatisfaction, social anxiety, and depression (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002; Cash & Labarge, 1996; Cash & Szymanski, 1995; Cash, Theriault, & Annis, 2004; Spoor, Bekker, Van Heck, Croon, & Van Strien, 2005). Also, the level of appearance investment is associated with a heightened sensitivity to the nature of social interactions (Forand, Gunthert, German, & Wenze, 2010) and greater variability of day-to-day body image states (Rudiger, Cash, Roehrig, & Thompson, 2007).

In addition to the overall level of appearance investment, examining the type of appearance investment is also important. Cash, Melnyk, and Hrabosky (2004) differentiated between maladaptive (self-evaluative salience) and adaptive (motivational salience) appearance investment. Self-evaluative salience refers to deriving one’s sense of self-worth from physical appearance whereas motivational salience refers to efforts or desires to maintain or improve one’s appearance (Cash, Melnyk, et al., 2004). Relative to motivational salience, self-evaluative salience of physical appearance is more strongly related to indicators of negative body image (i.e., exercise dependence, greater internalization of the thin ideal, more negative appearance body evaluation and self-esteem, and greater eating disorders symptoms; Cash, Jakatdar, & Williams, 2004; Cash, Melnyk, et al., 2004; Cash, Santos, & Williams, 2005; Ip & Jarry, 2008; Lamarche & Gammage, 2012). Given the described relationships, it seems reasonable to hypothesize that those higher in self-evaluative salience may respond more negatively to a social-evaluative body-related threat than those lower in self-evaluative salience. Alternatively, high motivational salience may buffer against high psychobiological responses to social-evaluative body-related threats. The present study examined appearance investment (self-
evaluative and motivational salience) as a potential moderator of the psychobiological responses to anticipating a social-evaluative body-related threat.

In summary, the present study sought to address two main objectives. First, psychobiological responses to, and recovery from, anticipating a social-evaluative body-related threat that is known to result in psychobiological responses consistent with SSPT were examined. Second, appearance investment as a potential moderator of psychobiological responses to anticipating a social-evaluative body-related threat was assessed. Based on past research using SSPT in both a body image setting (Chapter III; Martin Ginis et al., 2012) and non-body image setting (Dickerson et al., 2008; Dickerson & Kemeny, 2004; Dickerson, Kemeny, et al., 2004; Gruenewald et al., 2004; Het et al., 2009), the following hypotheses were examined:

1. Participants in the threat group would report higher levels of shame and social physique anxiety in anticipation of the social-evaluative body-related threat (response time point) than baseline. These variables would return to baseline levels after a period of quiet rest (recovery time point). Control participants would report no differences in any body image variables at either the response or recovering time points, following periods of quiet rest.

2. Participants in the threat group would show a smaller reduction in cortisol levels across all time points (baseline, following anticipation of the social-evaluative body-related threat, and recovery) compared to control participants.

3. Participants with higher levels of self-evaluative salience of physical appearance would show no change in cortisol levels in response to an anticipated social-evaluative body-related threat. Participants with lower levels of self-evaluative salience would show a reduction in cortisol levels in response to an anticipated social-evaluative body-related threat. There would be no differences in responses in the control group based on self-evaluative salience of physical appearance.
Method

Participants

Upon institutional ethics clearance (See Appendix G: Ethics Clearance for Study 3), participants were recruited to participate in a study examining self-perceptions and cortisol in a laboratory setting. Participants were recruited by placing posters around a university campus and making announcements in undergraduate classes (See Appendix H: Recruitment Materials for Study 3). A total of 95 participants agreed to participate and completed the study. Varsity athletes, smokers, individuals with a history of a clinical eating disorder, or those who were on medications that influence cortisol secretion (e.g., corticosteroids, anti-depressants) were excluded from participation. Participants were also required to refrain from eating, drinking, or participating in physical activity one hour prior to testing. Data screening showed that several participants did not follow study requirements \((n = 3); \) no eating, drinking, or physical activity participation one hour prior to testing), reported having completed a skinfold body composition test in the past \((n = 3); \) reported being a high-level athlete \((n = 1); \) had trouble understanding English \((n = 1); \) reported being a smoker \((n = 1); \) reported feeling unwell \((n = 2); \) or methodological problems occurred during testing \(\text{(i.e., experienced problems during saliva sampling, procedures timing; } n = 4). Independent t-tests showed no significant differences between participants removed and the final sample on key variables \(\text{(all } ps > .05). The final sample of 80 participants had a mean age of 20.24 \((SD = 1.96)\) years, mean body mass of 66.61 \((SD = 14.95)\) kg, mean height of 1.66 \((SD = 0.06)\) m, and mean body mass index (BMI) of 24.20 \((SD = 5.38).\)

Measures

Participants completed demographic information including age and university major, as well as a manipulation check regarding exclusion criteria and a series of questions ensuring that
they had complied with study requirements with respect to food, drink, and physical activity participation. Participants were also asked to complete a measure of trait body image investment.

**Appearance investment.** The Appearance Schemas Inventory-Revised (ASI-R; Cash, Melnyk, et al., 2004) was used to assess participants’ appearance investment with regard to beliefs or assumptions about the importance, meaning, and influence of physical appearance in one’s life. Participants completed the 20-item version of the original ASI (Cash & Labarge, 1996) because it was found to be more psychometrically sound. The measure has two subscales: self-evaluation salience (of appearance) and motivational salience (of appearance). Items were rated on a scale of 1 (strongly disagree) to 5 (strongly agree). Internal consistency for the self-evaluative and motivational subscales was deemed adequate in the present study (α = .88, .84 respectively).

A series of state body image questionnaires was also administered. These questionnaires included negative body-related self-conscious and non-self-conscious emotions and cognitions. For all of the following questionnaires, participants were instructed to respond to questions indicating how they felt at that moment.

**Body shame.** The body shame subscale from the Weight and Body-Related Shame and Guilt Scale (WEB-SG; Conradt et al., 2007) was used to measure body shame, a self-conscious body-related emotion. Six items assess the frequency an individual feels shame about her body. Items were rated on a 5-point scale ranging from 0 (never) to 4 (always). The WEB-SG has demonstrated satisfactory validity and reliability (Conradt et al., 2007). Internal consistency for all time points was deemed adequate in the present study (α’s ranged from .89 to .93).

**Social physique anxiety.** The Social Physique Anxiety Scale (SPAS; Hart et al., 1989) assesses anxiety associated with others’ evaluations of one’s body, a self-conscious body-related emotion. Originally twelve items, the SPAS was reduced to 9 items because it was found to be more psychometrically sound (Martin, Rejeski, Leary, McAuley, & Bane, 1997). Subsequently, a
state version of the SPAS was designed and was used in this study (Kruisselbrink, Dodge, Swanburg, & MacLeod, 2004). The items were measured on a 5-point scale ranging from 1 (*not at all characteristic of me*) to 5 (*extremely characteristic of me*). The state version of the SPAS has demonstrated acceptable validity and reliability in young adult women (Kruisselbrink et al., 2004; Martin Ginis, Murru, Conlin, & Strong, 2011). Internal consistency for all time points was deemed adequate in the present study (α’s ranged from .90 to .92).

**Body-esteem.** The Body Esteem Scale (BES; Franzoi & Shields, 1984) was used to assess body-esteem, a non-self-conscious body-related cognition. The BES measures attitudes toward different dimensions of the body. Participants rated 35 individual body parts (e.g., waist, lips, arms, hips) and functions (e.g., reflexes, agility, physical condition) on a 5-point scale ranging from 1 (*having strong negative feelings*) to 5 (*having strong positive feelings*). The female version of the BES has 3 subscales that measure sexual attractiveness, weight concern, and physical condition. The BES has demonstrated satisfactory validity and reliability in young adult women (Franzoi, 1994; Franzoi & Herzog, 1986; Franzoi & Shields, 1984; Thomas & Freeman, 1990). Internal consistency for all time points was deemed adequate in the present study (α’s ranged from .92 to .95).

**Body dissatisfaction.** The body dissatisfaction subscale of the Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983) was used to assess body dissatisfaction, a non-self-conscious body-related cognition. Nine items assessed body dissatisfaction with separate body parts (stomach, thighs, buttocks, hips) on a 6-point scale ranging from 1 (*always*) to 6 (*never*). The EDI has demonstrated adequate validity and reliability in healthy young adult women (Garner et al., 1983). Items were subsequently rescored so that higher scores represented higher dissatisfaction. Internal consistency for all time points was deemed adequate for the present study (α’s ranged from .85 to .87).
**Salivary cortisol.** Measuring cortisol in saliva is a reliable, stress-free, non-invasive technique that does not require a trained technician (Vinning, McGinley, Maksvytis, & Ho, 1983). A number of studies have used salivary cortisol in their protocols (Dickerson & Kemeny, 2004; Chapter III; Martin Ginis et al., 2012; Rohleder et al., 2007). Approximately one milliliter of saliva was collected using salivettes specific for cortisol measurement (Sarstedt, Germany). Participants placed the dental cotton in their mouths and left it in their mouths for one minute, then placed the cotton back into the test tube and sealed it. Samples were centrifuged immediately and then placed in a -80°C freezer until being assayed. Salivary cortisol concentration was measured in duplicate by commercial enzyme-linked immunosorbent assay (ELISA) kits according to the manufacturer’s instructions (Salimetrics, PA). The inter-assay and intra-assay coefficients of variability were calculated and deemed acceptable (< 15% and < 10% respectively; Salimetrics, no date).

**Perceived evaluative threat.** Participants rated their level of perceived evaluative threat for the upcoming situation (quiet rest or body composition assessment) in terms of having their physique evaluated (Focht & Hausenblas, 2004; Hart et al., 1989). The scale ranged from 0 (*not at all*) to 4 (*extremely*). This measure was completed after receiving instructions for their upcoming condition and used as a manipulation check to ensure perceived evaluative threat was higher in the threat group than the control group. See Appendix I: Questionnaire Package for Study 3 for a description of all measures.

**Procedures**

Interested participants contacted the principal investigator, and a mutually convenient time for participation was set. Once a test session was confirmed, participants were randomly assigned to one of two groups by drawing a number out of a hat: the control or threat group, but were not told of their group assignment. Participants were told that they would be completing a set of questionnaires three times across 75 minutes in a private research laboratory. Upon arrival
at the laboratory, participants provided informed consent and completed demographic information and a measure of appearance investment. Next, participants completed a series of state body image questionnaires which were counterbalanced to avoid order effects. Upon completion of baseline questions, participants then provided a baseline saliva sample. After completion of all baseline measures, participants were asked to sit quietly for 10 minutes.

Next participants completed the threat/control condition, depending on their group assignment. Participants in the control condition were asked to sit quietly for 10 minutes. In the threat condition, participants were told they would be completing a test to measure percent body fat while wearing clothes provided to them (spandex shorts and a jog bra). The following script was used to explain the body composition assessment:

“I am going to landmark three sites on your body – at the iliac crest or around the hip, the back of your arm at your tricep, and the mid part of your thigh. I will then pinch the fat that is underneath your skin and use the calipers (showed calipers) to get a skinfold measurement. I will read each skinfold measurement aloud to my assistant, who will record them and then calculate your percent body fat using an equation on a computer program. If you would like to give me your size for the shorts and bra, I will get my assistant to go to the lab upstairs and get the clothing.”

This threat and the specific manner in which it was explained was selected based on findings from past research examining responses to a social-evaluative body-related threat (Chapter III; Hart et al., 1989) and characteristics of social-evaluative threats identified as eliciting robust psychological and physiological responses (i.e., presence of other people, wearing revealing clothing, potential for a negative evaluation; Carron & Prapavessis, 1997; Lamarche et al., 2012; Leary et al., 1995; Rohleder et al., 2007).

All participants then sat while they completed the state body image questionnaires and provided another saliva sample (response measures). It is important to note that the response
time point saliva sample was provided at approximately 22-25 minutes after threat onset. For participants in the threat group, after completing all response measures, they were told they would not have to complete the body composition assessment and would be fully debriefed about the true purpose of the study after completing all measurements. Next, participants in both groups sat quietly for 15 minutes and then completed the same series of state questionnaires followed by a final saliva sample (recovery measures). It is important to note that the recovery time point saliva sample was provided at approximately 50 minutes post-threat. Timing of procedures was based on previous work examining psychological and cortisol responses to, and recovery from, a laboratory-based social-evaluative threat (Chapter III; Dickerson & Kemeny, 2004; Kirschbaum et al., 1993), and was timed to allow collection of the cortisol response measures at their peak as peak cortisol occurs approximately 21-40 minutes following onset of the stressor (Dickerson & Kemeny, 2004). Given the circadian rhythm of cortisol, all data collection took place at the same time of day (15:00-18:00) when levels are relatively constant (Dickerson & Kemeny, 2004; Vinning et al., 1983). Upon completion of all questionnaires and saliva samples, objective measures of height and weight were taken. Participants were debriefed as to the true purpose of the study and given $10.00 as compensation for their time. See Table 1 for a summary of the protocol timeline.

**Results**

Data were screened to check for the assumptions underlying data analyses (e.g., normality, homogeneity of variance, sphericity). Data screening showed that the data for cortisol were positively skewed. Thus, the cortisol values were log-transformed. The data then met assumptions for the data analyses. Descriptive statistics for state body image variables and cortisol by group are shown in Table 2 for the final sample ($N = 80$). Independent-samples $t$-tests were conducted to examine group differences on demographic variables and dependent variables at baseline. The results indicated no group differences on age (control: $M = 20.38$, $SD = 2.05$;
threat: $M = 20.10, SD = 1.88$), BMI (control: $M = 23.55, SD = 5.45$; threat: $M = 24.84, SD = 5.31$), self-evaluative salience of physical appearance (control: $M = 3.10, SD = .76$; threat: $M = 3.26, SD = .68$), or motivational salience of physical appearance (control: $M = 3.63, SD = .84$; threat: $M = 3.56, SD = .56$). In addition, no group differences were found on any dependent variable at baseline (all $p$s $> .05$; see Table 2 for means by group).

Some research has demonstrated a relationship between measures of body composition (i.e., percent BF and BMI) and body image outcomes (Hart et al., 1989), thus it was decided a priori to conduct bivariate correlations to examine BMI as a potential covariate. Body mass index was significantly positively related to baseline shame ($r = .42, p < .001$), body-esteem (weight concern: $r = -.43, p < .001$; physical condition: $r = -.34, p < .01$), and body dissatisfaction ($r = .30, p < .01$). Given these significant correlations, BMI was used as a covariate in the analyses for body shame, body-esteem, and body dissatisfaction.

