The Influence of Body-Related Envy on Psychophysiological Response of Stress In Young Women

by

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Abstract

Body-related envy is an understudied emotion that may be linked with adverse psychophysiological outcomes such as stress (Smith & Kim, 2007). The purpose of this study was to explore body-related envy and psychophysiological response of stress among young adult females. Participants ($N = 47; M_{age} = 21.6 \pm 1.8$ yrs) completed a weeklong assessment of phenomenological body-related envy, trait body image constructs and an acute laboratory stress-induction task. Findings support the hypothesis that negative body image constructs predict experiences of body-related envy ($R^2 = 0.17 - 0.54$), and that envy can be reliability assessed using phenomenological ratings. Body-related envy was a significant predictor of psychological appraisals of stress ($R^2 = 0.24 - 0.31$), but the proposed associations with physiological stress were not supported. Considering the adverse health outcomes associated with envy (Smith, et al., 1999) and stress (Anderson, 1998), this study has important implications for women’s psychological and physical health.
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Preface

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CHAPTER 1
Introduction

Body image disturbances are ubiquitous in many modern societies with prevalence rates that continue to rise with every decade (Heatherton, Mahamedi, Striepe, Field, & Keel, 1998; Neighbors & Sobal, 2007). This trend is especially widespread among females, who are at higher risk of experiencing disturbances relating to body weight, shape and overall physical appearance (Feingold & Mazzella, 1998; Striegel-Moore & Franko, 2002; Tiggerman, 2004). In fact, Rodin and colleagues (1985) referred to this trend of body image disturbances as a ‘normative discontent’ among females. Despite the origin of this concept 30 years ago (Rodin et al., 1985), body image disturbances are omnipresent in our current culture (Grogan, 2008). This normative discontent is troubling given the well-documented evidence that body image disturbances in females are associated with a host of maladaptive health outcomes (Cash, 2002). These health consequences include but are not limited to depression, body dysmorphic disorder, disordered eating (Carr, 2002) and chronic stress (Banfield & McCabe, 2002). As such, examining body image disturbances holds important promise for understanding influences on women’s health and overall well-being.

Body image is conceptualized as a multidimensional construct consisting of perceptual (i.e., view of the physical self), cognitive (i.e., thoughts and beliefs of physical self), affective (i.e., feelings and emotions of physical self) and behavioural (i.e., actions taken to change physical self) dimensions (Cash & Smolak, 2011). Disturbances of body image may be experienced as manifestations of perceptual, cognitive, affective, and/or behavioural dimensions. For example, body dissatisfaction refers to a disturbance in the cognitive domain. Body dissatisfaction occurs when individuals make negative evaluations regarding body size, shape, tone and weight. It often involves a perceived discrepancy between an individual’s evaluations of
his or her actual body and ideal or desired body. These self-discrepancies may also influence the affective dimension, including one’s moods, feelings and emotions in relation to the body (Cash & Pruzinsky, 2002). Body image affect is typically dichotomized in the literature and studied as either positive or negative affect. Most researchers have focused on negative affective experiences due to the abundance of literature on the high prevalence and adverse outcomes of negative body-related emotions (Cash & Smolak, 2011; Gamer, 1997).

Less research on body image disturbances has focused on specific emotions that may be commonly experienced in females. The limited existing research findings show convincing evidence that body image disturbances can be studied as body-related emotions, like social physique anxiety (Hart, Leary, & Rejeski, 1989; Martin Ginis, Strong, Arent, & Bray, 2012; Sabiston, Sedgwick, Crocker, Kowalski, & Mack, 2007) and body shame (Gilbert, 2002; Monro & Huon, 2005; Noll & Fredrickson, 2006). While this work has enabled a better understanding of body image affect, it is important to broaden the study of emotions beyond anxiety and shame. For example, numerous studies exploring emotions have indirectly identified that females encounter feelings of jealousy and engage in social comparison in body-related contexts (Fleming, Kowalski, Humbert, Fagan, Cannon, & Girolami, 2006; McHugh, Kowalski, Mack, Crocker, Junkin, Lejbak, et al., 2008; Sabiston et al., 2007). These findings are closely related to the primary tenets of the self-conscious emotion of envy. In fact, in a preliminary qualitative analysis of body-related emotions (Pila, Stamiris, Castonguay & Sabiston, submitted), experiences of body-related envy appeared highly prevalent in daily experiences among young adults, especially among females. Furthermore, these emotional experiences of body-related envy were combined with negative attitudes, thoughts and perceptions regarding the body and
physical appearance. These findings suggest the importance of examining envy contextualized to the body, especially since it is an emotion that body image researchers have overlooked.

Envy is an emotion that arises from an unfavourable comparison to others and a desire for what another possesses (Foster, 1972). Envy is described by feelings of inferiority, longing, resentment and ill will towards the envied individual (Parrott & Smith, 1993). Envy occurs in domains that are important to the self, and individuals envy the attributes they perceive as unattainable in “similar others” (Smith & Kim, 2007). Given the importance of the physical self to one’s global sense of self (Fox, 1997; Harter, 2012), and the high prevalence of females comparing physical appearance with others (Myers & Crowther, 2009), it may be valuable to explore body-related envy in women. Despite recent advances in the study of body-related self-conscious emotions, envy has not been examined as a unique emotion tied to the body.

Following a suggestion to consider multiple dimensions of body image within a framework (Cash & Smolak, 2011), this study will incorporate cognitive (i.e. body dissatisfaction; self-discrepancies) and affective (body-related envy) dimensions of body image. Constructs are drawn from frameworks of social comparison theory (Festinger, 1954) and self-discrepancy theory (Higgins, 1987). Consistent with social comparison theory (Festinger, 1954), it is likely that certain individuals have a tendency to experience more body-related envy on a daily basis. According to this theory, it can be hypothesized that body-related envy is manifested as a result of a tendency to make upward social comparisons around the body and physical appearance. This is especially true if the body and physical appearance are relevant domains to the self (Festinger, 1954; Fox, 2000). These theoretical tenets have been supported by studies that link high social comparison tendencies with various psychosocial outcomes (Chou & Chi, 2001; Giordano, Wood, & Michela, 2000; White, Langer, Yariv, & Welch, 2006). For example,
high appearance-focused social comparison tendencies have been linked with tendency to experience body dissatisfaction (Tiggerman & McGill, 2004) and traits of physical self-discrepancies (Bessenoff, 2006), low-self esteem (Tylka & Sabik, 2010), and perfectionism (Schutz, Paxton, & Wertheim, 2002). According to social comparison theory (Festinger, 1954), it is likely that body-related envy is predicted by similar personality traits as appearance-focused social comparisons (White, et al., 2006). In fact, individuals with a high tendency to make comparisons based on physical appearance also have a tendency towards negative body image, such as body dissatisfaction (Stormer & Thompson, 1996). This association between upward comparisons and body dissatisfaction is also consistent with tenets of self-discrepancy theory (Higgins, 1987), which focus on the gaps between current and desired attributes of the self. Based on self-discrepancy theory, individuals who are prone to experiencing physical self-discrepancies may be more likely to make social comparisons (Tiggerman & McGill, 2004) and experience body-related envy. Furthermore, according to self-discrepancy theory (Higgins, 1987) individuals prone to perfectionism may set high expectations in domains of physical appearance and experience prevailing discrepancies with perceived bodily flaws (Vohs, Petit, Bardone, Katz, Abramson, et al., 2001). Combined, these associations may provide support for utilizing social comparison theory (Festinger, 1954) and self-discrepancy theory (Higgins, 1987) in understanding predictors of envy contextualized to the body.

Understanding predictors of body-related envy is especially important considering that generalized forms of envy have been linked to specific health outcomes such as neuroticism, depression, stress, hostility, anger, anxiety, obsessive compulsiveness, and maladjustment (Smith et al., 1999; Stansfeld, North, White & Marmot, 1995). As a defining feature of envy, hostility on its own has been associated with many physical and psychological implications (Smith &
Kim, 2007). The most damaging is the link of hostility to stress outcomes, which has been seen on both psychological self-reports and physiological markers of cortisol (Dickerson & Kemeny, 2004). For example, hostility and envy have been linked with emotional arousal and activation of the hypothalamic pituitary adrenal (HPA) axis (Wasserman, Geijer, Sokolowski, Rozanvo, & Wasserman, 2007), which is part of the neuroendocrine response to stress. Furthermore, in a review, Dickerson & Kemeny (2004) conclude that individuals who engage in hostile behaviours also show elevations in cortisol. In another study, researchers show that individuals who are predisposed to envy experience greater daily stress and are also more reactive to stressful stimuli (Benotsch, Christensen, & McKelvey, 1997). Taken together, these associations suggest that the outcome of stress in experiences of envy is particularly problematic, since chronic experience of stress is viewed as an indicator of poor health (Anderson, 1998).

By definition, stress response occurs from an imbalance between external demands and internal resources (Lazarus & Folkman, 1984) and is characterized as an emotional experience accompanied by predictable biochemical, physiological and behavioural changes (Baum, 1990). Acute experiences of stress can have positive and adaptive outcomes, however chronically experiencing stress may present serious health consequences, such as immune system suppression, increased risk for hypertension, cardiovascular disease, cancer, diabetes and depression (McEwen, 1998). In addition to these health consequences of chronic stress, females may also be at risk of developing a set of sex-specific adverse health outcomes, including menstrual irregularity, ovulation disturbances, lower bone mineral density, and inhibited bone formation (Kudielka & Kirschbaum, 2005). These health consequences are particularly problematic for individuals who have highly reactive predispositions to stressful stimuli and consequently experience more chronic stress (Boyce & Ellis, 2005). Various studies suggest that
females subjectively experience more stress, and are more likely to appraise stressful stimuli as more threatening than males (Kroenke & Spitzer, 1998; Newman, O’Connor, & Conner, 2007; Troisi, 2001). Considering this evidence, and given that a high proportion of women report body image disturbances (Tiggemann, 2004), it is likely that females also experience more negative affect in response to stressful situations relating to the body.

In fact, there is empirical evidence that links body image affect to stress responses. In a qualitative analysis, researchers found that women are exposed to a range of body-related social threats on a daily basis, which negatively influences their overall emotional experiences and appraisal of stressful stimuli (Lamarche, Kerr, Faulkner, Gammage & Klentrou, 2012). Other researchers have demonstrated associations between body dissatisfaction, negative affect and stress appraisals (Sabiston et al., 2007), providing support for examining stress in relation to body-related emotions. For example, Page (1991) found that young adult females who perceived themselves to be overweight were more likely to be dissatisfied with their bodies and experience negative affect and psychosocial stress. Furthermore, researchers reporting on a prospective longitudinal study suggest that body dissatisfaction may be a predictor of stress (Johnson & Wardle, 2005). In the sample of adolescent girls followed over a one-year period, body dissatisfaction independently predicted a range of adverse outcomes, including psychological stress. These results support findings that body dissatisfaction is a predictor of stress both cross-sectionally and longitudinally. Furthermore, Puterman and Linden (2006) found that body dissatisfaction was predicted by perceived stress related to body image and appearance. The authors suggest that body image stress relates to affect, cognition and health behaviour in similar ways as general stress. This conclusion provides compelling evidence to suggest that the adverse health outcomes of stress can be experienced when stress is contextualized to the body and
appearance, and likely to body-related affect such as envy. This proposed association is supported by studies that show a relationship between physiological stress and body image disturbances (Bedford, Linden, & Barr, 2010; Rutters, Nieuwenhuizen, Lemmens, Born, & Westerterp-Plantenga, 2009; Therrien et al., 2008). One of these studies (Bedford, et al., 2010) suggests that negative body image attitudes may contribute to increased physiological response to stressful stimuli (i.e. activation of cortisol).

To date, researchers have not examined associations between appearance-focused upward social comparisons (conceptualized as envy experiences) and stress. Based on empirical findings that proneness to making upward comparisons is linked with higher levels of perceived stress (Osterman & Marie, 1996), it is valuable to explore the association of appearance-focused upward comparisons to stress. Based on social self preservation theory (Dickerson, Grueneald, & Kemeny, 2004), chronically experiencing social threats (such as negative social comparisons) will increase cortisol response to stress (Gunnar & Donzella, 2002). Considering that upward comparisons may be a social threat (Dickerson & Kemeny, 2004), it is likely that envy plays an important role in cortisol response and stress. Past research suggests a potential role of experiencing body-related emotions (e.g. body shame) in response to social threats in contexts where the body or physical appearance is called into question (Lamarche et al., 2012; Martin Ginis et al., 2012). This evidence may provide support for the use of social self preservation theory (Dickerson et al., 2004) in understanding associations between body-related envy and stress response.

Considering these emergent associations between disturbances in body image affect and experiences of stress, studying the affective domain of body image will have important implications in understanding unique emotions tied to the body, including envy. Given that
chronic stress and other adverse health outcomes (Smith et al., 1999) are related with envy experiences, there is merit in studying domain specific envy. Combined, these findings underscore the broad host of related health implications associated with experiences of chronic stress, emotional experiences of envy, and body image disturbances. And given the breadth of research that highlights the adverse health outcomes, it is imperative to better understand the associations among these constructs.

1.1. Purpose and Research Questions

Based on the theoretical tenets of social comparison theory (Festinger, 1954), self-discrepancy theory (Higgins, 1987) and social self preservation theory (Dickerson et al., 2004), the overall purpose of this research is to examine disposition to body-related envy experiences and associations to response of stress among young adult females. The following research questions are proposed:

RQ1. Are phenomenological ratings valid and reliable assessments of body-related envy experiences?

RQ2. Are body dissatisfaction, physical self-discrepancies, importance of physical appearance, physical self-worth and trait body shame significant predictors of body-related envy experiences?

RQ3. Are body-related envy experiences associated with psychological and physiological responses of stress?

RQ4. Does body-related envy mediate the association between the predictors and (i) physiological stress, and (ii) psychological stress appraisals?
1.2. Literature Review

1.2.1. Body Image

Over the past 50 years, research on body image disturbances has grown substantially, especially in women due to the well-documented associations with adverse health outcomes (Cash & Smolak, 2011). Females are at higher risk of experiencing negative cognitions and affect in relation to the body and physical appearance (Tiggerman, 2004). This is likely influenced by societal standards and ideals that are unrealistic and impossible for women to attain, for example, the pressure for women to be increasingly thin and toned (Bessenoff & Snow, 2006). The media plays a large role in perpetuating these disturbances for women, due to the portrayed of increasingly thin ideal that is unrealistic for the average woman to achieve (Tiggermann & McGill, 2004). Researchers have also shown that the media influence plays a large role in women’s body dissatisfaction (Tiggermann & Pickering, 1996). As a result of this ubiquitous message imposed by the media and society, internalizations of these ideals influence women to compare themselves to this standard, and seek comparison targets that also meet this ideal (Bessenoff & Snow, 2006; Lin & Kulik, 2002; Noles, Cash & Winstead, 1985). Furthermore, a pursuit for thinness can be considered a social norm, putting women at higher risk of adopting drastic methods in the quest to lose weight, including eating disorders and cosmetic surgery (Cash & Pruzinsky, 2002). Given this evidence, studying body image disturbances in women holds important promise in developing tailored intervention strategies aimed at improving women’s health and well-being.

Body image consists of an individual’s body-related perceptions, attitudes, thoughts, beliefs, feelings and behaviours (Banfield & McCabe, 2002; Cash, 2004). As such, body image is a multidimensional construct and refers to an individual’s internal representation of his or her
outer self (Cash, 2004; Thompson, Heinberg, Altabe & Tantleff-Dunn, 1999). Body image incorporates domains of physical appearance, like body weight and shape, as well as physical performance, fitness, functioning and health (Grogan, 2008), and body image ranges along a continuum from healthy to severe body image disturbances (Bane & McAuley, 1998). Depending on the level of severity, body image disturbances can cause significant impairments in social, occupational and psychological functioning (Bane & McAuley, 1998). For example, body image disturbances have been linked with excessive exercise, sedentary behaviours, depression, elective cosmetic surgery, eating disorders and anabolic steroid use (Hausenblas & Fallon, 2006; Grogan, 2008). Furthermore, the level of severity of body image disturbances depends on the extent to which individuals value their bodies and physical appearances.