**Examination of the Psychobiological Responses to and Recovery from a Threat**

A manipulation check was conducted to ensure the threat group reported higher perceptions of evaluative threat than the control group. Participants in the threat group reported significantly higher perceived evaluative threat ($M = 2.14, SD = .16$) than participants in the control group ($M = .13, SD = .08$; $t(54) = 11.01, p < .001$).

Since BMI was significantly related to body shame, body-esteem, and body dissatisfaction, a repeated-measures ANCOVA was conducted, using BMI as a covariate to track and compare the time course of the psychological response to, and recovery from, an anticipated social-evaluative body-related threat (research objective 1). For social physique anxiety, a 2 (group: control, threat) x 3 (time: baseline, response, recovery) repeated-measures ANOVA was conducted. For all significant group-by-time interactions, three sets of paired $t$-tests (baseline versus response, response versus recovery, baseline versus recovery) were conducted within each
group to examine the nature of the time effects. A Bonferroni correction factor was applied to correct for Type I error.

**Body shame.** The Mauchly’s test of sphericity was significant \((W = .88, \chi^2 (2) = 9.31, p = .01)\); therefore the Huynh-Feldt correction for degrees of freedom \((\epsilon = .94)\) is reported. There was a significant group-by-time interaction for body shame \((F(2, 139) = 16.59, p < .001, \eta^2 = .18)\); see Figure 1a). Comparisons made within the threat group showed that the level of body shame at response was significantly higher than the level of body shame at baseline \((t(39) = -6.41, p < .001)\) and recovery \((t(39) = 4.45, p < .001)\) time points. The level of body shame at recovery was not significantly higher than the level of body shame at baseline \((p = .03)\). No differences in the level of body shame between time points were found within the control group (all \(p\’s > .017\)). It should be noted that comparisons made between the control and threat groups at response showed that the level of body shame was significantly higher in the threat group compared to the control group \((t(78) = 2.92, p = .01)\). There was no significant main effect for time \((F(2, 139) = .45, p = .63, \eta^2 = .01)\) or group \((F(1, 74) = .75, p = .39, \eta^2 = .01)\). Body mass index was a significant covariate \((F(1, 74) = 15.20, p < .001, \eta^2 = .17)\).

**Social physique anxiety.** There was also a significant group-by-time interaction for social physique anxiety \((F(2, 77) = 20.08, p < .001, \eta^2 = .34); see Figure 1b). Comparisons made within the threat group showed that the level of social physique anxiety at response was significantly higher than the level of social physique anxiety at baseline \((t(39) = -5.01, p < .001)\) and recovery \((t(39) = 5.40, p < .001)\) time points. Levels of social physique anxiety at baseline were not different than at recovery \((p = .63)\). In addition, participants in the control group reported significantly lower levels of social physique anxiety at response than baseline \((t(39) = 2.72, p = .01)\); no significant differences were found between response and recovery \((p = .47)\) or recovery and baseline \((p = .14)\) time points. It should be noted that comparisons made between the control and threat groups at response showed that the level of social physique anxiety was
significant higher in the threat group compared to the control group ($t(78) = 3.75, p < .001$).

There was a significant main effect for time ($F(2, 77) = 10.40, p < .001, \eta^2 = .21$) and group ($F(1, 78) = 4.04, p = .05, \eta^2 = .05$).

**Body-esteem.** The Mauchly’s test of sphericity was significant for weight concern ($W = .88, \chi^2 (2) = 9.77, p = .01$) and physical condition ($W = .76, \chi^2 (2) = 19.72, p < .001$); therefore the Huynh-Feldt correction for degrees of freedom (weight concern: $\varepsilon = .93$; physical condition: $\varepsilon = .85$) is reported. The Huynh-Feldt correction for degrees of freedom ($\varepsilon = 1.00$) for sexual attractiveness is also reported as this more conservative estimate was not different from the uncorrected degrees of freedom statistic. There was a significant group-by-time interaction for sexual attractiveness ($F(2, 148) = 3.84, p = .02, \eta^2 = .05$; see Figure 2a) and weight concern ($F(2, 138) = 8.88, p < .001, \eta^2 = .11$; see Figure 2b). Comparisons made within the threat group showed that sexual attractiveness at response was significantly lower than baseline ($t(39) = 3.05, p < .01$) and recovery ($t(39) = -2.58, p = .01$) time points. No significant differences were found between baseline and recovery time points ($p = .68$). Similarly, weight concern at response was significantly lower than baseline ($t(39) = 4.07, p < .001$) and recovery ($t(39) = -2.71, p = .01$) time points. No significant differences were found between baseline and recovery time points ($p = .08$). No significant differences were found within the control group for sexual attractiveness or weight concern (all $ps > .13$). It should be noted that comparisons made between the control and threat group at response showed that the level of sexual attractiveness and weight concern was not different ($ps > .07$). There were no significant main effects for time for sexual attractiveness, weight concern, or physical condition (all $ps > .29$) or group (all $ps > .63$). Body mass index was a significant covariate for weight concern ($F(1, 74) = 15.31, p < .001, \eta^2 = .17$) and physical condition ($F(1, 74) = 10.07, p < .01, \eta^2 = .12$).

**Body dissatisfaction.** The Mauchly’s test of sphericity was significant ($W = .88, \chi^2 (2) = 9.46, p = .01$); therefore the Huynh-Feldt correction for degrees of freedom ($\varepsilon = .94$) is reported.
There was a significant group-by-time interaction for body dissatisfaction ($F(2, 139) = 6.63, p < .01, \eta^2 = .08$; see Figure 3a). Comparisons made within the threat group showed that body dissatisfaction at response was significantly higher than baseline ($t(39) = -2.89, p < .01$) and recovery ($t(39) = 2.63, p < .01$) time points. The level of body dissatisfaction was not different between baseline and recovery time points ($p = .46$). No significant differences in the level of body dissatisfaction across time were found within the control group (all $ps > .017$). It should be noted that comparisons made between the control and threat group at response showed that the level of body dissatisfaction was not different ($p = .09$). There were no significant main effects for time ($F(2, 139) = .88, p = .41, \eta^2 = .01$) or group ($F(1, 74) = .32, p = .57, \eta^2 = .01$). Body mass index was a significant covariate ($F(1, 74) = 6.42, p = .01, \eta^2 = .08$).

**Cortisol.** To track and compare the time course of the cortisol response to, and recovery from, anticipating a social-evaluative body-related threat (research objective 2), a 2 (group: control, threat) x 3 (time: baseline, response, recovery) repeated-measures ANOVA was conducted with log-transformed cortisol as the dependent variable. The Mauchly’s test of sphericity was significant ($W = .81, \chi^2(2) = 16.43, p < .001$); therefore the Huynh-Feldt correction for degrees of freedom ($\varepsilon = .87$) is reported. There was a significant group-by-time interaction for cortisol ($F(2, 135) = 3.42, p = .04, \eta^2 = .04$; see Figure 3b). Comparisons made within the threat group showed that log-transformed cortisol levels at response ($M = -1.22, SD = .25$) were significantly lower than cortisol levels at baseline ($M = -1.16, SD = .27; t(39) = 3.63, p = .001$). No differences in level of log-transformed cortisol were found between response and recovery ($M = -1.20, SD = .26$) time points ($t(39) = -1.00, p = .33$) or between baseline and recovery time points ($t(39) = 1.93, p = .06$). Comparisons made within the control group showed that log-transformed cortisol levels at response ($M = -1.16, SD = .21$) were also significantly lower than cortisol levels at baseline ($M = -1.07, SD = .24; t(39) = 6.44, p < .001$). Additionally, log-transformed cortisol levels at recovery ($M = -1.18, SD = .04$) were significantly lower than
cortisol levels at baseline ($t(39) = 4.69, p < .001$). It should be noted that comparisons made between the control and threat group at response and recovery time points showed that levels of log-transformed cortisol were not different (all $ps > .29$). There was a significant main effect for time ($F(2, 135) = 20.74, p < .001, \eta^2 = .21$), but not a significant main effect for group ($F(1, 78) = 1.19, p = .28, \eta^2 = .02$).

Area under the curve with respect to increase (AUCi) was also calculated for each group (Pruessner, Kirchbaum, Meinlschmid, & Hellhammer, 2003). Area under the curve with respect to increase can give an index of increase in cortisol secretion by correcting for baseline levels of cortisol and accounting for the change in cortisol over time with a repeated-measures experimental design (Pruessner et al., 2003). A negative value is referred to as an index of decrease in cortisol levels over time, while a positive value would represent an overall increase in cortisol secretion. To examine whether the social-evaluative threat elicited a cortisol response, a one-way ANOVA was conducted using group as the between-subjects factor and AUCi as the dependent variable. The results indicated a significant group difference for AUCi ($F(1, 78) = 5.01, p = .03, \eta^2 = .06$). Means for AUCi (on log-transformed cortisol values) indicated that both groups showed an index of decrease, with the control group showing a significantly greater overall decrease ($M = -.15, SD = .14$) than the threat group ($M = -.08, SD = .15$).

**Appearance Investment: A Potential Moderator**

Based on Barron and Kenny’s (1986) recommendations, the following steps were taken prior to the examination of appearance investment as a potential moderator of cortisol responses to a social-evaluative body-related threat. First, the categorical predictor variable (group: threat or control) was dummy coded (control membership = 0, threat membership = 1) to correspond with the number of levels in the categorical variable (number of levels minus one; Frazier, Tix, & Barron, 2004). Second, self-evaluative and motivational salience of physical appearance values were centered to reduce the multicollinearity between the predictor variable and the
interaction term (dummy coded predictor variable for group membership x centered self-evaluative and motivational salience values). Third, two product terms were calculated using the dummy coded predictor variable for group membership and the centred investment subscales, one for self-evaluative salience and one for motivational salience of physical appearance.

A hierarchical multiple regression analysis was conducted to examine whether appearance investment (self-evaluative salience or motivational salience of physical appearance) moderated the cortisol response (AUCi) from anticipating a social-evaluative body-related threat (research objective 3). On the first step, the dummy coded predictor variable for group membership was entered to examine a main effect of group membership on AUCi. Also, the centred self-evaluative and motivational salience values were entered on the first step to examine the main effect of appearance investment on AUCi. On the second step, the two interaction terms (dummy coded predictor variable for group membership x centred self-evaluative salience and the dummy coded predictor variable for group membership x centred motivational salience) were entered to examine the moderation hypothesis. The results indicated that the overall model on the first step was significant \( (F(3, 76) = 4.00, p = .01, R^2_{adj} = .10) \). The overall model on the second step was also significant \( (F(5, 74) = 2.51, p = .04, R^2_{adj} = .09) \); however, no significant additional increase in the variance accounted for in AUCi by the interaction terms was found \( (\Delta R^2 = .01, p = .69) \).

**Discussion**

The purpose of this study was to track and compare the time course of psychobiological responses to, and recovery from, an anticipated social-evaluative body-related threat in women. Further, appearance investment was assessed as a potential moderator of cortisol responses to such a threat. Consistent with the hypotheses and SSPT-related research, anticipating a body composition assessment (a social-evaluative body-related threat) elicited an increase in body shame and social physique anxiety (self-conscious emotions). These findings also provide
evidence that self-conscious emotions were more sensitive over non-self-conscious outcomes (body-esteem and body dissatisfaction). Also, consistent with the hypotheses, cortisol did not increase in response to anticipating the threat – cortisol levels in the control group decreased significantly more than the threat group. Inconsistent with our hypothesis and SSPT, appearance investment (an indicator of domain importance) did not moderate cortisol responses to the threat.

Our findings further extend the application of SSPT to the examination of psychobiological responses to anticipated social-evaluative body-related threats, as this threat elicited psychological responses consistent with SSPT and past research. Specifically, in the threat group body shame, social physique anxiety, and body dissatisfaction were higher while body-esteem (weight concern) was lower, at the response time point compared to baseline. These findings are consistent with SSPT and past research showing that situations with actual or imagined social evaluation elicit negative psychological outcomes (Dickerson, Kemeny et al., 2004; Dickerson et al., 2008; Het et al., 2009). These findings also replicate findings in the body image literature examining body image and self-presentational concerns in response to actual or anticipated social evaluation (Gammage et al., 2004; Hart et al., 1989; Martin Ginis et al., 2012).

In addition, the present findings provide evidence that self-conscious outcomes (body shame, social physique anxiety) were more sensitive than non-self-conscious outcomes (body dissatisfaction, body-esteem) to anticipating the threat. This contention is supported by our finding that at the response time point, body shame and social physique anxiety in the threat group were significantly higher than the control group, with no significant group differences at the response time point for body dissatisfaction or body-esteem (non-self-conscious outcomes). When a social-evaluative threat occurs, SSPT suggests self-conscious emotions and cognitions are more responsive (i.e., selectively elicited) over non-self-conscious emotions and cognitions. This is particularly true for shame, a self-conscious emotion thought to be the key signalling emotion alerting the individual a social threat is present (Dickerson et al., 2009).
Findings for cortisol in the present study are also consistent with SSPT-related research – no cortisol increase was found in the threat group. In fact, for both the control and threat group, results showed an index of decrease in cortisol. It should be noted though that the index of decrease in the threat group was less than the control group, suggesting the situation was more threatening for them. The findings are consistent with SSPT-related research examining cortisol responses to an imagined social-evaluative threat (Dickerson, Kemeny et al., 2004) or completing the TSST in the mere presence of others (Dickerson et al., 2008). Generally, thinking about a situation designed to induce shame has not elicited a cortisol response despite a psychological response (i.e., higher shame; Dickerson, Kemeny et al., 2004). Similarly, performing the TSST in the mere presence of others (i.e., not explicit social evaluation) does not lead to an increase in cortisol (Dickerson et al., 2008). Other evidence suggests that cortisol is less responsive to audiences that are imagined or not visible to the participant (Wadiwalla et al., 2010), virtual in nature, and do not actually change in anticipation of the evaluation (Kelly et al., 2007). In the body image literature, although Martin Ginis et al. (2012) found a significant group-by-time interaction for cortisol in each experiment (to an anticipated threat), it should be noted that this was a result of women in the control group having lower cortisol levels pre- to post-manipulation while cortisol was unchanged in the threat group (i.e., anticipating social evaluation). The present findings mirror those of past SSPT-research and Martin Ginis et al. (2012). The growing evidence in both SSPT and body image-related literature suggests that explicit social evaluation is required to elicit a significant increase in cortisol secretion, but not psychological responses.