Body image is considered a multidimensional construct (Cash & Pruzinsky, 2002). The perceptual dimension consists of how an individual sees him or herself in terms of physical appearance. Perceptual body image is assessed by examining how an individual perceives his or her body shape, size or appearance and this perception is then compared to his or her objective body shape, size or appearance. The cognitive dimension is the most studied and consists of how an individual evaluates his or her body in terms of appearance and function. It consists of an individual’s attitudes, thoughts and beliefs surrounding his or her body (Bane & McAuley, 1998; Grogan, 2008). Meanwhile, the behavioural dimension consists of actions pursued by the individual that reflect their perceptions, cognitions and affect surrounding the body (Cash, 2004), such as restricting caloric intake (Putterman & Linden, 2006). And finally, the affective dimension comprises feelings and emotions regarding the body and physical appearance. For example, failure to meet relevant size and weight goals may to lead to negative affect (Groesz, Levine & Murnen, 2002). It is important to emphasize that even though the affective dimension
is one part of a multidimensional framework, affective experiences independently contribute to body image disturbances (Cash, 2002). For example, it has been documented that the strongest predictor of overall body dissatisfaction is negative affect relating to the body (Cash & Smolak, 2011). Unfortunately, research on body image affect has been very narrow in focus, with most researchers conceptualizing affect as either positive or negative. Considering the importance of the affective dimension in understanding body image disturbances, it is important to conceptualize emotions beyond this dichotomy.

The most commonly studied emotion related to the body is social physique anxiety (SPA) (Hart et al., 1989). SPA is defined as a specific type of anxiety that is experienced when one’s physique is perceived or actually being evaluated by others, often in a social situation. Similar to general body image disturbances, SPA is more commonly reported by females than males (Hart et al., 1989). SPA is strongly predicted by negative physical self-perceptions (Crocker, Sabiston, Forrestor, Kowalski, Kowalski, & McDonough, 2003; Kowalski, Crocker, & Kowalski, 2001; Lindwall & Lindgren, 2005) and has been associated with other variables such as global self-esteem, drive for thinness, and body dissatisfaction (Crocker, Sabiston, Kowalski, McDonough, & Kowalski, 2006; Hausenblas & Mack, 1999). As such, it is no surprise that SPA has been investigated in influencing body and health-related cognitions (Crocker et al., 2006) as well as body and health related-behaviours, including exercise participation and avoidance, and dietary restraint (Crockert et al., 2006; Sabiston et al., 2007; Cafri, Thompson, Ricciardelli, et al., 2005). However, findings from a qualitative analysis (McHugh, et al., 2008) suggest that women’s experiences of body-related emotions are not restricted to only SPA. These findings are supported by other literature that suggests women’s feelings about their bodies are complex (Guendouzi, 2004; Tiggerman, Gardiner & Slater, 2000) and the experience of SPA are best
understood when emotions are explored as a more complex and interconnected “web of emotion” (McHugh, et al., 2008). This “web of emotion” (McHugh, et al., 2008; Sabiston, et al., 2007), may explain how women’s body-related experiences may be identified with more than one particular emotion. Especially prevalent in these body-related experiences are emotions that are self-conscious in nature.

1.2.2. Body-related self-conscious emotions

Self-conscious emotions have been predominantly overlooked in the literature, given the focus on the basic emotions (Fischer & Tangney, 1995; Tracy & Robins, 2004). Basic emotions are evolutionarily driven, play an important role in survival, have distinct facial features and are present early in development (Ekman & Friesen, 1971), meanwhile self-conscious emotions are primarily concerned with the self, and specifically in relation to social motivations (Lewis, 1993). Unlike basic emotions, self-conscious emotions are not universally recognized and do not have distinct facial expressions. Another significant difference is that self-conscious emotions require complex cognitive processing of the self in relation to the event, unlike basic emotions which are more automatic in nature (Tangney & Dearing, 2002). Similar to basic emotions, self-conscious emotions are central to fundamental social processes and behaviours (Izard, Ackerman & Schultz, 1999; Tracy & Robins, 2007) and central in regulating thoughts, feelings and behaviours (Fischer & Tangney, 1995). Specifically, a main role of self-conscious emotions is to promote attainment of social goals. Self-conscious emotions motivate behaviours that lead to socially valued outcomes (Keltner & Buswell, 1997). Researchers emphasize the importance of self-conscious emotions for motivating social behaviours (Cover, Tangney, Maddux, & Heleno, 2003; Lewis, 1993). In fact, researchers in specific fields like sport and exercise
psychology are focusing on these emotions due to their influence on performance, social, and health motivations (Crocker et al., 2004; Sabiston et al., 2010; Vallerand & Blanchard, 2000).

Unlike basic emotions, self-conscious emotions always involve self-awareness, self-representations and self-evaluation (Tracy & Robins, 2004; Tangney & Dearing, 2002). In other words, self-conscious emotions are elicited when an individual (a) becomes aware of a discrepancy in the actual or ideal self-representation, (b) reflects on the discrepancy and (c) evaluates it based on external evaluations and internalized self-representations (Tangney & Dearing, 2002). For these reasons, self-conscious emotions are likely experienced as affective experiences specific to the body. In fact, self-conscious emotions researchers (Tangney & Tracy, 2012) recently highlighted the importance of contextualizing emotions to specific domains of the self, such as the body and physical self. It is important to target the body as an important domain of the self for several reasons: (a) considering the importance of the physical self to one’s global sense of self (Fox & Corbin, 1989); (b) others are a great source of comparison when it comes to evaluating one’s own body (Morrison, Kalin & Morrison, 2004; Stice, 1994), (c) the body is particularly relevant in Westernized cultures that place a high value on one’s physical appearance relative to typically unattainable cultural standards (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), and (d) over 80% of males and females report experiencing high levels of body dissatisfaction (Neighbors & Sobal, 2007). Considering the importance of contextualizing self-conscious emotions to the body, it is no surprise that in recent years researchers have begun to explore emotions such as body-related shame, guilt and pride, while insinuating embarrassment and envy (Bane & McAuley, 1998; McHugh, et al., 2008; Mosewich, Kowalski, Sabiston, Sedgwick, & Tracy, 2011; Castonguay, Brunet, Ferguson, & Sabiston, 2012; Sabiston,
et al., 2010). This focus on body-related self-conscious emotions will have significant impact in advancing research in the affective dimension of body image.

Negative emotions of shame and guilt have been identified in body-related experiences (Sabiston, et al., 2010). Body shame occurs when the self fails to meet an idealized societal standard of physical appearance (Lewis, 1993; Noll & Fredrickson, 2006), for example “I gained weight because I am an undisciplined person.” In general, shame is associated with behaviours of submission and withdrawal, and characterized by desires to “hide”, “escape”, “disappear from view” and “shrink into the floor.” Research specific in body shame has linked similar phenomenological experiences when recalling a shameful experience regarding the body (Fusch, 2002). Body shame is commonly triggered by negative self and social judgments due to an internalization of societal standards, as well as perceived incompetence in appearance or physical features (Bessenoff & Snow, 2006; Brune, 2011; Noll & Fredrickson, 2006). Since body shame is related to global attributions made about the self, it tends to be intensely experienced and difficult to alleviate (Tangney, Wagner, & Gramzow, 1992). As such, body shame can be particularly disturbing to the self and lead to harmful health behaviour. For example, body shame has been identified as a mediator between self-objectification and disordered eating (Noll & Fredrickson, 1998), and as being a strong predictor of disordered eating (Burney & Irwin, 2000) and maladaptive physical activity motives (Sabiston et al., 2010).

Similar to shame, guilt is also an emotion that can be contextualized to the body, although significantly less research exists on body-related guilt. Generally, guilt is a negative emotion that involves tension, remorse and regret in reference to an undesirable behaviour (Tracy & Robins, 2006), for example, “I gained weight because I ate too much junk food.” This body-related emotion occurs when actions of the self do not meet a set standard, rather than the
global self not meeting a set standard (as in shame). As such, experiences of guilt are less detrimental and intense than experiences of shame, and generally motivate reparative action (Lewis, 1993). In body-related guilt, reparative action could include increased motivation to increase health behaviours such as healthier eating and increasing physical activity (Brune, 2011; Sabiston et al., 2010), but it can also increase unhealthy behaviours such as restricted eating (Burney & Irwin, 2000). In spite of the preceding research providing insight into some body-related emotions that women may encounter, there has been limited research focused on likely important body-related self-conscious emotions such as embarrassment and envy. While embarrassment is an emotion that is highly tied to shame experiences, and likely understood predominantly with an understanding of shame, envy is a unique emotion that likely has independent correlates and outcomes, and may further advance the research on body image affect.

1.2.3. Envy

In general, the self-conscious emotional experience of envy arises from an unfavorable comparison to another and a desire for what the other possesses (Foster, 1972). In reference to the defining features of self-conscious emotions, envy occurs when an individual (a) notices an attribute or characteristic in another, (b) reflects on the desirability of this attribute and (c) evaluates the attribute as important to the self and valued in society. Despite this, some disagreement exists for whether envy should be classified as a self-conscious emotion (Lewis, 1989), however prominent self-conscious emotion researchers agree that envy has unique similarities to self-conscious emotions like guilt and shame (Tangney & Salovey, 2010). Additionally, similar to other self-conscious emotions, envy occurs in interpersonal contexts and is driven by motives that facilitate social goals (Tangney & Salovey, 2010). Individuals have an
internal motive to make comparisons with others and envy can be experienced as a sense of admiration for the attributes of another and thus increase motivations and intentions to improve the self (Algoe & Haidt, 2009; Lockwood & Kunda, 1997), or it can be experienced as a discouraging and defeating comparison (Lockwood & Kunda, 1997). Despite the prevalence of social comparison motives in daily social interactions, and the ability of envy to influence motivations (Smith & Kim, 2007), research has predominantly focused on shame, guilt, and pride (Tangney & Fischer, 1995; Tracy & Robins, 2006; 2004).

1.2.3.1. Definition of envy.

Envy is a self-conscious emotion that arises in response to an unfavourable social comparison with an advantaged other, and tends to occur in domains of personal relevance (Parrot & Smith, 1993; Salovey & Rodin, 1991). For example, a salient domain may be the physical self (Fox, 2000), which may suggest that envy can be contextualized to the body and physical appearance. In support for this proposed association, some of our preliminary narrative and interview work has demonstrated that envy has been experienced as a body-related emotion among adolescent and young adult males and females (Pila et al., submitted). Emotional experiences of envy are characterized by a complex combination of unpleasant psychological states, such as feelings of hostility, inferiority, injustice, resentment and ill will towards the envied other (Salovey & Rodin, 1991; Smith & Kim, 2007; Smith, Kim, & Parrott, 1988). As such, envy consists of a mix of complex affective reactions that arise from a multidimensional appraisal (Lazarus, 1991; Parrot, 1991; Smith, 1991). Foster (1972) suggested that envy involves two primary affective components, including both feelings of inferiority and feelings of ill-will, and theorists support this notion (Montaldi, 1999; Parrot, 1991; Salovey, 1991). Furthermore, both inferiority and ill-will emerge in empirical studies on daily experience of envy (Smith et al.,
Considering these negative effects, it is no surprise that envy is a subjectively unpleasant emotion (Parrott, 1991). As such, Smith and Kim (2007) identified the challenges researchers face with characterizing and semantically defining envy. Although envy typically has negative connotations due to associations with hostility, it can also similar to feelings of admiration (van de Ven, Zeelenberg, & Pieters, 2009). For example, individuals are more likely to admit to envy when it parallels admiration and more likely to keep envious feelings secret when hostility is experienced (Smith & Kim, 2007).

1.2.3.2. Benign vs. malicious envy

In their review examining the emotion of envy, Smith and Kim (2007), emphasize the importance of properly defining envy as a hostile emotion, rather than a benign form of envy (i.e. admiration, longing) that is commonly referred to in everyday language. In fact, researchers have distinguished distinct features and profiles of malicious and benign envy (van de Ven, et al., 2009). In a cluster analysis, researchers found that both types of envy occur as a result of explicit social comparisons, however unlike benign envy, malicious envy is characterized by an assessment of injustice or unfairness, as well as low perceived behavioural control. This study also suggested that women’s envy experiences are more malicious and hostile when compared with men. Although benign envy presents as a less negative emotion, both types of envy are socially undesirable and associated with negative outcomes. For example, individuals may be reluctant to admitting benign envy as this feeling brings to light a personal inadequacy and may lessen other’s perceptions of the self. Similarly, malicious envy especially is associated with a series of socially undesirable behaviours, including sacrificing one’s own outcomes to diminish the advantage of a competitor (Parks, Rumble & Posey, 2002) and feelings of happiness when an envied other suffers (Leach, Spears, Branscombe & Doosje, 2003).
The current literature supports the notion that experiences of envy can be malicious or benign, depending on how an individual perceives the attainability of the envied characteristic. For example, Testa & Major (1990) suggest that individuals who are primed to have low perceived behavioural control for attaining a desired characteristic will also experience the strongest emotional reactions of hostility. Also supporting the role of perceived attainability, Lockwood & Kunda (1997) indicate that individuals will be inspired by a comparison when they perceive the envied other to have attainable attributes, and alternatively will feel defeated and discouraged when the target other has attributes that are perceived to be unattainable. This is further supported in a review by Smith and Kim (2007) that exemplifies how individuals are motivated to make comparisons with similar others, setting an expectation that the envied characteristic is attainable by virtue of other similarities. As such, if the goal is unattainable, the emotional consequences are far more negative. Experiences of both types of envy can be contextualized to the body and physical self since perceived behavioural control has been consistently linked with body image correlates (Webster & Tiggerman, 2003). Furthermore, in our preliminary examination of body-related envy, we found that some individuals, particularly women, are more prone to experiencing increasingly hostile or malicious types of body-related envy (Pila, Stamiris, Castonguay, & Sabiston, 2012; Stamiris, Pila & Sabiston, 2012).

1.2.3.3. Envy vs. jealousy

Researchers (Parrott & Smith, 1993) have theorized that envy and jealousy are distinct emotions with independent antecedents and experiences. Despite this knowledge among emotion theorists, semantically, envy and jealousy are terms that are used interchangeably (Wurmser & Jarass, 2002). In the English language, the word ‘jealousy’ can refer to both jealousy or envy, while the word ‘envy’ is strictly maintained for the negative hostile emotion (Parrot & Smith,
Envy typically occurs when an individual lacks a desirable quality, trait or possession that is held by another in a self-relevant domain and consists of a cluster of distinct affective elements including inferiority, resentment and ill will (Parrot, 1991). Jealousy typically occurs in interpersonal contexts when an individual fears losing an important other to a superior rival (Hupka, 1991). For example, jealousy may be experienced in social relationships, where a third party individual may present the threat of losing a close friend or romantic partner. Distinct from envy, jealousy is characterized by distrust, fear of loss, anxiety, uncertainty and anger over anticipated betrayal (Parrot & Smith, 1993).

Envy and jealousy have been paired in theoretical taxonomies of emotions (Lazarus, 1991). This is likely due to co-occurring reports of jealousy and envy, which further increases confusion between the two emotions (Parrot & Smith, 1993). For example, an individual may feel threatened when his/her romantic interest is talking to a rival, causing jealousy, but the individual may also feel envious of the rival’s physical attributes and social qualities (Schmitt, 1988). As such, there is more opportunity for experiencing envy in contexts of social comparison, since envy tends to be experienced in conjunction with jealousy. In context of the body and physical self, it is likely that envy is primarily experienced when comparisons are made with the desired physical attributes of a similar other, whereas jealousy is experienced when there is a perceived threat of losing a romantic partner to a more physically attractive individual.

1.2.3.4. Envy and other self-conscious emotions

A reoccurring difficulty in studying self-conscious emotions is the tendency for the emotional experiences to co-occur (Keltner & Buswell, 1996; Tangney & Robins, 2004). For example, due to the negative social stigma of experiencing this emotion, envy is commonly experienced with shame, which is another self-conscious emotion that involves a sense of
inferiority (Gilbert, 1998). Shame is also considered a socially undesired emotion and difficult to measure since individuals feel ashamed of admitting shame (Tangney, 1995). Considering research on how shame is contextualized to the body and physical appearance in situations in which an individual perceives their physical self to be inferior in comparison to another (Noll & Fredrickson, 2006), it is likely that envy and shame co-occur. In a preliminary study of body-related envy (Pila et al., 2012), individuals interviewed about envy tended to discuss the features of envy and upward social comparison, but would not label the experiences as ‘envy’. Due to a social stigma associated with experiencing envy, it is likely that admitting to feelings of envy can lead to feeling ashamed (Smith, 2008). Furthermore, participants described phenomenological features of shame when discussing envy experiences, such as feeling inferior and wanting to hide or disappear. These findings may suggest that emotions of envy and shame co-occur in experiences of upward comparisons regarding the body. Considering this likely co-occurrence, body shame any body-related envy should be studied simultaneously to explore the possible intertwined nature of associations.

1.2.3.5. Envy in society

From a psychological perspective, envy is traditionally examined as an isolated appraisal that unique to the individual experiencing it (Tangney & Salovey, 1999). However, as sociologists suggest, it is imperative to consider the social context in which this emotion occurs (Scheff, 1994). In fact, some theorists even consider negative emotions (e.g. shame and embarrassment) to occur completely as a result of social structure (Goffman, 1967). In combining the psychological and sociological perspective, Lewis (1971) discussed a dynamic relations of the “inside vs. outside” problem of understanding how negative emotions interact (Scheff, 1994). Using this perspective (Lewis, 1971), envy can be conceptualized as a socially
constructed emotion that is elicited in response to social threat, combined with the internal construction of the self. This perspective helps to shed light on the socially constructed view of envy as a destructive experience, and can help researchers in identifying and measuring this emotion.

Examining emotions from a sociological perspective may also suggest considering the role of gender, race and social class (Kemper, 1987). For example, Howard (1995) proposes that socially disadvantaged individuals will experience more negative emotions due to the degradation of their social status. This may cause these socially disadvantaged individuals to adopt the ideals of their social environment and experience more negative emotions, such as envy. In fact, conceptualizing envy within a social structure can help to illuminate how it may be personally experienced in contexts that are regarded as socially salient, such as physical appearance (Fox, 1988; Thompson et al., 1991). For example, in prominently Western societies, societal ideals promote thinness as the aesthetic standard for women (Salovey & Rodin, 1991), and individuals who do not conform to this standard (e.g. being overweight) can experience social discrimination and stigmatization (Myers & Rosen, 1999). As such, it can be speculated that experiences of envy may be more prominent in individuals whose physical appearance does not correspond with the constructed social ideals.

Despite that women may be at higher risk of this social inequality, it is imperative to note that these negative emotions are not necessarily unique to females (Else-Quest, Higgins, Allison, & Morton, 2012). Adhering to conventional gender roles, such as focusing on physical appearance and endorsement from others may exacerbate the experience of these emotions for females (Martz, Handley, & Eisler, 1995). However, empirical evidence is unclear on what shapes gender differences in the experience of negative emotions (Else-Quest et al., 2012).
Considering the risk of more intense negative emotions among women, perhaps it is practical for experimental studies to first examine envy among women, and then continue to broaden the conceptualization of this emotion across gender.

1.2.3.6. Measures of envy

Envy can be conceptualized as a stable dispositional trait as well as an episodic emotional state. Dispositional measurements of envy assess an individual’s tendency to feel envious, and are a marker of chronic envy experiences. Chronically envious individuals are likely to report low self-ratings compared to others on important domains of comparison and be more prone to responding with envy when facing upward social comparisons (Smith et al., 1999). Further outlined in this research is that chronically envious individuals are likely to respond with higher hostility and ill will with frequent and intense episodes of envy. The Dispositional Envy Scale (DES; Smith, et al., 1999) is the most commonly utilized measure of envy. It contains eight items, four of which explicitly assess frequency and intensity of envy, and four items that implicitly assess reactions associated with envy without explicitly asking about envy. For example, one of the implicit items is: “It somehow does not seem fair that some people have all the talent.” The latter set of items are designed to circumvent the issue that envy is underreported in order to maintain social desirability (Smith & Kim, 2007). Overall, this scale has high reliability and construct validity, as depicted by correlations with other relevant measures (Smith & Kim, 2007; Smith et al., 1999). Furthermore, the DES predicted envy longitudinally across various social comparison domains (Smith et al., 1999).

The other dispositional measure of envy is the York Enviousness Scale (YES; Gold, 1996), which is less commonly used in the current literature. This scale consists of 20 items that are less explicit in assessing envy (e.g. no items contain the word ‘envy’). It was hypothesized that using
this method would encourage truthful responses, by framing potentially undesirable items in less threatening ways (e.g. “It makes me feel good to rain on someone’s parade” rather than asking about spitefulness). The only known measure of state envy is the Episodic Envy Scale (EES; Cohen-Charash, 2009), which consists of 9 items. This measure consists of a feeling component and a cognitive appraisal component. The former assesses hostile feelings while the latter assesses upward social comparisons. Despite efforts to evade social desirability, Smith and Kim (2007) state that no scale likely captures all aspects of the emotion since experiencing envy is particularly painful and threatening to the self (Foster, 1972) and societal norms strengthen its undesirable disposition (Silver & Sabini, 1978).

1.2.3.7. Predictors of envy

Researchers consistently suggest that the main predictor of envy is a negative social comparison (Salovey, 1991; Salovey & Rodin, 1991). Social comparison is defined as a conscious or unconscious cognitive process that appraises the self in relation to another. Festinger’s (1954) social comparison theory posits that individuals have an innate drive for social evolution and self-enhancement. This drive leads to social comparisons in order to understand one’s standing in relation to others in terms of attributes and performance. Interestingly, social comparisons do not always occur consciously. In fact, researchers suggest that some self-evaluations cause automatic social comparison processes (Mussweiler & Ruter, 2003; Smith, 2008; Stapel & Blanton, 2004). Tendencies to engage in social comparisons vary between individuals, driven by individual and personality differences. Having a high social comparison orientation is characterized by higher engagement in social comparisons, negative affectivity and uncertainty of the self (Haliwell, 2012). There are two different types of comparisons: (i) upward social comparisons occur when a comparison is made with someone
who is perceived to be better off than the self, and results in negative consequences, such as decreased self-esteem; and (ii) downward comparisons are made when the self is compared to someone who is perceived to be worse off, and positive consequences result, such as increased self-esteem.

Upward social comparisons, which are conceptually similar to envy experiences, are most potent with familiar others who are physically present rather than unfamiliar others who are hypothetical targets of comparison (Buckingham & Alicke, 2002). Comparing with familiar others, such as friends, family members, coworkers or others in the immediate environment is most common due to chances for greater interaction with these individuals (Foster, 1972). In our qualitative study of body-related envy experiences, participants often described envy experiences specific to upward social comparisons with familiar others, and that these comparisons were more meaningful and salient than comparisons made with strangers.

Furthermore, making comparisons with reference to another who is characteristically similar to the self ensures self-evaluations are more stable and accurate, rather than when large discrepancies exist between two comparison targets (Festinger, 1954; Suls & Wills, 1991). Generally, comparisons are made to other individuals of the same sex, age, and who possess similar ability, qualities and backgrounds (Festinger, 1954; Parrott, 1991; Salovey & Rodin, 1991). Given that maximal information can be extracted for evaluation with an individual who is similar, a more precise comparison may occur (Parrot, 1991; Salovey & Rodin, 1991). On the contrary, comparisons made to dissimilar others are not useful to motives of self-enhancement and elicit feelings of indifference (Suls & Wills, 1991). These findings were supported in our study of body-related envy, where participants identified similar peers as the most common and useful comparison target (Pila, et al., 2012). Although Festinger’s (1954) original theory supports
this notion, some conflicting evidence exists. For example, individuals tend to make upward social comparisons to others who are far better off in the domain of comparison, such as celebrities or professional athletes. Research from Lockwood and Kunda (1997) explains that individuals make comparisons with far superior targets based on inspiration and admiration. This is often seen in studies where upward social comparisons are contextualized to physical appearance (Myers & Crowther, 2009). This notion was partially supported in our phenomenological analysis of body-related envy (Pila, et al., 2012). For instance, even though similar peers were the primary source of comparison for participants, athletes and celebrities were identified as desirable role models that may motivate behaviour. Interestingly, all participants who mentioned these dissimilar comparison targets also recognized these comparisons as unrealistic and impractical. Due to this awareness and acceptance, participants did not tie overly negative or hostile feelings with these targets. These results could suggest that although unrealistic targets may be used for comparisons, if they are accepted as unattainable, emotional experiences are more benign in nature. It is likely that some individuals do not appraise these unrealistic comparisons as unattainable, due to the ingrained and internalized social standards for physical appearance (Tiggerman, 2004), and as such experience more negative emotions such as envy.

In order to better understand the nature of these upward comparison targets, researchers have examined body image disturbances (e.g. body dissatisfaction) in laboratory settings, via media image manipulations to induce upward social comparisons (Fallon & Hausenblas, 2005; Tiggemann & Slater, 2004). A meta-analysis (Myers & Crowther, 2009) summarized how laboratory studies examining appearance-focused social comparisons were significantly associated with body dissatisfaction, primarily in females. Overall, females are more likely to
make appearance-focused social comparisons, primarily regarding weight (e.g., Jones, 2001), body size or shape (e.g., Depcik & Williams, 2004), specific body parts such as the lower body (e.g., Martin Ginis, Eng, Arbour, Hartman, & Phillips, 2005), or overall physical attractiveness (e.g., Halliwell & Dittmar, 2005). Even though appearance-focused upward comparisons are conceptually similar to body-related envy, no researchers to date have explicitly identified envy as the body image affect involved in social comparisons.

In addition to social comparison as a predominant antecedent of envy experiences, Salovey and Rodin (1991) identified three main independent predictors of envy experiences that are consistently supported in the current body of correlational research on envy. The first was the importance of the domain to the self, in that envy is experienced when an individual feels inferior relative to another in a domain that is central their identity (Wood, 1989). If a core part of an individual’s self-worth is associated with success in a certain domain (i.e. importance in being physically attractive), social comparisons are likely to elicit more negative emotions (Smith & Kim, 2007). This notion is widely supported by emotion researchers (Lazarus, 1991), since individuals are motivated to maintain a positive self-concept (Tesser, 1991). The second predictor of envy was identified as the failure to measure up to one’s ideal expectations in that domain (Salovey & Rodin, 1991). This predictor is consistent with definitions of self-discrepancies (Higgins, 1987). As per self-discrepancy theory, self-discrepancies occur when the self is perceived to fall short on an important standard (Higgins, 1987). In body-related contexts, experiencing a body-related self-discrepancy was an antecedent to making upward social comparisons (Tiggermann & McGill 2004) and may play a role in predicting negative emotions such as body-related envy (Pila, et al., 2012). Although research has not linked self-discrepancies with body-related envy, other self-conscious emotions of body-related shame, guilt and pride
have been identified (Castonguay, et al., 2012). Specifically, the authors found that discrepancies between actual and ideal weight predicted increases in shame and guilt, and decreases in pride. Since self-discrepancy theory (Higgins, 1987) has shown utility in use with body-related self-conscious emotions, it is likely a useful tool to understand other body-related emotions, like envy.

The third predictor of envy identified by Salovey and Rodin (1991) was low self-esteem. Specifically, envy is elicited in situations where attributes of others threaten self-worth. Humans are motivated to maintain positive self-worth, and experiencing envy can diminish one’s social position (Sabini & Silver, 1982). Past research has emphasized the role of low self-worth in predicting envy development (Barth, 1988). Researchers have recently linked low self-worth with a higher propensity towards experiencing envy, specifically malicious envy (Duarte, 2011). Furthermore, researchers indicate that upward social comparisons are more threatening to individuals with low self-worth (Wood, 1989). Additionally, women with highly contingent self-esteem reported experiencing more negative emotions and higher desires to retaliate and hurt the insulter (Paradise & Kernis, 1999). This latter observation demonstrates consistency with the operationalization of malicious envy. Given the link between envy and global self-worth, it is likely that body-related envy will be strongly linked to low physical self-worth (Fox & Corbin, 1989).

Another possible stable trait that may predict envy is perfectionism (Besser, Flett, & Hewitt, 2004; Fedewa, Burns, & Gomez, 2005; Wiebe & McCabe, 2002). Perfectionism is considered a multidimensional personality trait characterized by setting excessively high standards for the self, accompanied by critical self-evaluations (Frost, Marten, Lahart, & Rosenblate, 1990). Perfectionism traits have been liked with high psychological (Hewitt & Flett,
1993) and physiological reactivity to stress (Wirtz, Elsenbruch, Emini, et al., 2007). The negative self-evaluations in individuals high in perfectionism are strongly associated with negative affect in social contexts (Shafran & Mansell, 2001), negative self-conscious emotions (Klibert, Langhinrichsen-Rohling, & Saito, 2005; Stoeber & Otto, 2006; Tangney & Dearing, 2002), and body-related self-conscious emotions like SPA (Anshel & Seipel, 2007). In studies of daily occurring affect, individuals with high perfectionism experienced higher daily negative affect and lower positive affect (Mongrain, 1998; Mongrain & Zuroff, 1995). In conjunction with negative affect, perfectionism has been linked with individuals making unfavourable social comparison (Wyatt & Gilbert, 1998), which is paralleled to experiences of envy.

1.2.3.8. Health outcomes of envy

Disposition to experiencing envy is identified as having a pervasive need to compare the self with others, particularly in self-relevant domains (Smith, et al., 1999). An example of a common self-relevant domain is the body and physical self (Fox, 2000), which may suggest that some individuals may be prone to experiencing body-related envy. Individuals who are prone or predisposed to general envy are more likely to experience the adverse psychological and physiological implications associated with chronic experiences of envy (Smith & Kim, 2007). These health implications may be particularly important for individuals who are prone to experiencing body-related envy, considering the high relevance of this domain to overall self-worth (Harter, 2012; Harter, 1999). Chronic envy experiences of general or domain specific envy may negatively impact psychological and physical health in a complex system of cognition and emotion. For example, individuals prone to envy typically have overall poorer health (Smith & Kim, 2007). Dispositional envy has been linked with neuroticism, depression, resentment and hostility and has also been negatively correlated with life satisfaction and overall well-being.
(Smith et al., 1999). Envy, as measured on an enviousness scale (Gold, 1996), has also been positively correlated with anxiety and obsessive compulsiveness (Gold, 1996). It is also possible that accompanying hostile attitudes and behaviours decrease social interaction and make it less likely that hostile individuals will receive social support (Cohen & Wills, 1985; Smith & Kim, 2007). Additionally, since envy is experienced in conjunction with other negative emotions, such as shame, individuals are likely at risk of also experiencing the negative outcomes associated with other negative emotions. For example, body shame has been linked with depression, rumination and dietary restraint (Conradt et al., 2007; Grabe, Hyde, Linberg, 2007; Noll and Fredrickson, 2006). Body shame has also been shown to act as a mediator between self-objectification and disordered eating (Noll & Fredrickson, 1998). Weight-related shame is shown to strongly relate to the severity of symptoms in individuals with eating disorders (Burney & Irwin, 2000; Sanftner, Barlow, Marshall & Tangney, 1995). Furthermore, in a phenomenological analysis, Fuchs (2002) equated experiences of body-related shame with body dysmorphic disorder.

In terms of physical health, negative emotional states of unhappiness, hostility and resentment that accompany envy experiences are negatively linked with indexes of well-being (Gallo & Matthews, 2003). Specifically, feelings of inferiority, which are characteristic of envy, are linked with a series of negative social correlates, such as increase in stress and reduced ability to cope with chronic stress (Stansfeld, North, White, & Marmot, 1995). There is strong evidence that links hostility with poor health outcomes (Smith et al., 2004) and since hostility is a hallmark of envy, it is an important factor to consider in terms of implications of experiencing this emotion. For example, various studies have identified hostility as a strong predictor of cardiovascular disease (Gallo & Matthews, 2003; Smith, Glazer, Ruiz & Gallo, 2004; Suls &
Bunde, 2005), higher levels of systolic blood pressure and greater daily stress (Benotsch, Christensen, & McKelvey, 1997), elevations in cortisol (Kiecolt-Glasser, McGuire, Robles, Glaser, 2002). Along with hostility, anger and resentment have been associated with envy and linked with emotional arousal and activation of the hypothalamic pituitary adrenal (HPA) axis (Faber & Burns, 1996). Given this evidence for stress and overall health implications in experiences of envy, it is important to further develop research on domain-specific types of envy. Specifically, individuals who are more prone to body-related envy are more at risk of developing these adverse health outcomes. As such, it is important to further develop research that explores the relationship between body-related envy and stress.

1.3. Response of Stress

The response of stress in reaction to stressful stimuli consists of cognitive, emotional, behavioural and psycho-physiological reactions (Lazarus & Folkman, 1987). The most common measure of psycho-physiological stress response is cortisol activation (Dickerson & Kemeny, 2004). It is generally accepted that the HPA axis is activated to produce cortisol in response to social stress, such as situations in which abilities or traits on which one has built a positive social self, are called into question (Gruenewald, Kemeny, Aziz, & Fahey, 2004). This is conceptualized by the social self preservation theory, which asserts that situations of social threat elicit a coordinated response of negative self-evaluations and activation of the hypothalamic pituitary adrenal (HPA) axis and subsequent cortisol release (Kemeny, 2003). Several studies conclude that women experience more subjective experiences of stress, compared to men, and also show higher physiological response to stress (Kroenke & Spitzer, 1998; Troisi, 2001).