For example, Dickerson, Kemeny et al. (2004) found changes in shame, but no change in cortisol, in participants asked to write about a situation of self-blame (designed to increase shame) versus those in the control group (asked to write about their daily schedule). Similarly, the present study found a group-by-time interaction for psychological variables, particularly
body shame and social physique anxiety, but not for cortisol. It has been argued that shame can be elicited by explicit social evaluation or by thinking about social evaluation (Lewis, 1971; Tangney, 1999). Social self-preservation theorists have been less clear about whether or not the hypothesized physiological responses can be elicited in both situations characterized by explicit social evaluation or imagined social evaluation.

Inconsistent with our hypotheses and SSPT, appearance investment (self-evaluative and motivational salience), our indicators of domain importance, did not moderate cortisol responses to a social-evaluative body-related threat. Two reasons may have accounted for these non-significant findings. First, the measure of appearance investment used in the present study contains items which assess general physical appearance such as “I spend little time on my physical appearance.” Our social-evaluative body-related threat assesses a specific aspect of physical appearance (body fat), an aspect not directly measured by the ASI-R (Cash, Melnyk et al., 2004). It is possible that the domain importance must relate more specifically to the source of the evaluation.

Secondly, given that anticipating the social-evaluative body-related threat did not elicit an increase in cortisol, it is difficult to make any conclusions regarding whether women with high self-evaluative salience of physical appearance had higher cortisol responses than women with lower self-evaluative salience in the threat group. Perhaps if participants actually faced the social-evaluative body-related threat (e.g., Chapter III) and cortisol responses were elicited, appearance investment would be a moderator. In the only investigation to our knowledge to examine domain importance specifically, Rohleder et al. (2007) compared cortisol responses in competitive ballroom dancers on competition day versus during performance of the TSST in a laboratory. They found that higher cortisol responses occurred during the real-life social-evaluative threat (a dancing tournament) than during the TSST. They argued that this provides evidence for the contention that situations of domain importance elicit higher cortisol responses
than those of less importance. It is important to note that domain importance was not specifically measured in the ballroom dancers; however, it is likely that during a competition, the goal of making a positive impression would be more central to the individual than during the TSST. Future research could compare psychobiological responses to anticipating a body composition assessment in populations for whom weight and body fat would be important to the achievement of a goal (e.g., athletes in weight-class sports, individuals dieting to lose weight) versus those who do not hold this same perception (e.g., non-athletes, not dieters).

The assessment of a recovery phase also provides important information that women anticipating a social-evaluative body-related threat reported higher body shame, social physique anxiety, body dissatisfaction, and lower body-esteem; however, these variables returned to baseline levels within 50 minutes following the onset of the threat, reflecting an efficient recovery profile. Similarly, findings in Chapter III show that women psychologically and physiologically responded to, but also recovered relatively quickly from a social-evaluative body-related threat. It is possible that this threat (body composition assessment) is a relatively acute threat with short term effects (psychologically and physiologically). As noted in Chapter III, these effects reflect a different response-recovery profile than those from viewing media images of the thin ideal (a non-social-evaluative body-related threat; Groesz, Levine, & Murnen, 2002; Hausenblas, Janelle, Gardner, & Focht, 2004; Heinberg & Thompson, 1995; Myers & Biocca, 1992), in which the negative effects can last up to two hours after viewing (Hausenblas, Janelle, Gardner, & Hagan, 2003). The quick recovery from anticipating a social-evaluative body-related threat may be viewed in a positive light and perhaps reflect the way in which young women have adapted to such common body-related experiences. More research is needed to understand how women recover from situations designed to induce body image concerns. In addition, future research should examine variables that may be associated with efficient recovery.
Implications

Although we would argue that examining psychobiological responses to both real and anticipatory threats is important, it must be noted that findings between, and therefore implications of, studies examining physiological responses from anticipatory threats are different than studies examining responses from real threats. For example, the health-related implications with respect to cortisol may be more relevant for real versus anticipated threats, as cortisol responses are elicited during an actual evaluation (Chapter III) and not anticipated evaluation (Martin Ginis et al., 2012). It is believed that overexposure to physiological parameters such as cortisol leads to the incidence and progression of diabetes, heart disease, depression, and poor bone health (Black, 2003; Danesh, Collins, Appleby, & Peto, 1998; Feldmann, Brennan, & Maini, 1996; Harris et al., 1999; Kedzierksa, Crowe, Turville, & Cunningham, 2003; Kronfol & Remick, 2000; Maes, 1999; McEwen, 1998, 2004; Miller & Blackwell, 2006; Nickols-Richardson, Beiseigel, & Gwazdauska, 2006). Although cortisol may be more responsive under actual social evaluation, psychological responses appear to be elicited under real or anticipated threat. Such psychological responses to anticipated threats may initiate avoidant style coping responses to prevent a threat to the social self as outlined by SSPT, which may have important implications for overall well-being.

Limitations

There are several limitations that should be noted. First, results can only generalize to healthy, young adult women with a normal BMI, and who are comfortable enough to have a body composition assessment (i.e., not one participant indicated she wished to drop out after the explanation of the body composition assessment). Men, individuals who are overweight or individuals who have a clinical eating disorder may show different responses. It should also be noted that ethnicity was not recorded in the present study; thus, it is unknown whether the response-recovery profile to a social-evaluative body-related threat would vary based on
ethnicity. Second, a self-selection bias likely occurred. Some recruitment materials contained information that would lead the participant to believe the study was about the body (i.e., exclusion criteria regarding the presence of an eating disorder, being asked to respond to questions about the body), and therefore decide not to participate. In addition, social desirability may have played a role in responding to the questionnaires. Although it was stated that the full nature of the study could not be revealed prior to participation (due to REB requirements), the purpose of the study (to look at how physiological stress is related to how you feel and think about your body in a laboratory setting) may have given participants a sense of the true purpose, leading participants to answer the questionnaires how they thought would best help out the research findings. It should be acknowledged that this may be one reason cortisol findings did not correspond to psychological findings.

Another limitation to the present study is the timing of measurements. Timing was based on the procedures of the TSST and findings from a meta-analysis of cortisol responses to social-evaluative threats (Dickerson & Kemeny, 2004). Dickerson and Kemeny (2004) found differences in cortisol levels between pre- and post-threat across all 10-minute epochs from threat onset (1-10, 11-20, 21-30, 31-40, 41-50, 51-60 minutes), with differences between baseline and measurements taken 21-40 minutes from threat onset to be significantly greater than all other time points. In the present study, cortisol response was measured approximately 22-25 minutes after threat onset. In addition, attempts were made to measure a recovery time point in which variables would return to baseline (50 minutes from threat termination). Dickerson and Kemeny (2004) showed that cortisol levels returned to baseline levels approximately 41-60 minutes from threat termination. Given that the social-evaluative threat in the present study was anticipatory in nature, the response and recovery time points may be different than those of actual social evaluation; our support for the timing of measurements comes from research on
actual social evaluation. Second, it should be noted this support (e.g., Dickerson & Kemeny, 2004) does not come from the body image literature.

As reported in Chapter III, challenges with designing an equivalent control group should be noted as a limitation. Using a similar control group (quiet rest) to represent a non-threatening condition, similar to past studies in the SSPT literature (e.g., Kirschbaum et al., 1993; Nater et al., 2006, 2007), may not match the experimental condition with respect to body-related content. Our control group was a non-threatening condition rather than a non-social-evaluative body-related threat. Martin Ginis et al. (2012) also noted the difficulty in designing an equivalent control group when examining cortisol responses to a social-evaluative body-related threat. These challenges will need to be addressed in future research in order to make sound conclusions regarding the impact of social evaluation on cortisol responses.

Conclusions

Findings from this study extend the work of Lamarche et al. (2012), Chapter III, and Martin Ginis et al. (2012) by examining psychobiological responses to, and recovery from, an anticipatory social-evaluative body-related threat known to elicit a psychobiological response consistent with SSPT. The present findings provide further support for the applicability of SSPT to a body image context. Findings also contribute to the body image literature by providing a more complete understanding of the psychobiological aspects of body image.

Acknowledgements

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References


*Psychoneuroendocrinology, 34*, 1075-1086.


<table>
<thead>
<tr>
<th>Time Event</th>
<th>Control group Duration (protocol timeline)</th>
<th>Threat group Duration (protocol timeline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informed consent</td>
<td>5 minutes (~minutes 0-5)</td>
<td>Informed consent</td>
</tr>
<tr>
<td>Study requirements</td>
<td></td>
<td>Study requirements</td>
</tr>
<tr>
<td>Demographic information</td>
<td></td>
<td>Demographic information</td>
</tr>
<tr>
<td>Appearance investment</td>
<td></td>
<td>Appearance investment</td>
</tr>
<tr>
<td>State questionnaires</td>
<td>Baseline measures</td>
<td>State questionnaires</td>
</tr>
<tr>
<td>Saliva sample</td>
<td>Questionnaires: 10-12 minutes</td>
<td>Saliva sample</td>
</tr>
<tr>
<td></td>
<td>Saliva sample: 1 minute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quiet rest: 8 minutes (~minutes 5-25)</td>
<td></td>
</tr>
<tr>
<td>Will sit quietly alone, completed sitting for 10 minutes</td>
<td>Manipulation 10 minutes (~minutes 25-35)</td>
<td>Will perform a body composition assessment via skinfold (see Procedures for script to explain body composition assessment), asked for clothing size, waited for researcher to return with clothing</td>
</tr>
<tr>
<td>State questionnaires</td>
<td>Response measures</td>
<td>State questionnaires</td>
</tr>
<tr>
<td>Saliva sample</td>
<td>Questionnaires: 10-12 minutes</td>
<td>Saliva sample</td>
</tr>
<tr>
<td></td>
<td>Saliva sample: 1 minute (saliva sample completed ~ 22-25 minutes following stressor/condition onset) (~minutes 35-48)</td>
<td>Briefly told would not complete body composition and will be fully debriefed at end of study, asked to sit quietly</td>
</tr>
<tr>
<td>Sit quietly for 15 minutes</td>
<td>Quiet rest 15 minutes (48-63 minutes)</td>
<td>Sit quietly for 15 minutes</td>
</tr>
<tr>
<td>State questionnaires</td>
<td>Recovery measures</td>
<td>State questionnaires</td>
</tr>
<tr>
<td>Saliva sample</td>
<td>Questionnaires: 10-12 minutes</td>
<td>Saliva sample</td>
</tr>
<tr>
<td></td>
<td>Saliva sample: 1 minute (saliva sample completed ~ 50 minutes following stressor/condition onset) (~ minutes 63-75)</td>
<td></td>
</tr>
<tr>
<td>True purpose of study explained, compensation, re-consent, height/weight measurements</td>
<td>Debrief/Re-consent: 2 minutes Height and weight measurements: 1 minute</td>
<td>True purpose of study explained, compensation, re-consent, height/weight measurements</td>
</tr>
</tbody>
</table>
Table 2

Means (and Standard Deviations) by Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control (n = 40)</th>
<th>Threat (n = 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Response</td>
</tr>
<tr>
<td>BS</td>
<td>.87 (.85)</td>
<td>.88 (.94)</td>
</tr>
<tr>
<td>BE-SA</td>
<td>3.72 (.61)</td>
<td>3.68 (.66)</td>
</tr>
<tr>
<td>BE-WC</td>
<td>3.09 (.83)</td>
<td>3.12 (.86)</td>
</tr>
<tr>
<td>BE-PC</td>
<td>3.55 (.63)</td>
<td>3.51 (.68)</td>
</tr>
<tr>
<td>SPA</td>
<td>2.55 (.97)</td>
<td>2.39 (.92)</td>
</tr>
<tr>
<td>BD</td>
<td>3.24 (.89)</td>
<td>3.20 (.91)</td>
</tr>
<tr>
<td>Cortisol</td>
<td>.10 (.06)</td>
<td>.08 (.04)</td>
</tr>
</tbody>
</table>

Note. BS = body shame, ranges 0 to 4, higher scores represent higher shame; BE = body-esteem, ranges from 1 to 5, higher scores represent higher BE; SA = sexual attractiveness; WC = weight concern; PC = physical condition; SPA = social physique anxiety, ranges 1 to 5, higher scores represent higher SPA; BD = body dissatisfaction, ranges 1 to 6, higher scores represent higher BD; Cortisol = untransformed cortisol values, ranges 0 to 3 μg/dL.
Figure 1a. Significant group by time interaction for body shame.

Figure 1b. Significant group by time interaction for social physique anxiety.
Figure 2a. Significant group by time interaction for body-esteem (sexual attractiveness).

Figure 2b. Significant group by time interaction for body-esteem (weight concern).
Figure 3a. Significant group by time interaction for body dissatisfaction.

Figure 3b. Significant group by time interaction for log-transformed cortisol.
Chapter V

General Discussion
General Discussion

Body image concerns are associated with a number of negative health-related outcomes including lower self-esteem, increased risk of depression, social anxiety, body shame, eating pathologies, diet pill use, smoking, and higher cortisol levels (Cepeda-Benito & Reig-Ferrer, 2000; Levine & Smolak, 2002; McLean, Barr, & Prior, 2001; Putterman & Linden, 2006; Sabiston, Castonguay, Barnett, O’Loughlin, & Lambert, 2009; Stice, 2002; Strong, 2010; Thompson, Dinnel, & Dill, 2003; Ward, Klesges, Zbikowski, Bliss, & Garvey, 1997). These concerns are particularly salient in situations in which there is potential for other people to evaluate one’s body. This dissertation examined the applicability of social self-preservation theory (SSPT; Dickerson, Gruenewald, & Kemeny, 2004; Kemeny, Gruenewald, & Dickerson, 2004) to the examination of body experiences characterized by social evaluation. The overall purpose of the dissertation was addressed through a series of studies each with separate objectives. The first study sought to provide preliminary support for the main tenets of SSPT through the examination of everyday body image experiences including the context of body image threats, the responses to such threats, and the coping strategies used to deal with these experiences. The second study sought to determine if the pattern of psychobiological responses to, and recovery from, an actual social-evaluative body image threat are consistent with SSPT. The third study examined the psychobiological responses to an anticipated social-evaluative body-related threat and the moderating effects of appearance investment (the importance one places on physical appearance; Cash, 2005).