Cortisol activation is the most prevalent physiological system studied in laboratory settings, due to its central role in regulating the stress response (Nicolson, 2007). Most studies
measure cortisol in saliva, due to ease of extraction, non-invasiveness, and accuracy of assessing free, unbound cortisol that represents the portion of biologically active hormone in the body (Kirschbaum & Hellhammer, 1989). The HPA axis is responsible for regulating the release of cortisol, and is linked with psychological, physiological and physical health function. The HPA axis is activated when the hypothalamus releases corticotropin releasing hormone (CRH), which then stimulates the anterior pituitary to secrete adrenocorticotropic hormone (ACTH), which consequently triggers the adrenal cortex to release cortisol into the bloodstream (Lovallo & Thomas, 2000; Sapolsky, Romero, & Munck, 2000). In situations of stress, cortisol elevates blood glucose levels and releases energy necessary for metabolic function to meet the environmental needs. Cortisol also plays an important role in immune system functioning, and has anti-inflammatory properties (Boomershine, Wang, & Zwilling, 2001; Kemeny, 2003; McEwen, 1998). Given these findings, it is important to identify predictors of stress among women, and the current study proposes that body-related envy experiences are can be experienced as threatening situations and stressful stimuli, and likely associated with overall higher tendencies for stress.

1.3.1. Role of stress response in body-related affect

As previously mentioned, research has linked negative affect relating to the body with higher stress appraisals (Holle, 2004; Kowalski et al., 2006; Page, 1991; Sabiston et al., 2007), suggesting a potential role of stress response as an outcome of negative body image affect. In fact, specific affective experiences, such as jealousy and envy, have been conceptualized as emotional states that are highly linked to responses of stress (Vecchio, 2000). This research depicts how individuals who are more susceptible to experiencing negative emotions, such as envy, may also be at higher risk of also experiencing stress since both emotional states of envy
and stress are aroused as a consequence of social threat. These findings are supported by the social self preservation theory (Dickerson, et al., 2004). This theory defines threats to the social self as situations that may devalue the self by questioning self-relevant abilities or traits. In a meta-analysis, Dickerson and Kemeny (2004) demonstrate that stress is associated with social-evaluative threats, which can be experienced when an upward social comparison is made. These findings suggest that participants who become aware of a perceived inferiority, will also have greater cortisol response (Dickerson & Kemeny, 2004). Furthermore, these findings provide support for the role of social comparison processes (i.e. envy) in experiencing stress. This is especially important since chronic perceptions of social threat have been linked with increases in salivary cortisol (Stroud, Salovey & Epel, 2002) and higher response to stress (Gunnar & Donzella, 2002). Most research on this theory has focused on the role of the emotion of shame (Tracy, Robins & Tangney, 2007) in response to a threat to the social self. However, it is likely that another emotion, envy also plays an important role considering that upward comparisons are a social threat (Dickerson & Kemeny, 2004). Limited studies have examined the role of social threat contextualized to the body (Lamarche, et al., 2012; Martin Ginis et al., 2012; Pila, Frankovich, & Martin Ginis, 2011). Although, social threat has been examined as an antecedent to body shame (Pila, et al., 2011), the role of social comparisons that devalue the self have been suggested (Lamarche, et al., 2012; Dickerson & Kemeny, 2004), suggesting an important role of body-related envy in the conceptualization of this theory.

An important study (Martin Ginis, et al., 2012) has examined how negative body affect is related to the stress response. This recently published study (Martin Ginis, et al., 2012) is the first to examine body-related threat (i.e. physique evaluation) on physiological responses of cortisol, utilizing social self preservation theory (Dickerson et al., 2004). Two experiments (n = 50; n =
40) tested the effects of social evaluation threat of one’s physique. In both experiments, individual’s perceptions of social threat were significantly correlated with cortisol post-manipulation. In an unpublished supplement to this study, Pila and colleagues (2011) did not observe significant group differences between the control vs. manipulation condition. Although findings did not support main tenets of the social self preservation theory (Dickerson et al. 2004) as expected, the results highlight the importance of an individuals’ perception of threat in influencing the physiological stress response, rather than actual threat. Interestingly, high trait body shame and high SPA were associated with higher perception of threat in the stress-induction task. As such, it is suggested that perception of threat has a dispositional component, and women with high trait shame are more likely to perceive threat. This study is particularly noteworthy, as it is one of the first studies to examine associations between stress and body-related self-conscious emotions. Results form this study will be used to advance further research on stress responses and specific body-related emotions, such as body-related envy.

1.4. Summary & Hypotheses

   Overall, this proposed research aims to both identify experiences and potential measures of body-related envy, and examine theoretical predictors of this construct in young adult females. This study will also aim to understand the relationship between body-related envy experiences and the physiological response of stress. Figure 1 summarizes the proposed theoretical associations between body image constructs linked with body-related envy, as drawn from theoretical frameworks of social comparison theory (Festinger, 1954), self-discrepancy theory (Higgins, 1987) and social self preservation theory (Dickerson, et al., 2004).
As per RQ1, this study aimed to identify a measure of body-related envy and conducted a preliminary test of the psychometric properties of this scale. Based on past research on body-related self-conscious emotions (Tangney et al., 1996), it was hypothesized that phenomenological ratings would be a valid and reliable assessment of body-related envy. In addition, RQ2 aimed to examine body image constructs of body dissatisfaction, physical self-discrepancies, importance of physical appearance, physical self-worth and body shame as potential predictors of body-related envy. Using tenets of both social comparison theory (Festinger, 1954) and self-discrepancy theory (Higgins, 1987), it was hypothesized that individuals who report higher body dissatisfaction, physical self-discrepancies, body shame would experience more body-related envy. According to social comparison theory (Festinger, 1954), it was hypothesized that individuals who place a high importance on physical appearance and have low physical self-worth will experience more body-related envy. To address RQ3, this study will examine the association between body-related envy experiences and both the physiological response and psychological appraisal of stress. According to social self-preservation theory (Dickerson et al., 2004), it was hypothesized that individuals who are more prone to experiencing body-related envy will also experience a higher physiological response (i.e. elevated cortisol after exposure to a stressor) and appraise situations as more stressful.
Furthermore, RQ4, will assess if body-related envy mediates the association between body image constructs and both the physiological response of stress and the psychological stress appraisal. According to social self preservation theory (Dickerson et al., 2004), it was assumed that body-related envy is the emotional mechanism that explains the relationship between body image constructs related to the body and high responses of stress as an outcome.
2.1. Sample

Young adult females, ages 18 to 25 were recruited for this research. The focus on this particular group of individuals is due to the age-related salience of physical appearance and body image (Thompson, et al., 1999) and the high potential of experiencing self-conscious emotions (Tangney & Salovey, 1999). Females also experience greater reactivity in cortisol due to stress (Kudielka & Kirschbaum, 2005) and experience greater prevalence of body dissatisfaction and social comparisons (Myers & Crowther, 2009). Females are also more likely to feel evaluated solely on physical appearance (Fredrickson & Roberts, 1997; Stice, 1994). Inclusion criteria included (I) female, (II) aged 18-25 years, (III) no acute or chronic psychiatric disorders, (IV) currently taking oral contraceptives, (V) not taking prescription anxiety or depression medication, (VI) access to Internet every evening for 7 consecutive days.

2.1.1. Description of participants

Young adult female participants \( (n = 47) \) ranged in age from 18 to 25 years \( (M_{\text{age}} = 21.62 \pm 1.80) \). Body Mass Index (BMI) ranged from 17.97 to 33.06 \( (M_{\text{BMI}} = 22.04 \pm 3.31 \text{ kg/m}^2) \). Most participants were undergraduate (68.1%) or graduate students (12.8%) and the rest were employed full or part-time (19.2%). Participants’ self-reported ethnic background was Caucasian (61.7%), Asian (23.4%), Black (6.4%), Aboriginal (2.1%) or reported other ethnicity (6.4%). Participants that were aware of the true purpose \( (n = 5) \) of the stress induction task were eliminated from the analysis of cortisol data. Descriptive statistics are presented in Table 1.

2.1.2. Recruitment

The primary recruitment method used for this study was a web-based online tool. The study was advertised on the McGill University Classifieds website, where interested participants
can answer calls for various studies. In addition to the online advertisement, an email was sent to all currently registered students in the Department of Kinesiology and Physical Education at McGill University. In both recruitment tools, a written brief synopsis of the study was provided, along with compensation ($50) and contact information (Appendix A). Interested participants were asked to contact the research coordinator, given details on the study to determine eligibility, the opportunity to ask questions, and set up a time to come in to the lab for the initial assessment.

2.2. Measures

2.2.1. Daily measures

To assess body-related envy, a phenomenological rating of daily body-related envy experiences was utilized (Appendix B). In this task, participants were asked to describe in detail, one instance where they experienced body-related envy in the current day. Then, participants used phenomenological ratings of envy descriptors, which assess on a 5-point Likert scale (1 – never; 5 – always), the extent to which descriptors of envy were experienced during the self-reported narrative. The descriptors of envy (jealous; covetous; longing for; resentful) have been successfully used in preliminary assessments of envy (Pila, et al., submitted), with high construct reliability ($\alpha = .87$) in a similar sample of young adults. This measure was assessed every other day (day 1, 3, 5 and 7), with a total of four times throughout the week. This scale also includes descriptors for other emotions such as shame, guilt, embarrassment and pride to de-emphasize focus on envy.

2.2.2. Laboratory measures

To assess trait body dissatisfaction, the Appearance Evaluation Subscale of the Multidimensional Body-Self Relations Questionnaire (Cash & Prusinsky, 1990) was utilized (see Appendix C for all measures). This measure is a widely used to assess body image cognitions,
such as tendency for body dissatisfaction. This 7-item scale assesses positive and negative appraisals of one’s physical appearance on a 5-point Likert scale (1 – definitely disagree; 5 – definitely agree). Higher scores on this scale indicate high satisfaction. The measure has received extensive psychometric evaluation (Cash, 2000).

In order to assess an individual’s importance of physical appearance, two items from previous research assessing importance of weight and appearance with guilt and shame were utilized (Pila, Castonguay, Mack, Kowalski, & Sabiston, 2012). These items assess the level of agreement rated on a 5-point Likert scale (1 – strongly disagree; 5 – strongly agree) to determine the extent that the individual values appearing (1) physically attractive and (2) a desired weight. The sum of the two items was utilized to create a score of overall appearance importance. Higher scores indicate higher importance of physical appearance.

In order to examine the role of dispositional envy, the Dispositional Envy Scale (DES; Smith et al., 1999) will be used to assess individual proneness to experiencing envy across a variety of situations. On a 9-point scale (1 – strongly disagree; 9 – strongly agree), participants rated the extent to which they agreed with 13-items with statements on feelings of hostility and resentment towards perceived superior others. This scale has shown strong reliability and validity (Smith et al., 1999).

In order to examine dispositional body-related envy, a modified version of the Dispositional Envy Scale (DES; Smith et al., 1999) was created contextualized to the body. The one-dimensional structure was maintained and all 13-items were modified with focus on the physical self. For example, the original item ‘I feel envy every day’ was modified to ‘When it comes to thoughts about my body/physique, I feel envy every day’. All other scale properties remained unchanged and a detailed psychometric assessment of the scale is later discussed.
To assess dispositional differences in the tendency to experience body shame, the 8-item Body Shame Subscale of the Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996) was utilized. Each item was rated on a 7-point Likert scale (1 – strongly agree to 7 – strongly disagree). The Body Shame Subscale of the OBCS is based on the idea that the amount of shame a woman experiences towards her body is a measure of the extent to which she has internalized cultural standards for the feminine body. Not achieving these nearly impossible cultural standards can cause negative feelings about the self. Research supports the reliability and validity of the OBCS (McKinley & Hyde, 1996).

For reliability purposes, tendencies for making appearance-focused social comparisons were assessed using the Physical Appearance Comparison Scale (PACS; Thompson, Heinberg, & Tantleff, 1991). This 5-item scale assesses an individual’s tendencies to compare physical appearance with others on a 5-point Likert scale (1 – never; 5 – always). Higher scores illustrate higher tendencies for social comparison. Properties of the scale using standardized samples of young adult females show internal consistency at .78 and test-retest reliability at .72 (Thompson et al., 1991).

Two scales from the Physical Self-Description Questionnaire (PSDQ; Marsh, Richards, Johnson, Roche, & Tremaye, 1994) were used to measure physical self-worth. The PSDQ consists of 11 subscales and 70 items measuring various subdomains of the physical self in addition to a global self-domain (Marsh et al, 1994). The subscales utilizing in this study pertained to physical self-concept ($n_{items} = 6$) and global self-esteem ($n_{items} = 8$). However, only physical self-concept items were analyzed. All items were presented on a 6-point Likert scale (1 – false; 6 – true). Items were reverse scored if needed, and averaged to arrive at a total score,
with higher scores reflecting greater physical self-worth. The PSDQ scale has illustrated good internal consistency, \( \alpha = .92 \) and stability, \( r = .83 \) (Marsh, 1996).

To assess physical self-discrepancies, the recently developed Physical Self-Discrepancy Questionnaire (PSDQ; Brunet, Sabiston, Castonguy, Ferguson & Bessette, 2012) was used for this study. This scale assessed actual, ideal, and ought physical self-perceptions and discrepancies in relation to various domains, such as attractiveness, physical ability and thinness. Individuals rated the degree to which they believe the attribute describes them now, how they would like to be and how they think they should be on 7-point Likert scale (1 – not at all; 7 – very much). This measure is reliable and valid based on preliminary tests on young adult females (Brunet, et al., 2012).

Stress appraisals were measured using the 14-item Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983). On a 5-point Likert scale (1 – never; 5 – very often), participants indicated the extent to which they had perceived their lives as unpredictable, overloading, and uncontrollable over the past week. Higher scores indicate greater perceived stress. Acceptable reliability and validity of the PSS have been demonstrated (Hewitt, Flett, & Mosher, 1992).

To assess perfectionism, the Multidimensional Perfectionism Scale (MPS; Frost et al., 1990) was used. This 35-item questionnaire assesses various dimensions of perfectionism, including concern over mistakes, parental expectations, personal standards and organization on a 5-point rating scale. The average score of all items was used to create a final score, with higher values indicating higher perfectionism. Good psychometric properties including internal and external validity have been reported for this scale (Frost et al., 1990).
To measure *physiological response to stress*, salivary cortisol was repeatedly assessed at 8-timepoints throughout the experimental protocol. Salivary cortisol is a valid assessment of the concentration of biologically active cortisol in the blood (Kirchbaum & Hellhammer, 1989). To accurately assess cortisol response after exposure to an acute stressor, samples were collected at specific time intervals (during baseline, immediately following stress exposure and during recovery). Changes in cortisol are detected in the saliva between 20 to 40 minutes after the stress exposure (Dickerson & Kemeny, 2004). All samples were collected using a cotton dental roll salivette® (Sarstedt, Nümbrecht, Germany) in a tube, which the participants were required to place in the mouth for 1 minute before replacing in the tube. Saliva samples were frozen on the same day at -20° C to prolong the stability of the hormone (Garde & Hansen, 2005) and assays were performed from each participant tested on the same immuno-assey plate.

2.3. Design

Ethics approval for this study was granted by both the McGill University and University of Toronto research ethics boards (Appendix D). The study consisted of two-parts, an online daily assessment and a laboratory stress-induction task. After contacting the researcher, participants were scheduled for the lab assessment during the 21-day oral contraceptive pill phase to control for menstrual cycle-related hormonal fluctuations (Altemus et al., 2001; Arent et al., 2005). To control for diurnal variations in cortisol secretion and since cortisol stress reactivity is greater in the afternoon, all testing occurred between 12:00 – 4:00 pm (Dickerson & Kemeny, 2004; Kirschbaum & Hellhammer, 1989). Even though cortisol is typically collected in the afternoon, the HPA axis can respond to acute stress at any point in the diurnal cycle (Kudielka, Schommer, Hellhammer, & Kirschbaum, 2004). Participants were instructed to be awake for at least 4 hours prior to the start of the experiment. Participants were asked to abstain
from drinking alcohol 24 hours prior and to abstain from smoking the hour before testing. Furthermore, they were asked to abstain from exercise on the day of testing. They were also asked to fast once they woke up on testing day, to avoid influences of food particles in the saliva samples. These limits were put in place to control for possible influences on salivary cortisol levels (Kokavec et al., 2009; Morgan et al., 2004).