Overall, this dissertation provides support for the applicability of SSPT to investigate a specific set of social-evaluative threats – those that are body-related. Findings from the first study provided initial support of the use of SSPT in a body image context. The specific threats identified and the context of the threats that were described by participants were shown to be consistent with SSPT. Also, the responses to such threats and coping strategies used to deal with
the everyday threats were consistent with SSPT. The specific threat used and responses measured in the second study were based on SSPT and findings from the first study. The second study provided empirical support for the applicability of SSPT in a body image setting. Findings demonstrated that the psychobiological response to an actual social-evaluative body-related threat was consistent with SSPT; women reported higher social physique anxiety and had higher cortisol in response to an actual social-evaluative body-related threat. In addition, self-conscious outcomes, over non-self-conscious outcomes, were more sensitive to a social-evaluative body-related threat, providing additional support for the applicability of SSPT to a body image setting. The third study provided additional empirical support for the use of SSPT in the examination of social-evaluative body-related threats and extended its applicability to a social-evaluative body-related threat that was anticipatory in nature. Findings from this study showed that women reported higher body shame, social physique anxiety, and body dissatisfaction and lower body-esteem in the anticipation of a social-evaluative body-related threat than at baseline. Taken together, the series of studies provide information about the psychobiology of body image experiences. Specifically, these studies: (1) extend the literature on SSPT by providing further support of its use in a body image context; (2) broaden the present theoretical perspective and approach in the examination of body image; (3) provide evidence to support the psychobiology of body image by highlighting the role of cortisol in body image experiences; and (4) provide the methodological foundation for future researchers taking a psychobiological approach to investigate body image experiences. Overall, this dissertation extends two areas of literature.

**Theoretical Development**

A significant outcome of this dissertation is theory development. Social self-preservation theory has been applied primarily to the examination of responses to the Trier Social-Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993). Relatively less research has applied SSPT to other types of threats. For example, SSPT has been applied to competitive ballroom dancing
(Rohleder, Beulen, Chen, Wolf, & Kirschbaum, 2007) supporting its use in more real-life settings. In addition, Martin Ginis, Strong, Arent, and Bray (2012) provided initial support for its use in a body image setting. To further develop SSPT, future research will need to go beyond testing responses to the TSST and examine the generalizability of SSPT to other social-evaluative threats, such as body image. Findings from each study of this dissertation suggest that SSPT can be applied to body-related situations characterized by social evaluation. This provides additional support that SSPT can generalize to different types of social-evaluative threats, not just the TSST.

Testing responses to a social-evaluative body-related threat not only provides a broader perspective of SSPT as it relates to the type of threats (TSST versus body-related), but it also provides evidence to support the notion that self-conscious outcomes are more responsive to such threats than non-self-conscious outcomes. This dissertation highlights the possibility that SSPT can be applied to other types of social-evaluative threats (i.e., body-related threats), other types of self-conscious emotions and cognitions (i.e., body shame, social physique anxiety), and coping responses to body-related situations. Examining different types of self-conscious emotions and cognitions (i.e., body shame, social physique anxiety) provides a broader perspective of this class of emotions and their relationship to cortisol. In addition, SSPT suggests that psychobiological responses occur to initiate changes that support appeasement, behavioural disengagement, or withdrawal in order to protect one’s social standing or acceptance; however, few SSPT-related researchers have examined this end result. The first and second studies of this dissertation provide evidence of this type of coping behaviour to a social-evaluative body-related threat, a piece of evidence missing from the SSPT literature. Specifically, participants in the first study described coping responses consistent with SSPT (avoidant-type coping) and the number of participants randomized to the threat group who did not participate in the second study provide evidence of the ultimate outcome of social self-preservation.
Researchers have extended SSPT to examine the influence of audience presentation (real versus imagined or virtual) on psychobiological responses. Evidence shows that the greatest psychobiological responses occur in the presence of a real evaluative audience (Kelly, Matheson, Martinez, Merali, & Anisman, 2007). Social self-preservation theory states that self-conscious emotions, such as shame, can occur in response to real or imagined social evaluation (Lewis, 1971; Tangney, 1999), although SSPT is less clear regarding cortisol responses to imagined threats. Generally, psychological versus physiological outcomes are more responsive to imagined social-evaluative threats (Dickerson, Kemeny, Aziz, Kim, & Fahey, 2004). Findings from the second and third study of this dissertation support this contention in a body image context. Past SSPT-related research and the second and third study of this dissertation highlight that SSPT needs to make clearer distinctions between the psychological and physiological variables. Perhaps the characteristics of the threat needed to elicit a psychological response are different than those needed to elicit a physiological response (e.g., cortisol responses occur in actual social threat to prepare the body for the fight or flight response; perhaps psychological responses act as a warning to the individual of an upcoming threat). This contention is also supported by Martin Ginis et al. (2012) who showed that their significant group-by-time interaction for cortisol was due to the threat group maintaining cortisol levels and the control group showing a decrease in cortisol. Although SSPT suggests this psychobiological response is coordinated (i.e., psychological and physiological response occur concurrently) under social evaluation, more development is required to make stronger statements about imagined or anticipated social evaluation.

**SSPT’s Relationship to Other Theories in the Body Image Literature**

Although this dissertation provides theoretical development of SSPT, it should be noted that there is overlap between SSPT and other theories commonly applied to the study of body image. For example, the key tenet of self-objectification theory (Fredrickson & Roberts, 1997) is
that self-objectification (taking a third-person observer perspective of the body) leads to feelings of shame, leading to negative health outcomes such as depression and eating disorders. This third-person perspective may serve as a form of social evaluation as described by SSPT. A second similarity is that SSPT also contends that negative evaluation leads to negative outcomes such as shame, which may have long-term health-related implications (e.g., depression). There is also overlap with social comparison processes often applied to the study of body image. Social self-preservation theory states that psychobiological responses occur in situations where there is a threat to one’s social standing or acceptance. Perhaps social comparison theory can help understand the process underlying this response, as the discrepancy between the current self and standard to which the individual is comparing him/herself may lead to the perceived threat. The concept of self-presentation (Leary & Kowalski, 1990) can also be found embedded in SSPT. Psychobiological responses outlined by SSPT (i.e., appeasement, behavioural disengagement, or withdrawal) are ultimately self-presentational processes designed to reduce the impact a negative social evaluation may have on one’s social image.

**Weaknesses of SSPT**

Although this dissertation found general support for the applicability of SSPT to the examination of body image, two main weaknesses in SSPT should be highlighted. First, it appears that SSPT’s contention that psychological and physiological responses occur concurrently has never been challenged empirically. Social self-preservation theorists assume that the time course of psychological responses is the same as that of physiological responses. It may be that psychological responses occur first, followed by physiological responses. Findings that psychological, but not physiological, responses occur in anticipation of a social-evaluative body-related threat (Chapter IV) while both psychological and physiological response occur under an actual threat (Chapter III) may support this point. This weakness has been highlighted by Dickerson (2008).
Second, unlike other theories applied to a body image context, SSPT suggests that psychobiological responses may have adaptive qualities. However, what is not clear is at what point the shift from adaptive to maladaptive psychobiological responses occurs. What is lacking in the literature is a well-defined “adaptive” and “maladaptive” response-recovery profile. Further, does an adaptive response-recovery profile for psychological responses “look” the same as for physiological responses? Data from the second and third studies (Chapters III, IV, respectively) may serve as a starting point for which future researchers can compare different populations characterized as having positive or negative body image.

**Contributions to the Body Image Literature**

The most significant contribution of this dissertation to the body image literature is the new theoretical perspective it provides, one that few have examined (Martin Ginis et al., 2012). Social self-preservation theory is a fresh perspective that offers two major contributions to the body image literature. First, examining body image as a psychobiological experience will expand our understanding of body image and its impact on health. For example, demonstrating the impact of social-evaluative body-related experiences on cortisol levels highlights the biological implications of such body experiences. Cortisol has been shown to be associated with a number of health conditions and diseases (Black, 2003; Danesh, Collins, Appleby, & Peto, 1998; Feldmann, Brennan, & Maini, 1996; Harris et al., 1999; Kedzierska, Crowe, Turville, & Cunningham, 2003; Kronfol & Remick, 2000; Maes, 1999; McEwen, 1998, 2004; Miller & Blackwell, 2006; Nickols-Richardson, Beiseigel, & Gwazdaskas, 2006). Similarly, taking a psychobiological approach to investigate body image suggests that other physiological parameters may be associated with body image outcomes. Although cortisol is arguably the most common physiological outcome examined in the SSPT literature, other physiological outcomes have been investigated. For example, indicators of inflammatory activity have been shown to increase in response to a social-evaluative threat (Dickerson, Gable, Irwin, Aziz, & Kemeny,
2009; Dickerson, Kemeny et al., 2004). A psychobiological approach to investigating body image will provide a more complete understanding of the physiological aspects of body image concerns. This dissertation provides preliminary support for this psychobiological perspective, highlighting that (actual) social-evaluative body-related threats may be one group of threats that contribute to health-damaging conditions as listed above.

Second, using SSPT to examine body image threats offers information regarding the quality of responses to such experiences. Social self-presentation theory suggests that responses to social-evaluative threats have adaptive and maladaptive qualities. To address the quality of the psychobiological response, this dissertation sought to provide information on the recovery phase from a social-evaluative body-related threat, information lacking in most of the body image literature. Currently, when body image researchers find that body-related situations impact body image concerns, the tone of the conclusions is often negative. Social self-preservation theory would argue that quick, efficient responses (quick reactivity and recovery) are adaptive in nature because they alert the individual a social threat is present and coordinate the necessary response to deal with such a threat. Findings from the first and second studies of this dissertation would support the notion that participants both responded, and more importantly recovered quickly, perhaps suggesting that this response is adaptive rather than negative as previously and commonly thought. Although it is too early to draw conclusions regarding the contention that negative responses (i.e., feelings of body shame, social physique anxiety, cortisol) are adaptive in nature, this dissertation provides a different perspective on the assumed negative responses commonly associated with social-evaluative body-related threats.

**Methodological Contributions**

The methodology used in the second study may be used to assess the effectiveness of an intervention at changing psychobiological responses to a social-evaluative body-related threat. If the findings of the second study can be replicated, it could be validated as a method to elicit
robust psychobiological responses to a social-evaluative body-related threat. Having standard laboratory-based methodology will allow researchers to directly compare findings; this has been done in the literature examining responses to the TSST. In addition, validation of the placebo version of the TSST has recently been demonstrated (Het, Rohleder, Schoofs, Kirschbaum, & Wolf, 2009). It is necessary to have methods that consistently elicit psychobiological responses to social-evaluative body-related threats to examine outcomes, moderators, coping mechanisms, and measure intervention effectiveness. The second study provided a feasible and ethical social-evaluative body-related threat that demonstrated increases in key self-conscious body-related outcomes and cortisol.

In addition to the methodology itself, the second study provides basic descriptive statistics regarding psychobiological responses to, and recovery from, an actual social-evaluative body-related threat. These statistics may be seen as the “typical” response-recovery profile as the participant sample comprised healthy, young adult women. Many body image measures were first developed and validated in such a sample (Thompson, 2004). The second study provides a “typical” reference point to which future researchers may compare. This is especially important when comparing samples (e.g., high-risk groups, individuals of different ethnicities, younger versus older adults). In addition, when assessing the effectiveness of a program designed to reduce body image concerns and/or responses to body image threats, the degree of effectiveness can be compared to these “standard” values.

A second methodological contribution of this dissertation is related to the challenges of control group design. As noted in Chapters III and IV, designing an equivalent body-related control condition that is non-social-evaluative is difficult given the nature of body image. Martin Ginis et al. (2012) noted that simply trying on exercise clothing alone likely initiated a social comparison process in which participants compared their body to a societal body-related standard (a social-evaluative threat). Similarly, Fredrickson, Roberts, Noll, Quinn, and Twenge
(1998) stated that trying on a bathing suit heightens women’s sense of being on display, even while being alone. Body image is socially constructed and is very much influenced by social factors (e.g., social evaluation). Individuals, in part, rely on actual and perceived social evaluations from others to gauge the acceptability of their bodies. Simply trying on clothing may prompt an internal process of gauging the acceptability of one’s body. In fact, Festinger (1954) suggests that people have an innate drive to evaluate themselves to assess their adequacy, through either objective or social comparisons. Future research will need to design a control group that is body-related, but does not initiate this process, or perhaps a more realistic future direction would be to design a control group that prompts this process the least.

**Practical Applications**

By using SSPT as a theoretical guide, researchers can identify the most threatening social-evaluative body-related threats. By identifying these threats and understanding the characteristics that elicit an inefficient psychobiological response-recovery profile, it may be possible to reduce these threats, or improve the response-recovery profile to such threats. Improving the response-recovery profile may be particularly important in environments where body evaluation is more likely (i.e., physical education classes, gyms, competitive sports). For example, it may be possible to change aspects of the physical and social exercise environment (e.g., clothing, mirrors, gender composition; Fleming & Martin Ginis, 2004; Gammage, Martin Ginis, & Hall, 2004; Katula, McAuley, Mihalko, & Bane, 1998; Kruisselbrink, Dodge, Swanburg, & MacLeod, 2004; Lamarche, Gammage, & Strong, 2009; Martin & Fox, 2001; Sinden, Martin Ginis, & Angove, 2003) to impact psychobiological response in young women.

As noted above, this dissertation has two significant methodological contributions which have practical applications as they relate to an applied setting. The methodology developed and used in the second study provides a means to evaluate program effectiveness in reducing body image concerns or responses to body-related threats. Secondly, this methodology could be used
to teach young adult women coping skills to deal with body-related threats (i.e., a body composition assessment in a laboratory setting) in a relatively safe and controlled environment. This could be particularly relevant in high-risk populations in treatment for body image concerns (i.e., individuals with an eating disorder).

**Limitations**

Although each study has addressed its own limitations, one common limitation of this dissertation will be highlighted. The sample used in each study comprised young adult women. Although rationale for using this sample has been provided, it should be noted that the results of this dissertation may vary for different groups of individuals or subgroups of young women. For example, past research has shown that body image concerns can vary based on age, gender, ethnicity, sexual orientation, and socio-economic status (Grogan, 2008; Swami et al., 2010). It should be noted that differences based on such variables are lessening (Grogan, 2008; Shaw, Ramirez, Trost, Randall, & Stice, 2004). It is still possible, however, that differences in such variables may influence an individual’s constructed idea of body image. As body image is a social product, an individual’s body experience is impacted by factors such as gender and race. The impact of these variables on body experiences was not addressed in this dissertation.

**Strengths of the Dissertation**

There are two overarching strengths of this dissertation that should be highlighted. First, this dissertation used both qualitative and quantitative research designs. This mixed method approach allows for a more comprehensive understanding of body experiences of young women. In addition, a mixed method approach is important to highlight, given that most past research has used researcher-driven manipulations to elicit body image concerns. Findings from the first study provided participant-driven information regarding the common body image threats of young women and the context of such threats. This information allowed the testing of a participant-identified body-related threat in a laboratory setting. In addition to the specific threat, the context
of the threat described by participants was used in the second study to develop the manner in which the threat was presented.

A second strength of this dissertation was the novelty of each separate study and the line of research as a whole. To my knowledge, this was the first investigation to assess the applicability of SSPT to an explicit actual body image threat. This will ultimately contribute to SSPT and provide a different perspective on body experiences. Also, the second study was the first to successfully elicit a cortisol response to a social-evaluative body-related threat, providing sound methodology for future researchers taking a psychobiological approach to body experiences. In addition, the second and third study measured both self-conscious and non-self-conscious responses to a threat providing evidence of a key tenet of SSPT – that self-conscious outcomes are selectively elicited when faced with social-evaluative threats. Finally, this dissertation was the first to examine the recovery from a social-evaluative body-related threat; findings suggest women do recovery quickly from a body-related threat. This may indicate an efficient response-recovery profile.

**Ethical Considerations**

One of the major challenges of this dissertation was balancing the assessment of the applicability of SSPT to a body image context with the ethical considerations required for human research. Although deception was necessary for the second and third study, there is some restriction placed on the researcher regarding the use of deception because of ethical guidelines surrounding the treatment of human participants governed by research ethics boards. It should be noted that these guidelines may constrain the ability of the researcher to comprehensively test the tenets of SSPT in this context. This challenge is highlighted by Martin Ginis et al. (2012), who stated that “because of REB stipulations, participants could not be exposed to an actual situation involving social evaluation of the physique” (p. 4).
Future research will need to find ways to adequately test the tenets of SSPT in body image while posing no unnecessary psychological risk to participants. For example, the level of perceived threat could be heightened with manipulations to either the social (i.e., group versus two researchers) or the physical (i.e., public versus private laboratory) setting. The tenet of uncontrollability could be manipulated by giving false feedback to participants about their body composition assessment in relation to an unrealistic standard (i.e., telling participants they have more body fat than what is “normal”). Perhaps research using imagined social evaluation can achieve the balance between the focus on testing SSPT in body image and ethical considerations. However, it should be noted that even using an anticipated threat, such as in Martin Ginis et al. (2012) or the third study of this dissertation, cortisol increases may not be achieved; thus, it may be difficult to assess physiological responses to threats that are not actual threats. A second ethical consideration that should be noted relates to having participants experience a situation researchers know is threatening. In order to test SSPT in a body image context, researchers must place the participant in stressful body-related situations. This appears to be particularly necessary if researchers are interested in physiological outcomes such as cortisol – responses occurred only under actual social evaluation and not evaluation that was anticipatory in nature. Future researchers need to be aware of the ethical considerations related to placing participants in situations known to cause a stress response and elicit subsequent outcomes we know are related to negative health conditions (i.e., depression, anxiety, diabetes, poor bone health, heart disease).

**Future Directions**

There are several directions for future research that my work suggests. First, although this dissertation provides additional support of the applicability of SSPT, more research is needed to test its tenets as they apply to a body image setting. For example, the third study failed to find a moderating effect of appearance investment (indicator of domain importance) on the cortisol responses to anticipating a social-evaluative body-related threat. Perhaps using a more specific
measure of domain importance (i.e., related to weight or shape) would have yielded different results in cortisol responses. Future research could also examine the impact of domain importance by comparing cortisol responses between two extreme groups in appearance investment (i.e., a high investment group [individuals with an eating disorder, athletes in aesthetic sports, dieters] versus a low investment group). Future researchers can examine variables that characterize high versus low responders or individuals who recovery quickly versus slowly. Indicators of positive body image (i.e., body pride) may be one body image variable that can differentiate between individuals with an efficient response-recovery profile from those without.

The current line of research can also be extended by examining the relationship between trait levels of self-conscious body-related outcomes and daily cortisol levels. While much SSPT-related research has examined psychobiological responses to an acute threat, very little research has examined the effect of chronic threats on psychobiological outcomes. Examining the impact of chronic experiences of social-evaluative body-related threats on physiological variables such as cortisol may be particularly important as the health-related implications of unregulated physiological responses as outlined by SSPT are long-term health conditions (i.e., cancer, cardiovascular disease, diabetes, depression, and poor bone health and immune function). Rohleder, Chen, Wolf, and Miller (2008) examined whether chronic experiences of shame were associated with daily levels of cortisol. It was found that trait shame was associated with inflammatory activity, but not daily levels of cortisol. These findings highlight that chronic versus acute experiences with social-evaluative threats may be related to different physiological outcomes; however, more research is needed to better understand the impact of chronic social-evaluative experiences and their subsequent outcomes particularly as related to body image.

A third direction for future research is to examine the association between experiences of social-evaluative body-related threats and indicators of psychosocial well-being (i.e., depression,
self-esteem, negative affect, stress). It may be particularly important to examine chronic feelings of shame, an emotion thought to be a key component of depression (Gilbert, 1997; Lewis, 1971), and its associations with the maintenance of depressive symptoms (Tangney, Wagner, & Gramzow, 1992). Again, an examination of the relationship between chronic or recurrent experiences of social-evaluative body-related threats and indicators of psychosocial well-being may be particularly significant as SSPT suggests that psychological responses that are inefficient may be associated with long-term health conditions such as depression and anxiety. While research examining the psychobiological responses to acute, laboratory-based social-evaluative threats (both non-body-related and body-related) is important, future studies need to provide empirical evidence of the long-term consequences of such experiences on health.

In addition to examining the impact of chronic or recurrent social-evaluative body-related threats, future researchers will need to examine the generalizability of the findings of this dissertation to “real-life” threats. There has been some research that has successfully examined the real-life application of SSPT (Lehman & Conley, 2010; Rohleder et al., 2007). Participants in the first study (Chapter II) did report that social-evaluative body-related threats exist in their everyday life. Capturing the real-life response to such threats would be difficult, but would provide a greater understanding of the psychobiological responses to these common, everyday experiences. The manner in which saliva was collected would make real-life sampling more feasible. Measuring cortisol through saliva has been shown to be a valid and reliable technique that is especially useful for real-life applications (Rohleder et al., 2007; Vining, McGinley, Maksvytis, & Ho, 1983).

Finding ways to blunt the response to social-evaluative body-related threats may also be one important direction for future research. One proposed method is exercise. In general, exercise is associated with more positive body image (Campbell & Hausenblas, 2009; Hausenblas & Fallon, 2006). In addition, exercise has been shown to blunt the cardiovascular
response to social-evaluative threats in laboratory settings as measured by heart rate and blood pressure (Spalding, Lyon, Steel, & Hatfield, 2004). More recently, Strong (2010) found that exercise was effective in reducing daily cortisol levels in women. Taken together, this research suggests exercise may be one effective method at blunting the psychobiological response to a social-evaluative body-related threat. This may be particularly useful in women who display an unregulated psychobiological response-recovery profile (i.e., high responders).

**Conclusions**

In summary, these studies provide evidence of the applicability of SSPT to a body image context. The findings from this dissertation show that young adult women experience body image threats in their everyday lives. In addition, these women respond psychologically and physiologically to, and recover quickly from, an actual social-evaluative threat in a laboratory setting. Overall, this dissertation provides a new perspective on body experiences of young women and offers new avenues for future researchers.
References


Appendices
Appendix A: Questionnaire Package for Study 1

UNIVERSITY OF TORONTO
FACULTY OF PHYSICAL EDUCATION AND HEALTH

Letter of Invitation

June 2010

Project Title: A Qualitative Examination of Body Image Experiences in College-Aged Women
Principal Student Investigator: Larkin Lamarche, PhD Candidate, Department of Exercise Sciences, University of Toronto
Faculty Supervisor: Dr. Panagiota (Nota) Klentrou, Professor, Department of Physical Education & Kinesiology, Brock University
Faculty Supervisor: Dr. Gretchen Kerr, Professor, Faculty of Physical Education & Health, University of Toronto

I, Larkin Lamarche, PhD Candidate, from the Department of Exercise Sciences, University of Toronto, invite you to participate in a research project entitled A Qualitative Examination of Body Image Experiences in College-aged women.

The purpose of this study is to describe the everyday body image-related experiences of college-aged women.

Participation will take approximately 30 minutes. You will be asked to complete 3 brief questionnaires and take part in a one-on-one interview with a researcher in a private setting on campus. A summary of the interview will be sent to you one week later by email and you will have an opportunity to clarify any comments made. We will offer $10.00 to you for completing the study (i.e., verification that the summary of the interview has been reviewed) to compensate you for your time.

You may experience some discomfort due to the nature of the questions being asked; in this event, contact information for Drs Klentrou and Kerr, student health services (905-688-5550 ext.3243, http://www.brocku.ca/healthservices), the Niagara Distress Center (905-688-3711, www.distresscentreniagara.com/), and www.211Niagara.ca is provided. Information regarding body image concerns can be found at the following official websites: www.nedic.ca and www.womenshealth.gov/. Please remember that there is normal variety in body sizes and shapes within the population, and all different of body sizes and shapes are normal.

Your participation will help describe body image-related experiences that are common for college-aged women. You will have the opportunity to increase your knowledge of the setting characteristics and responses surrounding such experiences common to college-aged women. This information will aid in the development of ways to help individuals with body image concerns to cope with body image-related experiences in their lives.

If you have any pertinent questions about your rights as a research participant, please contact the Brock University Research Ethics Officer (905-688-5550 ext. 3035, reb@brocku.ca)
If you have any questions, please feel free to contact me.
Thank you

Principal Student: Larkin Lamarche, PhD student in Exercise Sciences at the University of Toronto

Faculty Supervisor: Dr. Panagiota (Nota) Klentrou, Professor in Dept. Physical Education & Kinesiology at Brock University

Faculty Supervisor: Dr. Gretchen Kerr, Professor in Dept. Physical Education & Kinesiology at University of Toronto

Contact Information:
905-688-5550 (x4147) 905-688-5550 (x4538) 416-978-6190
larkin.lamarche@utoronto.ca nklentrou@brocku.ca gretchen.kerr@utoronto.ca

This study has been reviewed and received ethics clearance through Brock University and University of Toronto Research Ethics Boards (file #09-229; #25234, respectively)
INFORMED CONSENT

Date: June 2010
Project Title: A Qualitative Examination of Body Image Experiences in College-Aged Women

Principal Student Investigator: Larkin Lamarche, PhD
Faculty Supervisor: Dr. Panagiota (Nota) Klentrou, Professor
Exercise Sciences Candidate: Dept. Physical Education & Kinesiology
University of Toronto Brock University
905-688-5550 (x4147) 905-688-5550 (x4538)
larkin.lamarche@utoronto.ca nk lentrou@brocku.ca

INVITATION
You are invited to participate in a study that involves research. The purpose of this study is to describe the everyday body image-related experiences of college-aged women. Only participants who indicate no previous history or diagnosis of a clinical eating disorder will be included in this study.

WHAT’S INVOLVED
As a participant, you will be asked to complete 3 brief questionnaires and take part in a one-on-one interview with a researcher in a private setting on campus. Participation will take approximately 30 minutes of your time. A summary of the interview will be sent to you one week later by email and you will have an opportunity to clarify any comments made. We will offer $10.00 to you for completing the study (i.e., reviewing the summary of the interview) to compensate you for your time.

POTENTIAL BENEFITS AND RISKS
There are no direct benefits to participants. Your participation will help describe body image-related experiences that are common for college-aged women. You will have the opportunity to increase your knowledge of the setting characteristics and responses surrounding such experiences common to college-aged women. This information will aid in the development of ways to help individuals with body image concerns to cope with body image-related experiences in their lives. You may experience some discomfort due to the nature of the questions being asked; in this event, contact information for Drs Klentrou and Kerr and student health services is provided (905-688-5550 ext.3243, http://www.brocku.ca/healthservices). Information regarding body image concerns can be found at the following official websites: www.nedic.ca and www.womenshealth.gov/. Please remember that there is normal variety in body sizes and shapes within the population, and all different of body sizes and shapes are normal. No known or anticipated physical risks are related to participation in this study.

CONFIDENTIALITY/ANONYMITY
Anonymity can not be offered in this study given the nature of the interview. Any information that arises from participants will be treated with confidentiality. Your name will not be included
or, in any other way, associated with the data collected in the study. Please do not place your name or any identifying information on the questionnaire. Data collected during this study will be stored in a locked filing cabinet of the research laboratory of Dr. Klentrou at Brock University. They will be retained until completion of the principal student’s PhD dissertation (expected completion is 2 years upon completion of this study). At this time, written documents will be shredded, and audiotapes, and electronic files of the transcripts destroyed. Access to this data will be restricted to the research team.

**VOLUNTARY PARTICIPATION**
Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. Further, you may decide to withdraw from this study at any time and may do so without any penalty or loss of benefits to which you are entitled. Your data will be withdrawn from the study on your request.

**PUBLICATION OF RESULTS**
Results of this study may be published in professional journals and presented at conferences. Feedback about this study will be available. At your request you may receive a summary of results by contacting the principal or faculty supervisor by e-mail.

**CONTACT INFORMATION AND ETHICS CLEARANCE**
If you have any questions about this study or require further information, please contact the Principal Student Investigator or the Faculty Supervisors using the contact information provided above. This study has been reviewed and received ethics clearance through the Research Ethics Board at Brock University (file #09-229) and University of Toronto (file #25234). If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office at 905-688-5550 ext. 3035, reb@brocku.ca.

Thank you for your assistance in this project. Please keep a copy of this form for your records.

**CONSENT FORM**
I agree to participate in this study described above. I have made this decision based on the information I have read in the Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

Name: _______________________________ (please print)

Signature: ___________________________ Date: __________________________
Demographic Information

Please complete the following information:

Age: _________
Height: _________
Weight: _________
Major: ______________________________________

Have you ever thought you have had a clinical eating disorder? __________
Have you ever been diagnosed or treated for an eating disorder? __________
Social Physique Anxiety Scale - Trait

Read each of the following statements carefully and indicate the degree to which the statement is characteristic or true of you. Use the following scale. Circle the appropriate value following each statement.