After scheduling the lab session, participants were given instructions about completing the daily online questionnaires, starting 7 days prior to their scheduled lab session. The questionnaires were sent to the participant’s email every evening at 9:00pm, with instructions to complete the questionnaires before bed each night. The first questionnaire included an online informed consent form (Appendix E) and the last questionnaire was to be completed the night before the scheduled lab session. The online questionnaires included phenomenological ratings of self-conscious emotions to measure daily experiences of body-related envy. This measure was collected on alternate days to reduce participant burden, and a composite score for dispositional envy was created to prevent recall bias.

Participants came to the research lab on their scheduled day for a 90-minute duration. They were instructed to sit down in a seating area with a desk, by the research coordinator. The participants verbally confirmed if they have abstained from alcohol, smoking and exercise, had been awake for at least 4 hours, if they were on the 21-day pill phase and if they had been fasting. Responses were collected as a method of account for possible confounders to the cortisol data. The purpose and methods of the study was repeated to the participants, and informed written consent (Appendix F) was obtained for this portion of the study. As soon as written consent was obtained, participants provided the first of eight salivary cortisol samples. After providing the first saliva sample, participants relaxed for 15 minutes while listening to ambient
music, before providing a second baseline saliva sample. The second saliva sample was used as a measure of ‘true cortisol baseline’ to control for potential physiological arousal that may have occurred from the uncertainty of entering a novel experience. Similar protocols have been used in the past (Martin Ginis, Strong, Arent & Bray, 2012). Then, participants completed a series of questionnaires for approximately 15-20 minutes.

The questionnaire package contains demographic information (age, gender, marital status, education, ethnicity, medications) along with the following scales: Multidimensional Body-Self Relations Questionnaire (Cash & Prusinsky, 1990), appearance importance items, Dispositional Envy Scale (Smith et al., 1999), Dispositional Envy Scale – Modified for the body (Smith et al., 1999), Objectified Body Consciousness Scale: Body Shame Subscale (McKinley & Hyde, 1996), The Physical Appearance Comparison Scale (Thompson et al., 1991), Physical Self-Discrepancy Scale (Brunet et al., 2012), Physical Self-Description Questionnaire (Marsh et al., 1994), Perceived Stress Scale (Cohen et al., 1994), and Multidimensional Perfectionism Scale (Frost et al., 1990) to measure body dissatisfaction, appearance importance, dispositional envy and body-related envy, trait body shame, social comparison tendencies, physical self-discrepancies, physical and global self-worth, stress appraisals, and trait perfectionism, respectively.

After completion of the questionnaires, participants were led to a scale and stadiometer and the researcher measured their weight and height. The third saliva sample was then collected. The 15-minute stress-induction procedure followed. This stress manipulation was an adaptation of the Trier Social Stress Test (TSST; Kirschbaum et al., 1993). The TSST is a validated performance task that combines uncontrollability and high levels of social-evaluative threat, which are two components associated with the largest HPA axis stress response (Dickerson &
Kemeny, 2004). In this protocol, participants were given 5-minutes to prepare a 5-minute presentation of their opinion on a controversial topic from a list (Appendix G) to present to a panel of 3 mixed-sex peers, under the pretense that the panel members were evaluating their body language, and video recorded so the tape could be shown to body language experts. In reality, the performance was not recorded nor assessed. The participants were prompted to continue if the presentation stops for any length of time, until a total of 5 minutes has passed. This protocol is an adaptation of the original TSST (Kirschbaum et al., 1993), in which participants are asked to convince a panel of potential employers of their suitable skills for a prospective job position. This variation has been used successfully in the past (Newman et al., 2007). The participants were then instructed to perform mental arithmetic for 5 minutes in front of the same audience. The task consisted of counting backwards serially in thirteen’s from the number 1022 as quickly and accurately as possible. If an incorrect response was made, the participants were required to restart the subtraction from 1022. Similar stress protocols involving both an assessment and mathematical component have been shown to be most effective in inducing cortisol reactivity (Dickerson & Kemeny, 2004). For example, in a meta-analysis of acute lab-induced psychological stressors, tasks that combined cognitive and public speaking tasks elicited the most significant increase in cortisol. The particular element in these tasks that elicited the high cortisol release was the social evaluative threat condition. The three factors that induce the greatest effect are; capturing performance on a permanent record; presence of an audience; and possibility for negative social comparison (Dickerson & Kemeny, 2004).

After the stress procedure, the panel members left the room, and a fourth saliva sample was collected. A 40-minute rest period followed. During this time, saliva samples were collected at
10-minute intervals (for a total of 4 saliva samples). Participants were then thanked for their participation, and compensated with $50 cash. A verbal manipulation check was be performed, by asking the participants what they thought the purpose of the presentation task was and prompted about the language assessment, to determine if deception was successful. The experiment came to an end with a verbal debrief and study debrief handout (Appendix H). An overview of the study design is presented in Figure 2.

Figure 2. Study protocol

2.4. Data Analysis
2.4.1. Procedures

Prior to conducting the main analyses, variables were examined to test assumptions of normality, linearity and homoscedasticity by examining skewness and kurtosis coefficients and scatterplots (Pedhazur, 1997; Tabachnick & Fidell, 2007). A range of statistical procedures performed on SPSS v20 were utilized to examine missing data, correlations, scale reliabilities, calculate descriptive statistics and test hypotheses. Utilizing both measures of body-related envy,
correlations and simple linear regression analyses were conducted to test hypothesis 1, 2 and 3. In addition, due to recent criticisms (Fritz & MacKinnon, 2007; Hayes, 2009) of the Baron and Kenny (1986) causal steps approach to testing mediation, this research utilized indirect effects of mediation with bootstrapping approach (Preacher & Hayes, 2004) to test hypothesis 4.

2.4.2. Hypothesis 1 – The utility of phenomenological ratings

It was expected that phenomenological ratings of body-related envy would be a valid and reliable assessment of body-related envy. To test this hypothesis, reliability was assessed as internal consistency using Cronbach’s alpha (Cronbach, 1951) for the 4-item phenomenological rating scale. Additionally, reliability was assessed as intra-class correlation coefficients (ICC; Koch, 1983) to assess the consistency of each item, and the consistency of the composite scores over repeated measures during the week. To assess construct validity, an exploratory factor analysis using maximum likelihood method (Gorsuch, 1997) was conducted for the phenomenological envy ratings. Convergent validity was examined using Pearson’s correlations with theoretically similar constructs including the Physical Appearance Comparison Scale (Thompson et al., 1999), and a modified version of the Dispositional Envy Scale (Smith et al., 1999) contextualized to the body.

2.4.3. Hypothesis 2 – The relationship of theoretical correlates to body-related envy

It was predicted that high body dissatisfaction, high physical self-discrepancies, high importance of physical appearance, low physical self worth and high trait body shame would be significant predictors of body-related envy. Simple linear regression models were conducted separately for dispositional body-related envy and phenomenological ratings of body-related envy as the dependent variable. Separate regression analyses, controlling for BMI, age and ethnicity (using dummy coding), were conducted testing each predictor (body dissatisfaction,
appearance importance, physical self-worth and trait body shame) due to power concerns from small sample size. Physical self-discrepancies were modeled as polynomial regression terms with response surface values (Edwards, 2002; Cafri, van den Berg, & Brannick 2010). As per recommendations by Shanock and colleagues (2010), actual and ideal scores were mean centered prior to analyses. Three additional variables were created (i) the square of the centered actual self ($x_1^2$) variable, (ii) the square of the centered ideal self ($x_2^2$), variable, and (iii) the cross-product of the centered actual self and ideal self variables ($x_1 x_2$) to assess the linear, nonlinear, and joint relationships between self-perceptions with body-related envy, respectively. The five terms (i.e., actual, ideal, and (i), (ii), and (iii)) terms were entered simultaneously in the regression and model significance was assessed using $R^2$. If $R^2$ was significant, the model coefficients were transformed into four surface test values $a_1$ to $a_4$ (Kazén & Kuhl, 2011). Values of $a_1$ reflect the linear relationship between agreement in actual and ideal self scores and body-related envy. Values of $a_2$ reflect the nonlinear relationship between agreement in actual and ideal self scores and body-related envy. Values of $a_3$ reflect the direction of the discrepancy between actual and ideal self scores related to body-related envy, and $a_4$ reflect the degree of discrepancy between actual and ideal self scores related to body-related envy (Shanock, et al., 2010). This method has been used successfully with physical self-discrepancies and other self-conscious emotions (Brunet, Sabiston, Castonguay, Ferguson & Bessette, 2012; Cafri et al., 2010; Castonguay, Brunet, Ferguson & Sabiston, 2012).

2.4.4. Hypothesis 3 – Body-related envy and psychological appraisal of stress

It was predicted that individuals with high scores of body-related envy would experience higher physiological and psychological responses of stress in a laboratory stress-induction task. Prior to analyses for physiological response of stress, participants who knew the true purpose of
the stressor aspect of the study based on the manipulation check were excluded from this portion of the analysis. Difference scores were created between Time 6 and Time 7 of cortisol collection (corresponding to 20 and 30 minutes post stress-induction, respectively). This difference score was used to determine cortisol response of stress and individuals were classified as reactors if increases in cortisol were observed, and non-reactors if no change or decrease in levels was observed. Similar groupings in cortisol response of stress have been conducted in previous research using similar protocols (Newman et al., 2007). Independent t-tests were examined to compare mean difference scores between reactors and non-reactors from Time 6 to Time 7 on envy (phenomenological and body-related), stress appraisal, body dissatisfaction, appearance importance, physical self-worth, trait body shame, actual and ideal self scores. In addition, effect size was calculated as the standardized difference between two means, using Cohen’s d (Cohen, 1988). Additionally, a logistic regression model was tested to explore body-related envy as a predictor of stress response. Finally, to assess psychological response of stress, stress appraisal was regressed on body-related envy in a linear regression analysis.

2.4.5. Hypothesis 4 – Body-related envy and physiological responses to stress

It was predicted that body-related envy would mediate the relationship between body-related traits and (i) physiological response of stress and (ii) psychological stress appraisal. The effects of trait characteristics (body dissatisfaction, appearance importance, physical self-worth, and trait body shame) on the relationship between (a) phenomenological envy and stress and (b) dispositional body-related envy and stress were tested using indirect effects of mediation (Preacher & Hayes, 2004). Separate models were conducted for each independent variable rather than using multiple independent variables, to maintain power with a small sample size (Hayes, 2009). Bootstrapping level was set to 5000 and evidence for mediation was observed with the
absence of zero in the 95% bias corrected and accelerated confidence interval (BCa CI; Preacher & Hayes, 2008). Specific indirect effects were examined through BCa CIs to examine the unique contribution and strength of each independent variable in the mediation model analysis. Examining BCa CIs is considered a superior method (Preacher & Hayes, 2008) in determining mediation to the former Sobel tests (Baron & Kenny, 1986), which requires distributional assumptions, is more likely to lead to Type I error.
CHAPTER 3
Results

3.1. Preliminary Results

First, data for variables of interest were screened for missing data points \( n_{items} = 0 \) and assumptions for regression analyses. All psychological variables were normally distributed based on skewness (skewness\(_{max} = 1.37\); skewness\(_{min} = -1.01\); \( SE = 0.35 \)) and kurtosis (kurtosis\(_{max} = 2.33\); kurtosis\(_{min} = -0.97\); \( SE = 0.68 \)) values and examination of histograms and p-p plots (Tabachnick & Fidell, 2007). Physiological values of cortisol were highly skewed in a positive direction and logarithmic transformations were computed on the raw data to create difference scores (refer to Table 1). In addition, assumptions of linearity and homoscedasticity were met in a test examining scatterplots of the residuals and homogeneity of variance assumption was not violated. No outliers were identified using z-score cutoffs > |3|, box and whisker plots and 5% trimmed mean values for psychological study variables. Individuals \( (n = 3) \) with physiologically implausible values of cortisol (>100 nmol/l) were removed from analyses that pertained to the results of the stress-induction only (RQ3). Presumably these participants did not follow the protocol and ate, drank, exercised, or smoked and contaminated the saliva samples. Finally, reliability analyses were conducted for each scale and are summarized in Table 2. Scale reliability scores demonstrated Cronbach’s alpha values ranging from \( \alpha = 0.72 \) to 0.95, with the exception of ideal self scores \( (\alpha = 0.51) \). In the 4-item ideal self subscale, the deletion of any one of the items did not provide stronger estimates.
Table 1. Descriptive Statistics

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<th>Std. Deviation</th>
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<th>Maximum</th>
<th>Skewness</th>
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<td>33.06</td>
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<td>5.75</td>
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<td>6.08</td>
<td>0.62</td>
<td>4.50</td>
<td>7.00</td>
<td>-0.35</td>
<td>-0.72</td>
</tr>
<tr>
<td>Physical Self-Worth</td>
<td>4.10</td>
<td>1.07</td>
<td>1.00</td>
<td>5.67</td>
<td>-1.01</td>
<td>0.55</td>
</tr>
<tr>
<td>Trait Shame</td>
<td>3.35</td>
<td>0.94</td>
<td>1.50</td>
<td>5.63</td>
<td>0.26</td>
<td>-0.39</td>
</tr>
<tr>
<td>Stress Appraisal</td>
<td>1.84</td>
<td>0.81</td>
<td>0.10</td>
<td>3.60</td>
<td>0.11</td>
<td>-0.65</td>
</tr>
<tr>
<td>Cortisol Response T4-T3 (nmol/l)</td>
<td>0.51</td>
<td>4.03</td>
<td>-4.39</td>
<td>14.60</td>
<td>3.01</td>
<td>13.15</td>
</tr>
<tr>
<td>Cortisol Response T7-T6 (nmol/l)</td>
<td>0.13</td>
<td>2.97</td>
<td>-4.24</td>
<td>19.41</td>
<td>3.30</td>
<td>13.94</td>
</tr>
<tr>
<td>Log Transformed T4-T3</td>
<td>0.73</td>
<td>0.73</td>
<td>0.00</td>
<td>1.30</td>
<td>-0.69</td>
<td>5.91</td>
</tr>
<tr>
<td>Log Transformed T7-T6</td>
<td>0.65</td>
<td>0.65</td>
<td>0.00</td>
<td>1.39</td>
<td>0.29</td>
<td>1.87</td>
</tr>
</tbody>
</table>

*Note:* All variables \((n = 47)\), except cortisol response \((n = 39)\). Skewness for \(n = 47\) \((SE = 0.35)\); kurtosis \((SE = 0.68)\). Skewness for \(n = 39\) \((SE = 0.38)\); kurtosis \((SE = 0.74)\).
Table 2. Reliability analyses for measured constructs

<table>
<thead>
<tr>
<th>Scale</th>
<th>Number of Items</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenomenological Envy</td>
<td>4</td>
<td>0.93</td>
</tr>
<tr>
<td>Body-Related Envy</td>
<td>8</td>
<td>0.94</td>
</tr>
<tr>
<td>Body Dissatisfaction</td>
<td>7</td>
<td>0.88</td>
</tr>
<tr>
<td>Appearance Importance</td>
<td>2</td>
<td>0.80</td>
</tr>
<tr>
<td>Actual Self</td>
<td>4</td>
<td>0.79</td>
</tr>
<tr>
<td>Ideal Self</td>
<td>4</td>
<td>0.51</td>
</tr>
<tr>
<td>Stress Appraisal</td>
<td>10</td>
<td>0.81</td>
</tr>
</tbody>
</table>

3.2. Main Results

3.2.1. Research Question 1

RQ1 aimed to determine if a measure of phenomenological envy would be a valid and reliable assessment of body-related envy. Composite measures of daily phenomenological envy scores collected on day 1, 3, 5, 7 over the course of a week revealed a mean value of 2.44 (SD = 1.04), with Cronbach’s alpha coefficient of 0.89, and ICC days = 0.83; ICC resentful = 0.72; ICC longing = 0.88; ICC jealous = 0.83; ICC covetous = 0.86. The exploratory factor analysis was conducted using the average of each of the 4-items over the days phenomenological measurements were collected (day 1, 3, 5, 7). This analysis revealed a one-factor scale, accounting for 76.2% of the variance in the 4-item phenomenological envy ratings. All items show high factor loadings (resentful = 0.79; longing for = 0.76; jealous = 0.95; covetous = 0.97). In addition, the phenomenological body-related envy items were positively correlated to the modified trait body-related envy scale ($r = 0.69, p < 0.01$) and appearance social comparison tendencies scale ($r = 0.36, p < 0.05$).
Table 3. Correlation matrix

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 BMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2 Age</td>
<td></td>
<td>0.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Phenomenologic Envy</td>
<td>0.2</td>
<td>-0.06</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Trait Body-Envy</td>
<td>0.32*</td>
<td>-0.08</td>
<td>0.69**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Body Dissatisfaction</td>
<td>0.19</td>
<td>0.06</td>
<td>0.37*</td>
<td>0.53**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Appearance Importance</td>
<td>-0.11</td>
<td>-0.14</td>
<td>0.25</td>
<td>0.53**</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Actual Self</td>
<td>-0.47**</td>
<td>-0.11</td>
<td>-0.26</td>
<td>-0.53**</td>
<td>-0.54**</td>
<td>-0.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Ideal Self</td>
<td>-0.20</td>
<td>-0.16</td>
<td>0.26</td>
<td>0.11</td>
<td>-0.15</td>
<td>0.29</td>
<td>0.32*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Physical Self-Worth</td>
<td>-0.31*</td>
<td>-0.14</td>
<td>-0.42**</td>
<td>-0.67**</td>
<td>-0.69**</td>
<td>-0.28</td>
<td>0.75**</td>
<td>0.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Trait Body Shame</td>
<td>0.08</td>
<td>0.18</td>
<td>0.39**</td>
<td>0.59**</td>
<td>0.35*</td>
<td>-0.47**</td>
<td>-0.34*</td>
<td>0.12</td>
<td>-0.43**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Stress Appraisal</td>
<td>-0.02</td>
<td>0.21</td>
<td>0.31*</td>
<td>0.41**</td>
<td>0.32*</td>
<td>0.29*</td>
<td>-0.39**</td>
<td>0.05</td>
<td>-0.45**</td>
<td>0.51**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Cortisol T4-T3</td>
<td>0.03</td>
<td>-0.07</td>
<td>-0.15</td>
<td>-0.07</td>
<td>-0.1</td>
<td>-0.19</td>
<td>0.06</td>
<td>0.05</td>
<td>0.05</td>
<td>-0.1</td>
<td>-0.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Cortisol T7-T6</td>
<td>0.04</td>
<td>0.01</td>
<td>0.14</td>
<td>0.02</td>
<td>-0.05</td>
<td>-0.19</td>
<td>-0.01</td>
<td>-0.00</td>
<td>0.12</td>
<td>0.09</td>
<td>-0.08</td>
<td>0.33*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Transformed T4 – T3</td>
<td>0.05</td>
<td>-0.05</td>
<td>-0.04</td>
<td>-0.10</td>
<td>-0.07</td>
<td>-0.17</td>
<td>0.14</td>
<td>0.13</td>
<td>0.05</td>
<td>-0.11</td>
<td>0.01</td>
<td>0.88**</td>
<td>0.35*</td>
<td></td>
</tr>
<tr>
<td>15 Transformed T7 – T6</td>
<td>0.11</td>
<td>-0.13</td>
<td>-0.11</td>
<td>-0.03</td>
<td>0.06</td>
<td>-0.17</td>
<td>-0.08</td>
<td>-0.09</td>
<td>0.16</td>
<td>-0.02</td>
<td>-0.07</td>
<td>0.33**</td>
<td>0.88**</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Note: 15. & 16. Cortisol Response (n = 39); *p < .05, **p < .01
3.2.2. Research Question 2

RQ2 assessed if body dissatisfaction, physical self-discrepancies, importance of physical appearance, physical self-worth\(^2\) and trait body shame are significant predictors of weekly body-related envy experiences.

3.2.2.1. Phenomenological envy

Results of the linear regressions using phenomenological envy as the dependent variable are presented in Table 4. After controlling for BMI (\(\beta = 0.22, p = 0.32\)), age (\(\beta = -0.07, p = 0.48\)) and ethnicity (\(\beta = -0.08, p = 0.70\)), body dissatisfaction (\(\beta = 0.35, p = 0.02, R^2 = 0.17\)), physical self-worth (\(\beta = -3.02, p = 0.006, R^2 = 0.22\)) and trait body shame (\(\beta = 0.41, p = 0.006, R^2 = 0.21\)) were significant predictors of phenomenological envy in the expected direction. Contrary to the hypothesis, appearance importance was not a significant predictor. Results from the polynomial analyses are presented in Table 5 and Figure 1. In this model, 22% of the variance in phenomenological body-related envy was accounted for by physical self-discrepancies (\(p = 0.058\)). According to the surface value coefficients, \(a_3\) was significant suggesting that phenomenological envy was lower when the direction of the discrepancy was such that actual physical self scores were higher than ideal physical self scores.

<table>
<thead>
<tr>
<th>Model</th>
<th>Predictor</th>
<th>(\beta)</th>
<th>(t)</th>
<th>SE B</th>
<th>(R^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body Dissatisfaction</td>
<td>0.35</td>
<td>2.43*</td>
<td>0.21</td>
<td>0.17</td>
</tr>
<tr>
<td>2</td>
<td>Appearance Importance</td>
<td>0.26</td>
<td>1.73</td>
<td>0.18</td>
<td>0.12</td>
</tr>
<tr>
<td>3</td>
<td>Physical Self-Worth</td>
<td>-0.41</td>
<td>-2.73**</td>
<td>0.15</td>
<td>0.20</td>
</tr>
<tr>
<td>4</td>
<td>Trait Body Shame</td>
<td>0.41</td>
<td>2.92**</td>
<td>0.15</td>
<td>0.21</td>
</tr>
</tbody>
</table>

**Note:** BMI (\(\beta = 0.22\)), age (\(\beta = -0.07\)), ethnicity (\(\beta = -0.08\)) as covariates; NS

*\(p < .05\), **\(p < .01\)
Table 5. Actual:ideal physical self-discrepancy as a correlate of phenomenological & dispositional body-related envy

<table>
<thead>
<tr>
<th>Variable</th>
<th>Phenomenological Envy</th>
<th>B (SE)</th>
<th>Dispositional Body-Related Envy</th>
<th>B (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Self</td>
<td>-0.37 (0.16)*</td>
<td></td>
<td>-0.66 (.15)**</td>
<td></td>
</tr>
<tr>
<td>Ideal Self</td>
<td>0.74 (0.29)*</td>
<td></td>
<td>0.66 (2.67)*</td>
<td></td>
</tr>
<tr>
<td>Actual Self Squared</td>
<td>0.00 (.13)</td>
<td></td>
<td>-0.05 (0.12)</td>
<td></td>
</tr>
<tr>
<td>Actual x Ideal Self</td>
<td>-0.10 (0.29)</td>
<td></td>
<td>0.00 (0.27)</td>
<td></td>
</tr>
<tr>
<td>Ideal Self Squared</td>
<td>0.44 (0.42)</td>
<td></td>
<td>0.34 (0.38)</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.22**</td>
<td></td>
<td>0.39**</td>
<td></td>
</tr>
</tbody>
</table>

Surface Values

<table>
<thead>
<tr>
<th></th>
<th>Phenomenological Envy</th>
<th>B (SE)</th>
<th>Dispositional Body-Related Envy</th>
<th>B (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$a_1$</td>
<td>0.37 (0.27)</td>
<td></td>
<td>0.00 (0.25)</td>
<td></td>
</tr>
<tr>
<td>$a_2$</td>
<td>0.34 (0.38)</td>
<td></td>
<td>0.29 (0.35)</td>
<td></td>
</tr>
<tr>
<td>$a_3$</td>
<td>-1.10 (0.39)**</td>
<td></td>
<td>-1.32 (0.35)**</td>
<td></td>
</tr>
<tr>
<td>$a_4$</td>
<td>0.54 (0.40)</td>
<td></td>
<td>0.29 (0.37)</td>
<td></td>
</tr>
</tbody>
</table>

Notes. $a_1 = b_1 + b_2$, where $b_1$ is the beta coefficient of actual self and $b_2$ is the beta coefficient for ideal self. $a_2 = b_3 + b_4 + b_5$, where $b_3$ is the beta coefficient of actual self squared, $b_4$ is the beta coefficient for the cross-product of actual and ideal self, and $b_5$ is the beta coefficient for ideal self squared. $a_3 = b_1 - b_2$, $a_4 = b_3 - b_4 + b_5$. Significance depends in part on standard errors, thus values of equivalent magnitude may not be significant.

$\hat{p} = .06; *p < .05, **p < .01$
3.2.2.2. Dispositional body-related envy

Results of the linear regression using the modified Dispositional Envy Scale (Smith et al., 1999) as the dependent measure of body-related envy are presented in Table 6. All regression models account for BMI ($\beta = 0.16, p = 0.06$), age ($\beta = -0.17, p = 0.31$) and ethnicity ($\beta = -0.28, p = 0.37$) as covariates. As hypothesized, in separate models, body dissatisfaction ($\beta = 0.45, p = 0.0001, R^2 = 0.38$), appearance importance ($\beta = 0.53, p = 0.0001, R^2 = 0.46$), physical self-worth ($\beta = -0.63, p = <0.0001, R^2 = 0.51$) and trait body shame ($\beta = 0.60, p = <0.0001, R^2 = 0.54$) were significant predictors of body-related envy in the anticipated direction. Results from the polynomial analyses are presented in Table 5 and Figure 2. In this model, 39% of the variance in trait body-related envy was accounted for by physical self-discrepancies ($p < 0.01$). With reference to surface value coefficients, $a_3$ was significant, also implying that body-related envy was lower when actual physical self scores were higher than ideal physical self scores.

Figure 3. Actual vs. ideal self-discrepancy on phenomenological envy
Table 6. Separate linear regression analyses for dispositional body-related envy

<table>
<thead>
<tr>
<th>Model</th>
<th>Predictors</th>
<th>β</th>
<th>t</th>
<th>SE B</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body Dissatisfaction</td>
<td>0.45</td>
<td>3.56</td>
<td>0.18</td>
<td>0.38</td>
</tr>
<tr>
<td>2</td>
<td>Appearance Importance</td>
<td>0.53</td>
<td>4.49</td>
<td>0.14</td>
<td>0.46</td>
</tr>
<tr>
<td>3</td>
<td>Physical Self-Worth</td>
<td>-0.63</td>
<td>-5.19</td>
<td>0.12</td>
<td>0.51</td>
</tr>
<tr>
<td>4</td>
<td>Trait Body Shame</td>
<td>0.60</td>
<td>5.67</td>
<td>0.12</td>
<td>0.54</td>
</tr>
</tbody>
</table>

*Note: BMI (β = 0.16*), age (β = -0.17*), ethnicity (β = -0.28*) as covariates
*p < .05, ** p < .01

Figure 4. Actual vs. ideal self-discrepancy on dispositional body-related envy

3.2.3. Research Question 3

RQ3 aimed to determine if body-related envy experiences are associated with psychological and physiological responses to stress. Results from a linear regression analysis (Table 7) suggest that phenomenological envy (β = 0.31, p = 0.04, R² =0.09) and dispositional body-related envy (β = 0.41, p = 0.004, R² =0.17) are significant predictors of stress appraisal.
For the model examining physiological stress response, participants were removed if they correctly identified the true purpose of the study during the manipulation check \((n = 5)\), or had outlier data \((n = 3)\). The analytical sample \((n = 39)\) was divided as stress reactors \((n = 19)\) and non-reactors \((n = 20)\) based on cortisol value cut-offs between saliva collection Time 6 and 7. Results from the correlation coefficients show nonsignificant relationships between log transformed physiological stress measures and body-related envy (Table 2). As such, logistic regression models were not tested. Cortisol data is presented for each participant at every saliva collection time point (Figure 5), and mean values for all participants (Figure 6) for descriptive purposes only. In addition to the peak responses occurring as expected between Time 6 and Time 7, graphical representation (see Figure 6) indicated a physiological stress response from Time 3 to Time 4, which corresponded to 10 to 20 minutes after collection of height and weight measurements and questionnaire data. Due to the possible physiological response elicited from these tasks, mean differences between Time 3 and Time 4 were further examined. Based on the results of the independent t-tests, there were no significant mean group differences between Time 6-7 (Table 8) or Time 3-4 (Table 9) reactors and non-reactors in any of the variables of interest. However, Cohen’s d indicates small to medium effect size for appearance importance and physical self-worth between individuals who were classified as Time 6 to Time 7 reactors vs. non-reactors using a measure of phenomenological envy. Effect sizes using measures of trait body-related envy were weak for all variables of interest.

**Table 7.** Separate linear regression analyses for stress appraisal

<table>
<thead>
<tr>
<th>Model</th>
<th>Predictors</th>
<th>(\beta)</th>
<th>t</th>
<th>SE B</th>
<th>(R^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Phenomenological Envy</td>
<td>0.36</td>
<td>2.62*</td>
<td>0.11</td>
<td>0.24</td>
</tr>
<tr>
<td>2</td>
<td>Body-Related Envy</td>
<td>0.47</td>
<td>3.45**</td>
<td>0.11</td>
<td>0.31</td>
</tr>
</tbody>
</table>

*Note: BMI \((\beta = -0.12)\), age \((\beta = 0.36*)\), ethnicity \((\beta = 0.29)\) as covariates

*\(p < .05\), **\(p < .01\)
Figure 5. Individual cortisol values at timepoint 1-8 ($n = 39$)
Figure 6. Mean cortisol values for all participants at timepoints 1-8 ($n = 39$)
**Table 8.** Mediation analyses with phenomenological envy as mediator and stress appraisal as DV

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>c</th>
<th>a</th>
<th>b</th>
<th>c'</th>
<th>Adjusted $R^2$</th>
<th>a*b</th>
<th>Bootstrap CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Dissatisfaction</td>
<td>0.36*</td>
<td>0.53**</td>
<td>0.17</td>
<td>0.27</td>
<td>0.11*</td>
<td>0.07</td>
<td>-0.03 – 0.31</td>
</tr>
<tr>
<td>Appearance Importance</td>
<td>0.27*</td>
<td>0.30</td>
<td>0.19</td>
<td>0.22</td>
<td>0.11*</td>
<td>0.05</td>
<td>-0.01 – 0.21</td>
</tr>
<tr>
<td>Physical Self-Worth</td>
<td>-0.34**</td>
<td>-0.40**</td>
<td>0.11</td>
<td>-0.29*</td>
<td>0.18**</td>
<td>-0.05</td>
<td>-0.19 – 0.04</td>
</tr>
<tr>
<td>Trait Body Shame</td>
<td>0.44***</td>
<td>0.44**</td>
<td>0.10</td>
<td>0.39**</td>
<td>0.24**</td>
<td>0.04</td>
<td>-0.05 – 0.17</td>
</tr>
<tr>
<td>Self-Discrepancy Actual</td>
<td>1.07</td>
<td>0.24</td>
<td>0.13</td>
<td>1.04</td>
<td>0.11</td>
<td>-0.03</td>
<td>-0.63 – 1.24</td>
</tr>
<tr>
<td>Self-Discrepancy Ideal</td>
<td>0.89</td>
<td>1.15</td>
<td>0.13</td>
<td>0.74</td>
<td>0.11</td>
<td>-0.03</td>
<td>-0.13 – 1.31</td>
</tr>
<tr>
<td>Self-Discrepancy Actual x Actual</td>
<td>-0.08</td>
<td>0.001</td>
<td>0.13</td>
<td>-0.08</td>
<td>0.11</td>
<td>0.002</td>
<td>-0.05 – 0.05</td>
</tr>
<tr>
<td>Self-Discrepancy Actual x Ideal</td>
<td>-0.13</td>
<td>-0.10</td>
<td>0.13</td>
<td>-0.12</td>
<td>0.11</td>
<td>0.003</td>
<td>-0.22 – 0.06</td>
</tr>
<tr>
<td>Self-Discrepancy Ideal x Ideal</td>
<td>0.23</td>
<td>0.44</td>
<td>0.13</td>
<td>0.17</td>
<td>0.11</td>
<td>-0.003</td>
<td>-0.05 – 0.49</td>
</tr>
</tbody>
</table>

*Note: Number of bootstrap resamples = 5,000. p < .05, **p < .01*
Table 9. Mediation analyses with dispositional body-related envy as mediator and stress appraisal as DV