- 1 = Not at all characteristic of me
- 2 = Slightly characteristic of me
- 3 = Moderately characteristic of me
- 4 = Very characteristic of me
- 5 = Extremely characteristic of me

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<td>1</td>
<td>I feel uptight about my physique/figure.</td>
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<td>2</td>
<td>I am bothered by thoughts that other people are evaluating my weight or muscular development negatively.</td>
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<td>3</td>
<td>Unattractive features of my physique/figure make me nervous.</td>
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<td>4</td>
<td>I feel apprehensive about my physique/figure.</td>
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<td>5</td>
<td>I am comfortable with how fit my body appears to others.</td>
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<td>6</td>
<td>It would make me uncomfortable to know that other people were evaluating my physique/figure.</td>
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<td>7</td>
<td>When it comes to displaying my physique/figure, I feel shy.</td>
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<td>8</td>
<td>I feel nervous about the shape of my body.</td>
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<td>9</td>
<td>I feel relaxed when it is obvious that others are looking at my physique/figure.</td>
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Request for Summary of Results

June 2010

Project Title: A Qualitative Examination of Body Image Experiences in College-Aged Women

Principal Student Investigator: Larkin Lamarche, PhD Candidate, Department of Exercise Sciences, University of Toronto

Faculty Supervisor: Dr. Panagiota (Nota) Klentrou, Professor, Department of Physical Education & Kinesiology, Brock University

Faculty Supervisor: Dr. Gretchen Kerr, Professor, Faculty of Physical Education & Health, University of Toronto

If you would like to receive a copy of a summary of the results of this study by email, please complete the following information:

Name: ________________________________________
Email: _________________________________________

If you would like to receive a copy of a summary of the results of this study by mail, please complete the following information:

Name: ________________________________
Address: ____________________________________________
City: ____________________________________________
Postal Code: ____________
Appendix B: Ethics Clearance for Study 1

University of Toronto Ethics Clearance

PROTOCOL REFERENCE # 25234
May 20, 2010

Dr. Gretchen Kerr                      Ms. Larkin Lamarche
Faculty of Physical Education & Health  Faculty of Physical Education & Health
University of Toronto                    University of Toronto
55 Harbord St.                           55 Harbord St.
Toronto, ON M5S 2W6                      Toronto, ON M5S 2W6

Dear Dr. Kerr and Ms. Lamarche:

Re: Your research protocol entitled “A Qualitative Examination of Body Image Experiences in College-Aged Women”

ETHICS APPROVAL

Original Approval Date: May 20, 2010
Expiry Date: May 19, 2011
Continuing Review Level: 1

We are writing to advise you that a member of the Health Sciences Research Ethics Board has granted approval to the above-named research study, for a period of one year. Ongoing projects must be renewed prior to the expiry date.

All your most recently submitted documents have been approved for use in this study.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events should be reported to the Office of Research Ethics as soon as possible.

Please ensure that you submit an Annual Renewal Form or a Study Completion Report 15 to 30 days prior to the expiry date of your study. Note that annual renewals for studies cannot be accepted more than 30 days prior to the date of expiry, as per federal and international policies.

If your research has funding attached, please contact the relevant Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your project.

Yours sincerely,
S. Lanthier

Research Ethics Coordinator

OFFICE OF RESEARCH ETHICS
McMurrich Building, 12 Queen’s Park Crescent West, 2nd Floor, Toronto, ON M5S 1S8 Canada
Tel: +1 416 946-3273 • Fax: +1 416 946-3763 • ethics.review@utoronto.ca • http://www.research.utoronto.ca/for-researchers-administrators/ethics/
Brock University Ethics Clearance

DATE: 4/21/2010
FROM: Michelle McGinn, Chair
        Research Ethics Board (REB)
TO: Dr. Gretchen Kerr, PEKN
        Dr. Panagiota Klentrou, Larkin Lamarche
FILE: 09-229 KERR
        Ph. D.
TITLE: A Qualitative Examination of Body Image Experiences in College Aged Women

The Brock University Research Ethics Board has reviewed the above research proposal.

DECISION: Accepted (with note)

This project has received ethics clearance for the period of April 21, 2010 to December 1, 2010 subject to full REB ratification at the Research Ethics Board's next scheduled meeting. The clearance period may be extended upon request. The study may now proceed.

Note:
* Please alter the statement on the consent form that states that withdrawal will not result in any loss as withdrawal affects compensation. Please ensure that a sensitive debriefing is conducted with any one excluded due to history of clinical eating disorder. The necessity for exclusion should be explained.

Please note that the Research Ethics Board (REB) requires that you adhere to the protocol as last reviewed and cleared by the REB. During the course of research no deviations from, or changes to, the protocol, recruitment, or consent form may be initiated without prior written clearance from the REB. The Board must provide clearance for any modifications before they can be implemented. If you wish to modify your research project, please refer to http://www.brocku.ca/research/policies-and-forms/forms to complete the appropriate form Revision or Modification to an Ongoing Application.

Adverse or unexpected events must be reported to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants and the continuation of the protocol.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research protocols.
The Tri-Council Policy Statement requires that ongoing research be monitored. A Final Report is required for all projects upon completion of the project. Researchers with projects lasting more than one year are required to submit a Continuing Review Report annually. The Office of Research Services will contact you when this form Continuing Review/Final Report is required.

Please quote your REB file number on all future correspondence.

MM/sp

Research Ethics Office
Brock University | Brock Research
Niagara Region  | 500 Glenridge Ave. | St. Catharines, ON  L2S 3A1
brocku.ca | T 905 688 5550  x3035  | F 905 688 0748

Please consider the environment before printing this email.
Confidentiality Notice: This e-mail, including any attachments, may contain confidential or privileged information. If you are not the intended recipient, please notify the sender by e-mail and immediately delete this message and its contents. Thank you
Appendix C: Recruitment Materials for Study 1

Recruitment Poster

Research Participants Wanted

Who: Female, university students, no previous history or diagnosis of a clinical eating disorder

What: Complete 3 brief questionnaires and a 30-minute interview on Brock campus

Topic: Describing Body Experiences in Everyday Life

Upon completion, $10.00 will be offered to compensate participants for their time

Contact the following:

Larkin Lamarche, PhD Candidate
Exercise Sciences
University of Toronto
larkin.lamarche@utoronto.ca

Dr. Nota Klentrou, Professor
Dept. Physical Education & Kinesiology
Brock University
nklentrou@brocku.ca

This study has received ethics clearance through Brock University and University of Toronto Research Ethics Boards (file #09-229; #25234, respectively)

Verbal Announcement

Hi, my name is Larkin Lamarche and I am recruiting for a research study that examines body experiences in college-aged women. Participation takes one visit that will last approximately 30 minutes of your time. You will be asked to participate in an interview conducted on campus. Participants who complete this study will be offered $10.00 in compensation. Show recruitment poster on overhead.
Appendix D: Ethics Clearance for Study 2

University of Toronto Ethics Clearance

PROTOCOL REFERENCE # 25663

October 1, 2010

Professor Gretchen Kerr
Faculty of Physical Education & Health
University of Toronto
55 Harbord St.
Toronto, ON M5S 2W6

Larkin Lamarche
Faculty of Physical Education & Health
University of Toronto
55 Harbord St.
Toronto, ON M5S 2W6

Dear Professor Kerr and Larkin Lamarche:

Re: Your research protocol entitled, “The Relationship between Self-Perceptions, Physical Characteristics, and a Physiological Indicator of Stress”

We are writing to advise you that a member of the Health Sciences Research Ethics Board has granted approval to the above-named research study, for a period of one year. Ongoing projects must be renewed prior to the expiry date.

All your most recently submitted documents have been approved for use in this study.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events should be reported to the Office of Research Ethics as soon as possible.

Please ensure that you submit an Annual Renewal Form or a Study Completion Report 15 to 30 days prior to the expiry date of your study. Note that annual renewals for studies cannot be accepted more than 30 days prior to the date of expiry, as per federal and international policies.

If your research has funding attached, please contact the relevant Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your project.

Yours sincerely,
Daniel Gyewu
Research Ethics Board Manager- Health Sciences

OFFICE OF RESEARCH ETHICS
McBurney Building, 22 Queen's Park Crescent West, 2nd Floor, Toronto, ON M5S 3E8 Canada
Tel: +1 416 946-3273 • Fax: +1 416 946-8763 • ethics.review@utoronto.ca • http://www.research.utoronto.ca/fir-researchers-administrators/ethics/
Brock University Ethics Clearance

Certificate of Ethics Clearance for Human Participant Research

DATE: 8/27/2010

PRINCIPAL INVESTIGATOR: PANAGIOTA/GRETCHEN, - PEKN

FILE: 10-023 - PANAGIOTA/GRETCHEN

TYPE: Ph. D. STUDENT: Larkin Lamarche
SUPERVISOR: Klentrou Panagiota & Gretchen Kerr

TITLE: The Relationship between Self-Perceptions, Physical Characteristics, and a Physiological Indicator of Stress

ETHICS CLEARANCE GRANTED
Type of Clearance: NEW
Expiry Date: 8/31/2011

The Brock University Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University’s ethical standards and the Tri-Council Policy Statement. Clearance granted from 8/27/2010 to 8/31/2011.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before 8/31/2011. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Research Ethics web page.

In addition, throughout your research, you must report promptly to the REB:
  a) Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
  b) All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;
  c) New information that may adversely affect the safety of the participants or the conduct of the study;
d) Any changes in your source of funding or new funding to a previously unfunded project.

We wish you success with your research.

Approved: ________________

Michelle McGinn, Chair  
Research Ethics Board (REB)

Note: Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.
Appendix E: Recruitment Materials for Study 2

Recruitment Poster

Research Participants Wanted

Examine the relationship between self-perceptions, physical characteristics, and a physiological indicator of stress

- Female university students
- No history or diagnosis of a clinical eating disorder
- Not taking anti-depressants/corticosteroids

What:

- Completed at Brock University
- One visit lasting 60 minutes
- Complete several questionnaires, anthropometric measurements, and provide 3 samples of saliva

$10.00 will be offered upon completion

Contact the following:

Larkin Lamarche, PhD Candidate       Dr. Nota Klentrou, Professor
Exercise Sciences                   Dept. Physical Education & Kinesiology
University of Toronto               Brock University
larkin.lamarche@utoronto.ca          nklentrou@brocku.ca

This study has received ethics clearance through Brock University and University of Toronto Research Ethics Boards (file #10-023 and #25663, respectively)

Verbal Announcement

Hi, my name is Larkin Lamarche and I am recruiting for a research study that examines the relationship between self-perceptions, physical characteristics, and a physiological indicator of stress. Participation takes one visit that will last about 60-75 minutes of your time. You will be asked to complete several questionnaires and anthropometric measurements and provide 3 samples of saliva. We are recruiting university-aged women with no previous diagnosis of a clinical eating disorder, who are not varsity athletes, who are non-smokers, and who are not on medication that affects cortisol secretion such as anti-depressants or corticosteroids. Upon completion, you will be offered $10.00 or one hour course credit for research participation to compensate you for your time.
Appendix F: Questionnaire Package for Study 2

UNIVERSITY OF TORONTO
FACULTY OF PHYSICAL EDUCATION AND HEALTH

Letter of Invitation
August 2010

Project Title: The Relationship between Self-Perceptions, Physical Characteristics, and a Physiological Indicator of Stress

Principal Student Investigator: Larkin Lamarche, PhD Candidate, Department of Exercise Sciences, University of Toronto

Faculty Supervisor: Dr. Panagiota (Nota) Klentrou, Professor, Department of Physical Education & Kinesiology, Brock University

Faculty Supervisor: Dr. Gretchen Kerr, Professor, Faculty of Physical Education & Health, University of Toronto

I, Larkin Lamarche, PhD Candidate, from the Department of Exercise Sciences, University of Toronto, invite you to participate in a research project entitled The Relationship between Self-Perceptions, Physical Characteristics, and a Physiological Indicator of Stress.

The purpose of this study is to examine the relationship between self-perceptions, physical characteristics, and a physiological indicator of stress in university-aged women.

Participation will take approximately 60-75 minutes. You will be asked to complete a series of questionnaires and anthropometric measurements (height, weight, body composition assessment) in a private laboratory. You will also be asked to take three samples of your own saliva in the test tubes provided. We will offer $10.00 or one hour course credit for research participation to you for completing the study to compensate you for your time. Compensation will only be offered upon completion of all components of the study.

You may experience some discomfort due to the nature of the questions being asked and during the anthropometric measurements; in this event, contact information for Drs Klentrou and Kerr, student health services (905-688-5550 ext.3243, http://www.brocku.ca/healthservices), the Niagara Distress Center (905-688-3711, www.distresscentreniagara.com/), and www.211Niagara.ca is provided. Information regarding body image concerns can be found at the following official websites: www.nedic.ca and www.womenshealth.gov/. Please remember that there is normal variety in body sizes and shapes within the population, and all different of body sizes and shapes are normal.

Your participation will help in the development of interventions designed to reduce body image concerns in university-aged women. You will also receive feedback regarding your anthropometric measurements. You will have the opportunity to increase your knowledge regarding body image concerns among university-aged women.
If you have any pertinent questions about your rights as a research participant, please contact the Brock University Research Ethics Officer (905-688-5550 ext. 3035, reb@brocku.ca)
If you have any questions, please feel free to contact me.

This research was supported by a grant from the North American Society for the Psychology of Sport and Physical Activity (NASPSPA)

Thank you

Principal Student Investigator:  Faculty Supervisor:  Faculty Supervisor:
Larkin Lamarche, PhD  Dr. Panagiota (Nota)  Dr. Gretchen Kerr,  
student  Klentrou, Professor  Professor 
Exercise Sciences  Dept. Physical  Faculty of Physical 
University of Toronto  Education &  Education & Health 
905-688-5550 (x4147)  Kinesiology  University of Toronto 
larkin.lamarche@utoronto.ca  Brock University  416-978-6190 
nklentrou@brocku.ca  905-688-5550 (x4538)  gretchen.kerr@utoronto.ca

This study has been reviewed and received ethics clearance through the Research Ethics Boards of Brock University (file #10-023) and the University of Toronto (file #25663)
Informed Consent

Date: August 2010

Project Title: The Relationship between Self-Perceptions, Physical Characteristics, and a Physiological Indicator of Stress

Principal Student Investigator: Larkin Lamarche, PhD student Exercise Sciences University of Toronto 905-688-5550 (x4147) larkin.lamarche@utoronto.ca

Faculty Supervisor: Dr. Panagiota (Nota) Klenrou, Professor Dept. Physical Education & Kinesiology Brock University 905-688-5550 (x4538) nklentrou@brocku.ca

Faculty Supervisor: Dr. Gretchen Kerr, Professor Faculty of Physical Education & Health University of Toronto 416-978-6190 gretchen.kerr@utoronto.ca

INVITATION
You are invited to participate in a study that examines the relationship between self-perceptions, physical characteristics, and a physiological indicator of stress in university-aged women.

WHAT’S INVOLVED
As a participant, you will be asked to complete a series of questionnaires and anthropometric measurements (height, weight, body composition assessment). You will also be asked to take three samples of your own saliva in the test tubes provided. Participation will take approximately 60-75 minutes of your time and is done in a private laboratory setting. We will offer $10.00 or one hour course credit for research participation to you for completing the study to compensate you for your time. Compensation will only be offered to you upon completing all components of the study.

POTENTIAL BENEFITS AND RISKS
Participants will be given the results of their body composition test and be provided with information regarding diet and exercise to achieve and maintain a healthy body composition. Your participation will help examine the relationship between self-perceptions, physical characteristics, and a physiological indicator of stress in university-aged women. This information will aid in the development of interventions designed to reduce body image concerns in university-aged women. You may experience some discomfort due to the nature of the questions being asked and the anthropometric assessment; in this event, contact information for Drs. Klenrou and Kerr (see above), and student health services is provided (905-688-5550 ext.3243, http://www.brocku.ca/healthservices). Information regarding body image concerns can be found at the following official websites: www.nedic.ca and www.womenshealth.gov/. Please remember that there is normal variety in body sizes and shapes within the population, and all different body sizes and shapes are normal. No known or anticipated physical risks are related to participation in this study.

CONFIDENTIALITY/ANONYMITY
The data in this study is not anonymous as due to the nature of the anthropometric assessment. Any information that arises from participants will be treated with confidentiality. Your name will not be included or, in any other way, associated with the data collected in the study. Please do not place your name or any identifying information on the questionnaires. Data collected during this study will be stored in a locked filing cabinet of a research laboratory of Dr. Klentrou at Brock University and will be destroyed following the completion of the principal student’s PhD dissertation (expected completion is 2 years upon completion of this study). Access to this data will be restricted to the principal student investigator, the faculty supervisors, and their research team.

**VOLUNTARY PARTICIPATION**
Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. After participation, it will not be possible to withdraw, as your data will not be identifiable.

**PUBLICATION OF RESULTS**
Results of this study may be published in professional journals and presented at conferences. Feedback about this study will be available. At your request you may receive a summary of results by completing the request for feedback from provided, or by contacting the principal student investigator or faculty supervisor by e-mail.

**CONTACT INFORMATION AND ETHICS CLEARANCE**
If you have any questions about this study or require further information, please contact the Principal Investigator or the Faculty Supervisor using the contact information provided above. This study has been reviewed and received ethics clearance through the Research Ethics Boards of Brock University (file #10-023) and the University of Toronto (file #25663). If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office at 905-688-5550 ext. 3035, reb@brocku.ca. Thank you for your assistance in this project. Please keep a copy of this form for your records. This research was supported by a grant from the North American Society for the Psychology of Sport and Physical Activity (NASPSPA).

**CONSENT FORM**
I agree to participate in this study described above. I have made this decision based on the information I have read in the Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

Name: ________________________________  (please print)

Signature: _____________________________ Date: ________________
Demographic Sheet

Please complete the following information:

Age: _________

Major: ______________________________

How many days (in the last 6 months) on average do you exercise per week _______

If any, what types of activities do you participate in __________________________

Are you on a birth control pill? _________

Have you ever thought you have had a clinical eating disorder? _________

Have you ever been diagnosed with a clinical eating disorder? _________

Do you smoke? _______

Are you on corticosteroids or anti-depressants? _____

If so, please list the medications __________________________

Did you eat anything within one hour of this appointment? _________

Did you drink anything within one hour of this appointment? _________

Did you do any physical activity within one hour of this appointment? _________
**Objectified Body Consciousness Scale – Body Shame**

Read each of the following statements carefully and indicate the degree to which you agree with the statement **right now**. Use the following scale. Circle the appropriate value following each statement.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

1. When I can’t control my weight, I feel like something must be wrong with me.
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | N/A |
2. I feel ashamed of myself when I haven’t made the effort to look my best.
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | N/A |
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 | 7 | N/A |
4. I would be ashamed for people to know what I really weigh.
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | N/A |
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 | 7 | N/A |
6. When I’m not exercising enough, I question whether I am a good enough person.
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | N/A |
7. Even when I can’t control my weight, I think I’m an okay person.
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | N/A |
8. When I’m not the size I think I should be, I feel ashamed.
   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | N/A |
Social Physique Anxiety Scale – State

Read each of the following statements carefully and indicate the degree to which the statement is characteristic or true of you right now. Use the following scale. Circle the appropriate value following each statement.

1 = Not at all characteristic of me
2 = Slightly characteristic of me
3 = Moderately characteristic of me
4 = Very characteristic of me
5 = Extremely characteristic of me

1. I feel uptight about my physique/figure.
   1  2  3  4  5

2. I am bothered by thoughts that the other people in the room are evaluating my weight or muscular development negatively.
   1  2  3  4  5

3. Unattractive features of my physique/figure make me nervous in this setting.
   1  2  3  4  5

4. In this environment, I feel apprehensive about my physique/figure.
   1  2  3  4  5

5. I am comfortable with how fit my body appears to the others.
   1  2  3  4  5

6. It would make me uncomfortable to know that other people in the room were evaluating my physique/figure.
   1  2  3  4  5

7. When it comes to displaying my physique/figure in this setting, I feel shy.
   1  2  3  4  5

8. Sitting here in my clothes, I feel nervous about the shape of my body.
   1  2  3  4  5

9. I feel relaxed when it is obvious that others are looking at my physique/figure.
   1  2  3  4  5
**Body-Esteem Scale**

On this page are listed a number of body parts and functions. Carefully read each item and indicate how you feel about this part or function of **your own body right now** using the following scale:

1 = Have strong negative feelings  
2 = Have moderate negative feelings  
3 = Have no feeling one way or the other  
4 = Have moderate positive feelings  
5 = Have strong positive feelings

<table>
<thead>
<tr>
<th>Item</th>
<th>Strong Negative</th>
<th>Moderate Negative</th>
<th>No Feelings</th>
<th>Moderate Positive</th>
<th>Strong Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Body Scent</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Appetite</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Nose</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Physical stamina</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Reflexes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Lips</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Muscular strength</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. Waist</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Energy level</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Thighs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. Ears</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. Biceps</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. Chin</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. Body build</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. Physical coordination</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. Buttocks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17. Agility</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18. Width of shoulders</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19. Arms</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20. Chest or breasts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>21. Appearance of eyes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>22. Cheeks/cheekbones</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>23. Hips</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>24. Legs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>25. Figure of physique</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>26. Sex drive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>27. Feet</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>28. Sex organs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>29. Appearance of stomach</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>30. Health</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>31. Sex activities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>32. Body hair</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>33. Physical condition</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
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<tr>
<td>34. Face</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>35. Weight</td>
<td>1</td>
<td>2</td>
<td>3</td>
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</tbody>
</table>
Eating Disorder Inventory – Body Dissatisfaction

Read each of the following statements carefully and indicate the **degree to which the statement is true of you right now**. Use the following scale. Circle the appropriate value following each statement.

1 = Always  
2 = Usually  
3 = Often  
4 = Sometimes  
5 = Rarely  
6 = Never

<table>
<thead>
<tr>
<th>Statement</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 think that my stomach is too big</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2. I think that my thighs are too large</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3. I think that my stomach is just the right size</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4. I feel satisfied with the shape of my body</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5. I like the shape of my buttocks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6. I think my hips are too big</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7. I think that my thighs are just the right size</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>8. I think my buttocks are too large</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>9. I think that my hips are just the right size</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
Re-Consent/Debriefing Form

August 2010

Project Title: The Relationship between Self-Perceptions, Physical Characteristics, and a Physiological Indicator of Stress

Principal Student Investigator: Larkin Lamarche, PhD Candidate, Department of Exercise Sciences, University of Toronto

Faculty Supervisor: Dr. Panagiota (Nota) Klentrou, Professor, Department of Physical Education & Kinesiology, Brock University

Faculty Supervisor: Dr. Gretchen Kerr, Professor, Faculty of Physical Education & Health, University of Toronto

During the debriefing session, I was given an explanation as to why the researchers had to disguise the true purpose of this study. The true purpose of this study was to examine physiological (i.e., cortisol) and psychological (i.e., shame, body-related anxiety, body dissatisfaction) responses to a body-related situation in which people are evaluated by others. In this study, half of the participants undergo a social-evaluative body image threat (i.e., a body composition test while wearing a bathing suit) and half the participants sat quietly for 15 minutes. I was informed that having full knowledge of the true purpose of the study may have influenced the way in which I completed the questionnaires and responded physiologically to the body composition assessment and this would have invalidated the results. Therefore, to ensure this would not happen, some details about the true nature of this study were initially not provided (or were provided in a manner that slightly misrepresented the real purpose of the study). However, I now was informed of the true purpose of this study. Also, I was informed that all participants were given the results of their body composition assessment and were provided with information regarding diet and exercise to achieve or maintain a healthy body composition. In addition, I have had the opportunity to ask questions about the study and to receive acceptable answers to my questions.

Re-Consent:

I have been asked to give permission for the researchers to use my data in their study, and agree to this request. I am aware I may contact Brock University (905-688-5550 ext. 3035 or reb@brocku.ca).

Date: __________________________

Participant name (please print): _____________________________________

Participant signature: ______________________________________________
Request for Summary of Results

August 2010

Project Title: The Relationship between Self-Perceptions, Physical Characteristics, and a Physiological Indicator of Stress

Principal Student Investigator: Larkin Lamarche, PhD Candidate, Department of Exercise Sciences, University of Toronto

Faculty Supervisor: Dr. Panagiota (Nota) Klentrou, Professor, Department of Physical Education & Kinesiology, Brock University

Faculty Supervisor: Dr. Gretchen Kerr, Professor, Faculty of Physical Education & Health, University of Toronto

If you would like to receive a copy of a summary of the results of this study by email, please complete the following information:

Name: ________________________________________

Email: _______________________________________

If you would like to receive a copy of a summary of the results of this study by mail, please complete the following information:

Name: ________________________________________

Address: __________________________________________

City: _____________________________________________

Postal Code: ____________
Appendix G: Ethics Clearance for Study 3
University of Toronto Ethics Clearance

PROTOCOL REFERENCE # 26217

May 5, 2011

Professor Gretchen Kerr
Faculty of Physical Education and Health
University of Toronto
55 Harbord Street
Toronto, ON M5S 2W6

Larkin Lamarche
Faculty of Physical Education and Health
University of Toronto
55 Harbord Street
Toronto, ON M5S 2W6

Dear Professor Kerr and Larkin Lamarche:

Re: Your research protocol entitled, “The Relationship between Self-Perceptions and Cortisol in a Laboratory Setting”

<table>
<thead>
<tr>
<th>ETHICS APPROVAL</th>
<th>Original Approval Date: May 5, 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expiry Date: May 4, 2012</td>
</tr>
<tr>
<td></td>
<td>Continuing Review Level: 2</td>
</tr>
</tbody>
</table>

We are writing to advise you that the Health Sciences Research Ethics Board has granted approval to the above-named research study, for a period of one year. Ongoing projects must be renewed prior to the expiry date.

All your most recently submitted documents have been approved for use in this study.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events should be reported to the Office of Research Ethics as soon as possible.

Please ensure that you submit an Annual Renewal Form or a Study Completion Report 15 to 30 days prior to the expiry date of your study. Note that annual renewals for studies cannot be accepted more than 30 days prior to the date of expiry, as per federal and international policies.

If your research has funding attached, please contact the relevant Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your project.

Yours sincerely,
Dario Kuzmanovic
Research Ethics Analyst

OFFICE OF RESEARCH ETHICS
McMurrich Building, 12 Queen’s Park Crescent West, 2nd Floor, Toronto ON M5S 3S8 Canada
Tel: +1 416 946-3273 • Fax: +1 416 946-5763 • ethics.reviews@utoronto.ca • http://wwwresearch.utoronto.ca/re-search-administrators/ethics/
DATE: 8/27/2010

PRINCIPAL INVESTIGATOR: PANAGIOTA/GRETCHEN, - PEKN

FILE: 10-023 - PANAGIOTA/GRETCHEN

TYPE: Ph. D. STUDENT: Larkin Lamarche
SUPERVISOR: Gretchen Kerr & Panagiota Klentrou

TITLE: The Relationship between Self-Perceptions and Cortisol in a Laboratory Setting

ETHICS CLEARANCE GRANTED

Type of Clearance: NEW Expiry Date: 2/28/2012

The Brock University Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University’s ethical standards and the Tri-Council Policy Statement. Clearance granted from 2/24/2011 to 2/28/2012.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before 2/28/2012. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Research Ethics web page.

In addition, throughout your research, you must report promptly to the REB:

a) Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;

b) All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;

c) New information that may adversely affect the safety of the participants or the conduct of the study;

d) Any changes in your source of funding or new funding to a previously unfunded project.
We wish you success with your research.

Approved:

Michelle McGinn, Chair
Research Ethics Board (REB)

Note: Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.
Appendix H: Recruitment Materials for Study 3

Recruitment Poster

Research Participants Wanted

Look at the relationship between self-perceptions and cortisol in a laboratory setting

- Female university students, not varsity athletes
- No history of a clinical eating disorder
- Not taking anti-depressants/corticosteroids

What:

- Completed at Brock University
- One visit lasting 60 minutes
- Complete several questionnaires and provide 3 samples of saliva

$10.00 will be offered upon completion

Contact the following:

Larkin Lamarche, PhD Candidate	Dr. Nota Klentrou, Professor
Exercise Sciences	Dept. of Kinesiology
University of Toronto	Brock University
larkin.lamarche@utoronto.ca	 nklenrou@brocku.ca

This study has received ethics clearance through Brock University and University of Toronto Research Ethics Boards (file #10-196 and #26217, respectively)

Verbal Announcement

Hi, my name is Larkin Lamarche and I am recruiting for a research study that examines the relationship between self-perceptions and cortisol (a physiological indicator of stress) in a laboratory setting. Participation takes one visit that will last about 60 minutes of your time. You will be asked to complete several questionnaires and provide 3 samples of saliva. We are recruiting university-aged women with no previous diagnosis of a clinical eating disorder, who are non-smokers, and who are not on medication that affects cortisol secretion such as anti-depressants or corticosteroids. Upon completion, you will be offered $10.00 or one hour course credit for research participation to compensate you for your time.
Appendix I: Questionnaire Package for Study 3

UNIVERSITY OF TORONTO
FACULTY OF PHYSICAL EDUCATION AND HEALTH

Letter of Invitation

May 2011

Project Title: The Relationship between Self-Perceptions and Cortisol in a Laboratory Setting

Principal Student Investigator: Larkin Lamarche, PhD Candidate, Department of Exercise Sciences, University of Toronto

Faculty Supervisor: Dr. Panagiota (Nota) Klentrou, Professor, Department of Physical Education & Kinesiology, Brock University

Faculty Supervisor: Dr. Gretchen Kerr, Professor, Faculty of Physical Education & Health, University of Toronto

I, Larkin Lamarche, PhD Candidate, from the Department of Exercise Sciences, University of Toronto, invite you to participate in a research project entitled The Relationship between Self-Perceptions and Cortisol in a Laboratory Setting.