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>$c$</th>
<th>$a$</th>
<th>$b$</th>
<th>$c'$</th>
<th>Adjusted $R^2$</th>
<th>$a*b$</th>
<th>Bootstrap CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Dissatisfaction</td>
<td>0.36*</td>
<td>0.77***</td>
<td>0.25*</td>
<td>0.17</td>
<td>0.15**</td>
<td>0.16</td>
<td>0.03 – 0.48</td>
</tr>
<tr>
<td>Appearance Importance</td>
<td>0.27*</td>
<td>0.65***</td>
<td>0.27*</td>
<td>0.10</td>
<td>0.14*</td>
<td>0.17</td>
<td>0.02 – 0.42</td>
</tr>
<tr>
<td>Physical Self-Worth</td>
<td>-0.34**</td>
<td>-0.67***</td>
<td>0.15</td>
<td>-0.24</td>
<td>0.19**</td>
<td>-0.11</td>
<td>-0.36 – 0.07</td>
</tr>
<tr>
<td>Trait Body Shame</td>
<td>0.44***</td>
<td>0.67***</td>
<td>0.13</td>
<td>0.35*</td>
<td>0.24***</td>
<td>0.09</td>
<td>-0.05 – 0.31</td>
</tr>
<tr>
<td>Self-Discrepancy Actual</td>
<td>1.07</td>
<td>-0.29</td>
<td>0.17</td>
<td>1.12</td>
<td>0.12</td>
<td>-0.01</td>
<td>-1.23 – 1.09</td>
</tr>
<tr>
<td>Self-Discrepancy Ideal</td>
<td>0.89</td>
<td>0.66</td>
<td>0.17</td>
<td>0.77</td>
<td>0.12</td>
<td>-0.004</td>
<td>-0.23 – 1.45</td>
</tr>
<tr>
<td>Self-Discrepancy Actual x Actual</td>
<td>-0.08</td>
<td>-0.05</td>
<td>0.17</td>
<td>-0.07</td>
<td>0.12</td>
<td>0.001</td>
<td>-0.09 – 0.02</td>
</tr>
<tr>
<td>Self-Discrepancy Actual x Ideal</td>
<td>-0.13</td>
<td>0.001</td>
<td>0.17</td>
<td>-0.13</td>
<td>0.12</td>
<td>0.002</td>
<td>-0.21 – 0.12</td>
</tr>
<tr>
<td>Self-Discrepancy Ideal x Ideal</td>
<td>0.23</td>
<td>0.34</td>
<td>0.17</td>
<td>0.17</td>
<td>0.12</td>
<td>0.001</td>
<td>-0.06 – 0.34</td>
</tr>
</tbody>
</table>

Note: Number of bootstrap resamples = 5,000. *$p < .05$, **$p < .01$, ***$p < .001$
3.2.4. Research Question 4

Finally, RQ4 assessed if body-related envy mediates the association between the predictors and both (i) physiological response of stress and (ii) psychological stress appraisal. Due to nonsignificant correlation coefficients between physiological stress (i.e. cortisol values at Time 6 to Time 7 and Time 3 to Time 4) and body-related envy, physiological stress was not considered in the mediation analysis. Meanwhile, the total and indirect effects of the bootstrapping analysis are presented for stress appraisal through proposed mediator variables, phenomenological envy (Table 10) and trait body-related envy (Table 11). There were no significant indirect paths with the selected independent variables and stress appraisal with phenomenological envy as a mediator. Results using trait body-related envy indicate a significant indirect path from body dissatisfaction to stress appraisals (CI95% = 0.03, 0.48), suggesting that trait body-related envy mediates the relationship between body dissatisfaction and stress appraisals. Additionally, there is a significant indirect path from appearance importance to stress appraisal through body-related envy (CI95% = 0.02, 0.42), suggesting that trait body-related envy mediates the relationship between appearance importance and stress appraisals. The remaining indirect paths between physical self-worth, trait body shame and physical self-discrepancies were nonsignificant, indicating that the aforementioned variables and stress appraisals are not mediated by trait body-related envy.
**Table 10.** Independent t-test comparing individuals who reacted to stress physiologically from T6 to T7

<table>
<thead>
<tr>
<th>Variable</th>
<th>Reactor (T7-T6 &gt; 0) Mean (SD)</th>
<th>Non-Responder (T7-T6 ≤ 0) Mean (SD)</th>
<th>t</th>
<th>p</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body-Related Envy</td>
<td>2.51 (1.15)</td>
<td>2.55 (1.04)</td>
<td>-0.11</td>
<td>0.91</td>
<td>-0.04</td>
</tr>
<tr>
<td>Phenomenological Envy</td>
<td>2.36 (1.25)</td>
<td>2.65 (0.93)</td>
<td>-0.90</td>
<td>0.43</td>
<td>-0.26</td>
</tr>
<tr>
<td>Stress Appraisal</td>
<td>1.74 (0.78)</td>
<td>1.81 (0.84)</td>
<td>-0.25</td>
<td>0.81</td>
<td>-0.09</td>
</tr>
<tr>
<td>Body Dissatisfaction</td>
<td>2.63 (0.85)</td>
<td>2.52 (0.62)</td>
<td>0.48</td>
<td>0.64</td>
<td>0.15</td>
</tr>
<tr>
<td>Appearance Importance</td>
<td>3.53 (0.83)</td>
<td>3.74 (0.87)</td>
<td>-0.75</td>
<td>0.46</td>
<td>-0.25</td>
</tr>
<tr>
<td>Physical Self-Worth</td>
<td>4.32 (1.07)</td>
<td>3.96 (1.06)</td>
<td>0.99</td>
<td>0.33</td>
<td>0.34</td>
</tr>
<tr>
<td>Trait Body Shame</td>
<td>3.46 (1.10)</td>
<td>3.36 (0.85)</td>
<td>0.30</td>
<td>0.77</td>
<td>0.10</td>
</tr>
<tr>
<td>Actual Self</td>
<td>4.14 (1.09)</td>
<td>4.00 (1.20)</td>
<td>0.38</td>
<td>0.71</td>
<td>0.12</td>
</tr>
<tr>
<td>Ideal Self</td>
<td>6.03 (0.68)</td>
<td>6.01 (0.62)</td>
<td>0.08</td>
<td>0.94</td>
<td>0.03</td>
</tr>
</tbody>
</table>

*Note.* Reactors n = 19, Non-Reactors n = 20, df = 37
Table 11. Independent t-test comparing individuals who reacted to stress physiologically from T3 to T4.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Reactor (T4-T3 ≥ 0) Mean (SD)</th>
<th>Non-Reactor (T4-T3 &lt; 0) Mean (SD)</th>
<th>t</th>
<th>p</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body-Related Envy</td>
<td>2.74(1.18)</td>
<td>2.34(0.97)</td>
<td>1.13</td>
<td>0.27</td>
<td>0.37</td>
</tr>
<tr>
<td>Phenomenological Envy</td>
<td>2.70(1.19)</td>
<td>2.34(1.00)</td>
<td>1.00</td>
<td>0.32</td>
<td>0.33</td>
</tr>
<tr>
<td>Stress Appraisal</td>
<td>1.93(0.76)</td>
<td>1.65(0.83)</td>
<td>1.06</td>
<td>0.30</td>
<td>0.35</td>
</tr>
<tr>
<td>Body Dissatisfaction</td>
<td>2.54(0.75)</td>
<td>2.61(0.73)</td>
<td>-0.28</td>
<td>0.78</td>
<td>-0.09</td>
</tr>
<tr>
<td>Appearance Importance</td>
<td>3.74(0.77)</td>
<td>3.55(0.92)</td>
<td>0.66</td>
<td>0.52</td>
<td>0.22</td>
</tr>
<tr>
<td>Physical Self Worth</td>
<td>3.94(1.20)</td>
<td>4.30(0.94)</td>
<td>-1.02</td>
<td>0.32</td>
<td>-0.33</td>
</tr>
<tr>
<td>Trait Body Shame</td>
<td>3.48(1.08)</td>
<td>3.34(0.89)</td>
<td>0.39</td>
<td>0.69</td>
<td>0.14</td>
</tr>
<tr>
<td>Actual Self</td>
<td>4.17(1.26)</td>
<td>3.98(1.04)</td>
<td>0.52</td>
<td>0.61</td>
<td>0.16</td>
</tr>
<tr>
<td>Ideal Self</td>
<td>6.08(0.66)</td>
<td>5.96(0.64)</td>
<td>0.57</td>
<td>0.57</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Note. Reactors n = 18, Non-reactors n = 21, df = 37
Footnotes

1In a validation study of young adults (n = 103; M age = 21 years) with similar sample characteristics, the 8-item Dispositional Envy Scale (Smith et al., 1999) was modified to the body and had Cronbach’s alpha coefficient of α = 0.94. Emotion researchers have highlighted the utility of contextualizing emotion measurement to specific domains (Tangney & Tracy, 2012). The scale was also highly correlated to a 4-item measure of phenomenological envy (r = 0.68, p < 0.0001, α = 0.85) and a standardized (Physical Appearance Social Comparisons; Thompson et al., 1999) 5-item measure of physical appearance social comparison tendencies (r = 0.48, p < 0.0001, α = 0.76).

2Additional relationships were explored based on literature evidence for the potential role of global self-worth (Crocker, Park & Leary, 2003; Salovey & Rodin, 1991) and perfectionism (Besser et al., 2004; Hewett & Flett, 2002) on body-related envy and psychophysiological stress response. Results indicate a strong correlation in the expected direction between global self-worth (M = 5.05; SD = 0.66) and phenomenological envy (r = -0.26, p < 0.05) and trait body-related envy (r = -0.40, p < 0.001). Similar associations are found between global self-worth and stress appraisal (r = 0.75, p < 0.001), but non-significant relationships with physiological stress. Linear regression equations further highlight the ability of global self-worth to predict phenomenological envy (β = -0.46, p < 0.001, R 2 = 0.07) after controlling for BMI (β = 0.22, p = 0.51), age (β = -0.07, p = 0.48) and ethnicity (β = -0.08, p = 0.70). Similar results were found for predicting trait body-related envy (β = -0.44, p < 0.001, R 2 = 0.35) after controlling for BMI (β = 0.16, p < 0.05), age (β = -0.17, p < 0.05) and ethnicity (β = -0.28, p < 0.05). Furthermore, mediation analyses indicate there are no significant indirect paths between global self-worth and stress appraisal through body-related envy.

In addition to global self-worth, the role of perfectionism was explored. Results indicate a strong relationship in the anticipated direction between perfectionism (M = 2.96; SD = 0.56) and trait body-related envy (r = 0.36, p < 0.05), but not phenomenological envy (r = 0.14, p = 0.33). Additionally, there was a positive relationship between stress appraisals and perfectionism (r = 0.33, p < 0.05), but non-significant relationships with physiological stress at either Time 6-7 (p = 0.06) or Time 3-4 (p = 0.22). Furthermore, linear regression analyses of perfectionism indicate a non-significant role in predicting phenomenological envy (β = 0.24, p = 0.31, R 2 = 0.07) after controlling for BMI (β = 0.22, p = 0.51), age (β = -0.07, p = 0.48) and ethnicity (β = -0.08, p = 0.70). Despite this, linear regression analyses indicate that perfectionism significantly predicts trait body-related envy (β = 0.33, p < 0.05, R 2 = 0.29) after controlling for BMI (β = 0.16, p < 0.05), age (β = -0.17, p < 0.05) and ethnicity (β = -0.28, p < 0.05). Lastly, mediation analyses indicate there are no significant indirect paths between global self-worth and stress appraisal through body-related envy. Considering mediation model, although there are no significant indirect paths with perfectionism and body-related envy, there is a significant indirect path from perfectionism to stress appraisals through trait body-related envy (R adj = 0.17, p < 0.0001; CI95% = 0.03, 0.47), indicating that the relationship between perfectionism and stress appraisals is mediated by trait body-related.
CHAPTER FOUR
Discussion

Envy is a powerful and consuming emotion that is highly prevalent among young adult females, especially in domains that concern physical appearance and body image (Pila et al., submitted, see Appendix I). Researchers have operationalized the emotion as a “dimension of a person’s health and illness” (Maijala, Munnukka, & Nikkonen, 2000). In fact, individuals prone to experiencing envy are at higher risk of adverse psychological and physiological outcomes (Smith & Kim, 2007) such as depression, anxiety, obsessive compulsiveness, cardiovascular disease and increased stress (Gallo & Matthews, 2003; Smith, Glazer, Ruiz & Gallo, 2004; Suls & Bunde, 2005). Stress is arguably one of the most detrimental consequences of envy, given the strong links to ill-being and poor health (Anderson, 1998). However, there has been no study to date examining the association between body-related envy and stress outcomes. As such, the purpose of this study was to examine disposition to body-related envy experiences and associations to stress responses among young adult females. In particular, this study aimed to examine theoretically supported body image constructs as predictors of envy and to understand the relationships between envy and both psychological and physiological responses to stress. It was hypothesized that body-related envy would be predicted by body dissatisfaction, physical self-discrepancies, high importance of physical appearance, low physical self-worth and high body shame. Furthermore, it was proposed that body-related envy would mediate the relationship between these predictors and physiological stress outcomes. The proposed associations were partially supported for the body-related trait characteristics of body dissatisfaction, physical self-discrepancies, physical self-worth, appearance importance, and body shame. Similarly, body-related envy was linked with psychological stress appraisals. Meanwhile, the proposed relationship between body-related envy and physiological response of stress was not supported.
4.1. The utility of phenomenological ratings in assessing body-related envy

A key finding in this research suggests that phenomenological measures are a reliable and valid assessment of body-related envy experiences. Providing preliminary support for a measure of body-related envy, phenomenological items were positively associated with the dispositional body-related envy scale, and appearance social comparison tendencies. These findings are supported by the theoretical link between social comparison tendencies and dispositional envy (Smith, 2008). In fact, theorists have stated, “envy is the regrettable offspring of otherwise benign [social comparison] tendencies” (pg. 2; Alicke & Zell, 2008). It is suggested that social comparison tendencies have emotional outcomes, with individuals who compare unfavorably experiencing negative mood (Gibbons & Buunk, 1999; Smith, 2000). Furthermore, experiences of social comparison and envy are highly related in terms of the target of comparison (e.g. a perceived superior other with otherwise similar characteristics) and domain of comparison (e.g. domain with high importance to self-worth) (Alicke & Zell, 2008). Considering the theoretical link between social comparison and envy, and the empirical associations from this study, envy can be assessed using a social comparison perspective. This perspective is especially useful in considerations of advancing body-related envy measurement – an understudied emotion.

Studies on dispositional envy suggest that an appropriate measure of envy needs to acknowledge the emotion as a complex blend of affective reactions that arise from a multifaceted appraisal (Lazarus, 1991; Smith, 1991) and assesses the tendency of various affective responses (i.e. inferiority and ill will), as well as the frequency and intensity with which these appraisals tend to occur. Allowing for these recommendations, a phenomenological measure of body-related envy may be useful in measuring tendencies to experience this emotion (Pila et al., submitted). Phenomenological measures combine two successful and common measurement
properties for self-conscious emotions: narrative and adjective-based items (Else-Quest et al., 2012). Self-reported narratives are useful in eliciting a particular emotion in context to the individual’s lived experience, rather than a hypothetical narrative, which may be less useful. Additionally, adjective-based items included with the phenomenological narrative are useful in that they can subscribe distinct theoretical properties associated with the emotion (Tangney et al., 1996), for example, the use of the ‘resentful’ adjective in envy. Furthermore, typical self-reported measures of emotion rest on the assumption that individuals are aware of the emotion at a conscious level (Shaver & Mikulincer, 2005), while self-reported narratives may circumvent this issue by drawing information from the related affects, cognitions and behaviours associated with the emotion. Despite this advantage of phenomenological ratings of self-reported narratives, measures of envy are associated with underreporting for reasons of social desirability (Smith & Kim, 2007), making this understudied emotion inherently difficult to measure empirically. For this reason, all analyses were conducted with both the phenomenological measure of envy and the disposition body-related envy scale. Generally, the findings were consistent across both measures, with some unique outcomes.

Furthermore, the findings from this study advance our knowledge of domain-specific emotions and emotion measurement in general. Research on domain-specific emotions (i.e. body-related envy) influences how emotions are generally conceptualized (Roseman, Weitz, & Swarts, 1994), and therefore researchers (Tangney & Tracy, 2012) have recently highlighted the importance of assessing domain-specific emotions, with a specific focus on the body. As such, evidence to support body-related envy is important in how emotions are conceptualized in theory, research and practice. For example, evidence on the distinct properties of the self-conscious emotions of guilt, shame and embarrassment (Tangney et al., 1996) has paved the way
for other researchers to understand associations to health-related behaviours (Mosewich et al., 2011; Sabiston et al., 2010). Arguably, one of the most important steps in better understanding domain-specific emotional experiences is developing measurement tools, thus urging the development of a standardized body-related envy scale.