The purpose of this study is to look at how physiological stress (cortisol) is related to how you feel and think about your body in a laboratory setting. I am not able to tell you about the full nature of the study in advance. At the end of the study the true nature of the study will be explained, at which time you can withdraw your consent.

Participation will take approximately 60 minutes. You will be asked to complete a series of questionnaires in a private laboratory. You will also be asked to take three samples of your own saliva in the test tubes provided. Your saliva will only be analyzed for cortisol. We will offer $10.00 or one hour course credit for research participation to you for completing the study to compensate you for your time. Participants who do withdraw will still be fully compensated.

You may experience some discomfort due to the nature of the questions being asked; in this event, contact information for Drs Klentrou and Kerr, student health services (905-688-5550 ext.3243, http://www.brocku.ca/healthservices), the Niagara Distress Center (905-688-3711,www.distresscentreniagara.com/), and www.211Niagara.ca is provided. Information regarding body image concerns can be found at the following official websites: www.nedic.ca and www.womenshealth.gov/. Please remember people have a variety of body sizes and shapes within the population.

You will have the opportunity to increase your knowledge regarding body image concerns among university-aged women.

If you have any pertinent questions about your rights as a research participant, please contact the Brock University Research Ethics Officer (905-688-5550 ext. 3035, reb@brocku.ca).
If you have any questions, please feel free to contact me.

Thank you

Principal Student: Larkin Lamarche, PhD  
Faculty Supervisor: Dr. Panagiota (Nota)  
Faculty Supervisor: Dr. Gretchen Kerr, Professor

Larkin Lamarche, PhD student 
Exercise Sciences 
University of Toronto 
905-688-5550 (x4147)  
larkin.lamarche@utoronto.ca

Faculty Supervisor: Dr. Panagiota (Nota)  
Dept. Physical Education & Kinesiology 
Brock University 
905-688-5550 (x4538)  
nklentrou@brocku.ca

Faculty Supervisor: Dr. Gretchen Kerr, Professor  
Dept. Physical Education & Kinesiology 
University of Toronto 
416-978-6190  
gretchen.kerr@utoronto.ca

This study has been reviewed and received ethics clearance through Brock University and University of Toronto Research Ethics Boards (file #10-196; #26217, respectively)
INFORMED CONSENT

DATE: May 2011

PROJECT TITLE: The Relationship between Self-Perceptions and Cortisol in a Laboratory Setting

Principal Student Investigator: Larkin Lamarche, PhD

Faculty Supervisor: Dr. Panagiota (Nota) Dr. Gretchen Kerr,

Exercise Sciences Student: Kinesiology

University of Toronto: Brock University

905-688-5550 (x4147) 905-688-5550 (x4538) 416-978-6190

larkin.lamarche@utoronto.ca nklentrou@brocku.ca gretchen.kerr@utoronto.ca

INVITATION

You are invited to participate in a study that looks at how physiological stress (cortisol) is related to how you feel and think about your body in a laboratory setting.

WHAT’S INVOLVED

As a participant, you will be asked to complete a series of questionnaires. You will also be asked to take three samples of your own saliva in the test tubes provided. Your saliva will only be analyzed for cortisol. Participation will take approximately 60 minutes of your time and is done in a private laboratory setting. We will offer $10.00 or one hour course credit for research participation to you for completing the study to compensate you for your time. Participants who do withdraw will still be fully compensated.

POTENTIAL BENEFITS AND RISKS

Your participation will help clarify the relationship between how you feel and think about your body and a physiological indicator of stress (cortisol) in university-aged women. I am not able to tell you about the full nature of the study in advance. At the end of the study the true nature of the study will be explained, at which time you can withdraw your consent. You may experience some discomfort due to the nature of the questions being asked; in this event, contact information for Drs. Klentrou and Kerr (see above), and student health services is provided (905-688-5550 ext.3243, http://www.brocku.ca/healthservices). Information regarding body image concerns can be found at the following official websites: www.nedic.ca and www.womenshealth.gov/. Please remember people have a variety of body sizes and shapes within the population. No known or anticipated physical risks are related to participation in this study.

CONFIDENTIALITY/ANONYMITY

The data in this study is anonymous as the information provided cannot be matched to individual participants. Informed consent will be kept separate from data collected. Any information that arises from participants will be treated with confidentiality. Your name will not be included or, in any other way, associated with the data collected in the study. Please do not place your name or any identifying information on the questionnaires. Data collected during this study will be stored in a locked filing cabinet of a research laboratory of Dr. Klentrou at Brock University and will be destroyed following the completion of the principal student investigator’s PhD.
dissertation (expected completion is 2 years upon completion of this study). Access to this data will be restricted to the principal student investigator, the faculty supervisors, and their research team.

**VOLUNTARY PARTICIPATION**
Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. During or just after debriefing it is possible to withdraw, however, after this time, your data will not be identifiable, and withdrawal will not be possible.

**PUBLICATION OF RESULTS**
Results of this study may be published in professional journals and presented at conferences. Feedback about this study will be available. At your request you may receive a summary of results by completing the request for feedback from provided, or by contacting the principal student investigator or faculty supervisor by e-mail.

**CONTACT INFORMATION AND ETHICS CLEARANCE**
If you have any questions about this study or require further information, please contact the Principal Investigator or the Faculty Supervisor using the contact information provided above. This study has been reviewed and received ethics clearance through the Brock University and University of Toronto Research Ethics Boards (file #10-196; #26217, respectively). If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office at 905-688-5550 ext. 3035, reb@brocku.ca.

Thank you for your assistance in this project. Please keep a copy of this form for your records.

**CONSENT FORM**
I agree to participate in this study described above. I have made this decision based on the information I have read in the Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

Name: ____________________________ (please print)

Signature: ____________________________

Date: ____________________________
Demographic Sheet

Please complete the following information:

Age: _________

Major: ______________________________

Are you on a birth control pill? _________

Have you ever thought you have had a clinical eating disorder? _______

Have you ever been diagnosed with a clinical eating disorder? _______

Do you smoke? _______

Are you on corticosteroids or anti-depressants? _____

If so, please list the medications ____________________________

Did you eat anything within one hour of this appointment? _______

Did you drink anything within one hour of this appointment? _______

Did you do any physical activity within one hour of this appointment? _______
The statements below are beliefs that people may or may not have about their physical appearance and its influence on life. Decide on the extent to which you personally disagree or agree with each statement and enter a number from 1 to 5 in the space on the left. There are no right or wrong answers. Just be truthful about your personal beliefs.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>Strongly</td>
<td>Mostly</td>
<td>Neither Agree or</td>
<td>Mostly</td>
<td>Strongly</td>
</tr>
<tr>
<td>Disagree</td>
<td>Disagree</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree</td>
</tr>
</tbody>
</table>

1. I spend little time on my physical appearance.
2. When I see good-looking people, I wonder about how my own looks measure up.
3. I try to be as physically attractive as I can be.
4. I have never paid much attention to what I look like.
5. I seldom compare my appearance to that of other people I see.
6. I often check my appearance in a mirror just to make sure I look okay.
7. When something makes me feel good or bad about my looks, I tend to dwell on it.
8. If I like how I look on a given day, it’s easy to feel happy about other things.
9. If somebody had a negative reaction to what I look like, it wouldn’t bother me.
10. When it comes to my physical appearance, I have high standards.
11. My physical appearance has had little influence on my life.
12. Dressing well is not a priority for me.
13. When I meet people for the first time, I wonder what they think about how I look.
15. If I dislike how I look on a given day, it’s hard to feel happy about other things.
16. I fantasize about what it would be like to be better looking than I am.
17. Before going out, I make sure that I look as good as I possibly can.
18. What I look like is an important part of who I am.
19. By controlling my appearance, I can control many of the social and emotional events in my life.
20. My appearance is responsible for much of what’s happened to me in my life.
Weight and Body-Related Shame and Guilt – Body Shame

Read each of the following statements carefully and circle the appropriate value following each statement.

<p>| | | | | | |</p>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Right now, I feel ashamed because others can see my body.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>Right now, the appearance of my body is embarrassing for me in front of others.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>Right now, I would rather hide somewhere because others can see my body.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>Right now, I would be ashamed of myself if others knew how much I really weighed.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>Right now, I would feel embarrassed if I had to physical exert myself in front of others.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>Right now, the size of my clothes is embarrassing for me.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Read each of the following statements carefully and indicate the degree to which the statement is characteristic or true of you **right now**. Use the following scale. Circle the appropriate value following each statement.

1 = Not at all characteristic of me  
2 = Slightly characteristic of me  
3 = Moderately characteristic of me  
4 = Very characteristic of me  
5 = Extremely characteristic of me

<p>| | | | | | |</p>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I feel uptight about my physique/figure.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>I am bothered by thoughts that the other people in the room are evaluating my weight or muscular development negatively.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Unattractive features of my physique/figure make me nervous in this setting.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>In this environment, I feel apprehensive about my physique/figure.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>I am comfortable with how fit my body appears to the others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>It would make me uncomfortable to know that other people in the room were evaluating my physique/figure.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>When it comes to displaying my physique/figure in this setting, I feel shy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Sitting here in my clothes, I feel nervous about the shape of my body.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>I feel relaxed when it is obvious that others are looking at my physique/figure.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
**Body-Esteem Scale**

On this page are listed a number of body parts and functions. Carefully read each item and indicate how you feel about this part or function of *your own body right now* using the following scale:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td><strong>Have strong negative feelings</strong></td>
<td><strong>Have moderate negative feelings</strong></td>
<td><strong>Have no feeling one way or the other</strong></td>
<td><strong>Have moderate positive feelings</strong></td>
<td><strong>Have strong positive feelings</strong></td>
</tr>
<tr>
<td>1. Body Scent</td>
<td>19. Arms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Appetite</td>
<td>20. Chest or breasts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Nose</td>
<td>21. Appearance of eyes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Physical stamina</td>
<td>22. Cheeks/cheekbones</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Reflexes</td>
<td>23. Hips</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Muscular strength</td>
<td>25. Figure of physique</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Waist</td>
<td>26. Sex drive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Energy level</td>
<td>27. Feet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Thighs</td>
<td>28. Sex organs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Ears</td>
<td>29. Appearance of stomach</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Chin</td>
<td>31. Sex activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Physical coordination</td>
<td>33. Physical condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Buttocks</td>
<td>34. Face</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Agility</td>
<td>35. Weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Width of shoulders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Eating Disorder Inventory – Body Dissatisfaction

Read each of the following statements carefully and indicate the degree to which the statement is true of you right now. Use the following scale. Circle the appropriate value following each statement.

1 = Always  
2 = Usually  
3 = Often  
4 = Sometimes  
5 = Rarely  
6 = Never

<table>
<thead>
<tr>
<th></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 think that my stomach is too big</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2. I think that my thighs are too large</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3. I think that my stomach is just the right size</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4. I feel satisfied with the shape of my body</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5. I like the shape of my buttocks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6. I think my hips are too big</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7. I think that my thighs are just the right size</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>8. I think my buttocks are too large</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>9. I think that my hips are just the right size</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
Perceived Evaluative Threat

Using the scale below, please circle the number that best corresponds to how threatening you think the upcoming situation is:

0 = not at all

1

2

3

4 = extremely
Re-Consent/Debriefing Form

May 2011

Project Title: The Relationship between Self-Perceptions and Cortisol in a Laboratory Setting

Principal Student Investigator: Larkin Lamarche, PhD Candidate, Department of Exercise Sciences, University of Toronto

Faculty Supervisor: Dr. Panagiota (Nota) Klentrou, Professor, Department of Physical Education & Kinesiology, Brock University

Faculty Supervisor: Dr. Gretchen Kerr, Professor, Faculty of Physical Education & Health, University of Toronto

During the debriefing session, I was given an explanation as to why the researchers had to disguise the true purpose of this study. The true purpose of this study was to examine physiological (i.e., cortisol) and psychological (i.e., shame, body-related anxiety, body dissatisfaction) anticipatory responses to a body-related situation in which people are evaluated by others. In this study, half of the participants thought they would undergo a social-evaluative body image threat (i.e., a body composition test while wearing a bathing suit) and half the participants sat quietly for 10 minutes. I was informed that having full knowledge of the true purpose of the study may have influenced the way in which I completed the questionnaires and responded physiologically to the body composition assessment and this would have invalidated the results. Therefore, to ensure this would not happen, some details about the true nature of this study were initially not provided (or were provided in a manner that slightly misrepresented the real purpose of the study). However, I now was informed of the true purpose of this study. In addition, I have had the opportunity to ask questions about this and to receive acceptable answers to my questions.

Re-Consent:

I have been asked to give permission for the researchers to use my data in their study, and agree to this request. I am aware I may contact Brock University (905-688-5550 ext. 3035 or reb@brocku.ca).

Date: __________________________

Participant name (please print): _____________________________________

Participant signature: _____________________________________________
Request for Summary of Results

May 2011

Project Title: The Relationship between Self-Perceptions and Cortisol in a Laboratory Setting

Principal Student Investigator: Larkin Lamarche, PhD Candidate, Department of Exercise Sciences, University of Toronto

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Faculty Supervisor: Dr. Gretchen Kerr, Professor, Faculty of Physical Education & Health, University of Toronto

If you would like to receive a copy of a summary of the results of this study by email, please complete the following information:

Name: ________________________________
Email: ________________________________

If you would like to receive a copy of a summary of the results of this study by mail, please complete the following information:

Name: ________________________________
Address: _________________________________
City: _________________________________
Postal Code: _______________