Overall, results from this study provide the first examination in measurement of body-related envy, using a social comparison perspective. This study advances the use of phenomenology in understanding and measuring emotions (Fusch, 2003; Gilbert, Pehl, & Allan, 1994; Tangney, Miller, Flicker, & Barlow, 1996) and suggests that body-related envy has dispositional properties. Considering the limited empirical evidence in body-related envy, further examination of this emotion depends on a comprehensive examination of the psychometric properties of this phenomenological measure.

4.2. The relationships between theoretical body image constructs and body-related envy

Overall, the relationships between body image constructs and body-related envy were supported. Differences exist in the strength of the relationships between the phenomenological and dispositional measures of body-related envy.

4.2.1. Body dissatisfaction

In support of the hypothesis, body dissatisfaction was strongly linked with increases in body-related envy. Existing literature has shown a relationship between negative body image and a tendency to compare with others based on physical attributes (Besenoff & Snow, 2006; Engeln-Maddox, 2005; Trampe, Stapel & Siero, 2007). In support of body dissatisfaction as a predictor of body-related envy, it is possible that individuals with concerns of their physique are more primed to be aware or focus on others they perceive to be superior (i.e. unidirectional drive to compare upward; Taylor, Buunk & Aspinwall, 1990) or motives of self-enhancement (Suls,
Martin & Wheeler, 2002). In fact, envy theorists suggest that individuals are most likely to experience the emotion in domains where one perceives a real or imagined threat to the self (Salovey & Rodin, 1991). Considering over 80% of females in Western societies report body dissatisfaction (Spitzer, Henderson & Zivian, 1999), it is not surprising that body-related envy is reported prevalently. This high prevalence of body-related envy is greatly problematic considering the strong association between body dissatisfaction and psychopathological outcomes, such as eating disorders (Croning, Krumm, Smitham, 2006; Pila et al., submitted; Stice, 2002; Stormer & Thompson, 1996). The link between body dissatisfaction and negative health outcomes highlights the importance of examining body-related envy as a potential link between body image concern and negative health outcomes.

4.2.2. Physical self-discrepancies

Consistent with the hypothesis, mean scores for ideal physical self were higher compared to actual physical self scores. Upon further investigation, greater agreement between actual and ideal self scores had positive but not significant linear and non-linear links to both phenomenological and trait body-related envy. In addition, the degree of discrepancy between actual and ideal selves was positively related to both measures of envy. Meanwhile, the direction of discrepancy was significantly related to both measures of envy in a negative direction. This suggests that young adult women’s body-related envy is influenced by differences between who they perceive they are (actual self) and who they would like to be (ideal self). These results are consistent with previous findings that self-discrepancies elicit negative self-conscious emotions (Castonguay et al., 2012; Tracy & Robins, 2004). These findings are also consistent with Salovey and Rodin (1991) and Higgins’ (1987) theoretical propositions in that envy is experienced when a discrepancy exists between the current state of the self and the desired state.
of the self, which stems from awareness of a perceived superior other. Nonetheless, the findings are novel in the focus on body-related envy – a highly understudied emotion.

In addition, physical self-discrepancies are closely linked to body image concerns, whereby individuals who experience higher discrepancies between what they look like versus what they would like to look like are more likely to be dissatisfied with their appearance (Stice & Shaw, 2002). The causes of these discrepancies are likely complex, with some researchers (Fredrick, Peplau & Lever, 2006) speculating that self-discrepancies reflect internal manifestations of external pressure to conform to culturally idealized physical standards. Experiencing a large incongruity between the ideal and actual physical self has been linked with maladaptive psychological outcomes such as decreased self-esteem, disordered eating, depressive symptoms and body shame (Bessenoff & Snow, 2006; Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006). This highlights the importance of reducing discrepancies between the real and ideal physical self.

4.2.3. Importance of physical appearance

It was hypothesized that individuals who place high importance in appearing physically attractive and being a desirable weight would experience more envy contextualized to the body. This hypothesis was supported in a regression model using the dispositional measure (however no significant results were noted when the phenomenological measure was used). The significant link between appearance importance and body-related envy can be explained by the strong link in both social comparison and envy literatures that domains of comparison are highly salient to the self (Festinger, 1954; Smith & Kim, 2008). For example, the more personally significant an attribute or characteristic is, the more likely one is to select the person in possession for comparison and the stronger the envious experience (Schaubroeck & Lam, 2004; Tangney &
Salovey, 1999). The link between appearance importance and envy is further supported when considering a sociocultural perspective. In predominantly Western cultures, there is a socially constructed belief that equates physical attractiveness with overall successes in life (Hesse-Biber, Leavy, Quinn & Zoino, 2006). In fact, the bombardment of media portrayals of females with idealized physiques sends the message that these standards of attractiveness are necessary to thrive in our society (Jones, 2001; Spitzer, Henderson, & Zivian, 1999). As such, considering this ubiquitous importance placed on physical appearance, it is likely that those who fall short of this standard will be likely to experience negative outcomes, such as body-related envy.

Appearance importance was not significantly related to body-related envy when using the phenomenological envy ratings. Considering the strong link with appearance importance when using the dispositional measure, and the robust theoretical association, these non-significant findings could be attributed to the different measurement properties of both scales. For example, the dispositional measure implicitly hints at the importance of physical appearance, in items that highlight the value of body-related achievements (e.g. “the body-related successes of others makes me resent them”). In the phenomenological measure, unless participants suggest the personal salience of physical appearance in the self-reported narratives (e.g., situation-specific), it may not be captured in the adjective responses. As such, it may be that appearance importance is a more global self-evaluation that is more strongly tied to dispositional rather than situational envy. Nonetheless, the correlation between appearance importance and the phenomenological envy ratings ($r = .25$), suggests that there is an association between the two constructs. In summary, these results provide partial support for the role of appearance importance in predicting body-related envy. Given the theoretical underpinnings of appearance importance and
the links with both social comparisons and envy, future research initiatives are needed to further examine the associations tested in the current study.

4.2.4. Physical self-worth

Consistent with hypotheses, physical self-worth was negatively related to both measures of envy, in that individuals with low physical self-worth were more prone to experiencing body-related envy. These findings are supported in research examining self-esteem and social comparisons (Wood, 1989), in that individuals with lower self-esteem are more prone to making upward-focused comparisons. Findings in self-esteem and non-domain specific envy extend the previous findings and suggest that individuals with dispositional low self-esteem are likely to also experience more negative affect, including envy (Barth, 1988). In addition, low physical self-worth has been associated with negative self-conscious emotions of body shame (Gruewalk, Kemeny, Aziz & Fahey, 2004). Due to the self-evaluative processes tied with self-conscious emotions, it is no surprise there is such a powerful association with self-esteem (Lewis, 1993). This relationship is substantially stronger for females compared to males, especially in domains of physical appearance (Else-Quest et al., 2012; Gentile, Grabe, Dolan-Pascoe, Twenge, Wells, & Maitino, 2009).

A potential manifestation of this relationship may be that societal and cultural norms teach women that their self-worth is strongly tied or equivalent to their physical appearance and attractiveness. As such, the physical self becomes a target that defines a woman’s overall self-worth (Grabhorn, Kopp, Gitzinger, Wietersheim, & Kaufhold, 2003; Harter, 2012; Strahan et al., 2006). This strong societal value on physical appearance is often internalized and can prime appraisals to socially compare physical attributes in an upward direction (Tylka & Sabik, 2010). For example, a situation that has potential for self-evaluation of physical appearance (e.g. being
at the beach while in a bathing suit) may be especially threatening to an individual with dispositional low physical self-worth (Wood, 1989), who may experience strong feelings of body-related envy. On the other hand, if an individual with high physical self-worth experiences the same situation of self-evaluation, they may be less attuned to the physical appearance of others, and thus less prone to experiencing body-related envy. These findings suggest the potential relevance of interventions to increase both global and physical self-worth, in order to reduce the burden of negative body-related emotions, like envy. Targeting self-worth may be particularly important, considering this construct is highly predictive of overall psychological and social adjustment (Harter, 1989; Harter, 2012).

4.2.5. Trait body shame

As expected, body shame was positively linked with both measures of envy. This finding is supported in most self-conscious emotion literature that highlights the difficulty in studying negatively valanced emotions due to their potential to co-occur (Tangney & Robins, 2004). Previous qualitative accounts of body related envy (Pila et al., submitted) depict a strong presence of shame phenomenology in envy-related narratives and interviews. This is theoretically plausible, as both shame and envy involve a strong sense of inferiority and perceived failure to attain a societal standard (Parrot & Smith, 1991; Leary, 1992). Utilizing self-objectification theory and the link between body shame and self-monitoring (Fredrickson et al., 1998), it is plausible that individuals who habitually monitor their body and physical appearance are more in tune to notice a perceived physically superior other, and consequently experience envy. Furthermore, researchers (Lewis, 1993; Tangney, 1990) have theorized that individuals who are prone to experiencing shame tend to be in a consistency negative affective state, which causes a predisposition to experience other negative emotions. Researchers from a
psychoanalytical perspective (Morrison & Lansky, 2008) posit “shame triggers envy, which serves in fantasy to repair the sense of inferiority by tearing down the other”. These theoretical foundations linking shame with envy are supported by findings from this study that suggest trait body shame is a predictor of body-related envy. Smith and Kim (2007) described the interconnection between shame and envy as a “demoralizing mixture” (pg. 54) These results highlight the potential compounding of co-occurring feelings of shame and envy, and the critical repercussions this may have on psychological health (Montaldi, 1999). The findings in the current study are highly consistent with this strong evidence for the association between shame and envy in the context of body image.

4.2.6. Overview of associations and measurement of envy

Taken together, these results may indicate that phenomenological measure is more diverse and captures varied emotional underpinnings, whereas the dispositional measure is more general and may show stronger associations with theoretical constructs. For example, since the phenomenological measure did not provided any guidance in terms of definition or example of ‘body-related envy’, self-reported experiences were likely based on the individual’s cognitive appraisal of the emotion (Tangney et al., 1996). Furthermore, ratings are dependent on a comprehensive and detailed account of the emotional experience. If participants did not provide this type of narrative, the ratings of envy adjectives may not have been fully encapsulate the emotional experience (Tangney et al., 1996) These properties of phenomenological measure may contribute to a greater variation in responses, compared to the dispositional measure, which provides options that are more universal and constrictive (Else-Quest et al., 2012). These findings highlight the practicality of utilizing a dispositional scale, while also emphasize the advantage of phenomenological measures in capturing the lived experience and personal
disposition to body-related envy. The further use of phenomenological measures will play a key role in further understanding this overlooked emotion.

4.2.7. Associations to BMI, age and ethnicity

To control for possible confounding effects, each regression model controlled for possible covariates of BMI, age and ethnicity. Findings from the linear regressions conclude that BMI, age and ethnicity were inconsequential concerning the phenomenological measure, however trait body-related envy was positively related to BMI, and negatively related to age and ethnicity when coded into Caucasian and non-Caucasian. The difference in the findings for the two measures of envy may highlight again the trait versus state nature of the assessment tools. It is not surprising that personal demographics, many of which are not malleable, are not associated with situation-specific ratings of envy. Limited research has examined age and ethnicity in terms of envy, however these variables were identified as possible covariates considering links in other body-related emotions like social physique anxiety (Russell, 2002), and shame, guilt, embarrassment and pride (Else-Quest et al., 2012). As anticipated, dispositional body-related envy was positively associated with age, suggesting a potential developmental fluctuation in experiences of this emotion. Meta-analytic evidence suggests that more negative emotions are experienced in young adulthood, compared with older adolescence (Else-Quest et al., 2012). As anticipated, Caucasians experienced higher body-related envy, likely due to links with Western culture physique and appearance ideals that influence individual self-evaluation standards (Thompson et al., 1999). These findings are supported by meta-analytic evidence in emotions that suggests Caucasian females would experience more negative emotions compared to other ethnicities (Durik, Hyde, Marks, Roy, Anaya, & Schultz, et al., 1999). Similarly, BMI was positively associated with body-related envy experiences, which is similar to other negative
body-related emotions (e.g. weight-related guilt and shame; Conradt, Dierk, Schlumerger, Rauh, Hebebrand, & Rief, 2007) and reiterates the ideal of slimness and low weight. Presumably, individuals with higher weight and BMI are further from societal ideal and thus experience greater discrepancies with ideal, influencing negative emotions of envy. In summary, these findings underscore the need to consider demographic variables in the examination of body-related emotions.

4.3. Body-related envy and stress

It was hypothesized that body-related envy would be positively linked with (i) the tendency to appraise situations as more stressful and (ii) higher physiological response of stress, with higher peak cortisol levels after exposure to a stressor. Findings for this research supported the hypothesis for psychological stress appraisals, but not for physiological response of stress. Furthermore, results reveal a nonsignificant association between stress appraisal and physiological response of stress. This finding is unsurprising given the challenges of using a self-report measure of a psychological construct to predict a biological variable (Pennebaker, 1982).

4.3.1. Body-related envy and psychological appraisal of stress

Results from this study revealed that both phenomenological and dispositional envy were significant predictors of stress appraisal, with a stronger association using the dispositional measure. These findings are supported by evidence that suggests negative cognitive appraisals are influenced by negative body-related emotions (Cash, Santos & Williams, 2004). Research using cognitive-behavioural models (Cash, 1994) notes that individuals with negative body image schemas have distorted thought processing regarding their appearance (i.e. tendency for upwards social comparisons), which prompts negative affective reactions (i.e. envy) and causes higher reactivity to threatening stimuli (i.e. stressful situations). This model (Cash, 1994)
highlights the dynamic and continuous process between cognitions and affect, and provides support for body-related envy as a predictor of stress appraisal, but may also suggest a reciprocal relationship.

These findings are supported by literature that suggests predisposition to hostility (i.e. the trademark of envy experiences; Smith et al., 1999) leads to greater daily stress and higher reactivity to stressful stimuli (Benotsch, et al., 1997). There are currently two predominant models that support this finding. First, the “psychophysiological reactivity model” can explain how individuals who are predisposed to experiencing envy are likelier to show a neuroendocrine response to a stressful environmental stimuli (Williams, Barefoot, & Shekelle, 1985). Secondly, the “psychosocial vulnerability model” suggests that individuals predisposed to envy may also experience a greater degree of social stress due to lower levels of social support, which may otherwise safeguard against stress (Smith & Christensen, 1992). This well-established link between hostility and stress (Williams et al., 1985) underscores the importance of studying potential predictors of stress, such as body-related envy. Overall, findings from the present study combined with theoretical reinforcements in stress and health literature may elucidate the relationship between negative self-conscious emotions and overall health.

4.3.2. Body-related envy and physiological responses of stress

A non-significant relationship was revealed between body-related envy and physiological responses of stress. Due to these non-significant correlations between body-related envy and cortisol changes over each of the eight time points (capturing cortisol assessment before, during, and after a stress response manipulation), further analyses were not pursued. Despite this, in a graphical representation of averaged cortisol values for all participants, the highest peak appeared at timepoint 7, which was collected 30 minutes past stress induction. This pattern
supports evidence that acute changes in cortisol are detected in the saliva between 20 and 40 minutes after the stress exposure (Dickerson & Kemeny, 2004). Therefore, despite lacking statistical significance, cortisol peak patterns followed a predicted path. In addition, the highest mean peak cortisol value occurred at timepoint 1, which was collected as soon as participants entered the lab. This finding is likely explained by the stress of entering a novel situation, and high baseline cortisol levels are a common challenge in acute stressor tasks (Dickerson & Kemmey, 2004; Martin Ginis et al., 2012).

Additionally, a smaller secondary peak appeared at timepoint 4, 20-30 minutes after collection of height and weight data and completion of questionnaires. It is plausible that completion of several questionnaires with a heavy focus on body image concerns and negative affect could have contributed to this physiological response. It is also important to consider the possibility of physique evaluative threat associated with collection of weight measurements, which cause potential for the participants physique to be negatively evaluated (Leary, 1992) and has been linked with increases in cortisol (Martin Ginis et al., 2012). Although no known research examining acute weight-related stresses physiologically, researchers (Gay, Monsma & Torres-McGehee, 2009) have discussed potential for participant discomfort and invasiveness when collecting BMI measures in a laboratory setting.

Surprisingly, findings from independent t-tests comparing individuals who react vs. non-reactors at two peaks (timepoint 6 to 7 and 3 to 4) portray no significant mean differences between the groups among theoretically linked constructs such as body dissatisfaction, and appearance importance. Referring to Cohen’s d statistic, there were small to medium effect sizes for appearance importance and physical self-worth using measure of phenomenological envy. These results are promising in terms of associations to the social self preservation theory.
(Dickerson et al., 2004), which proposes that experiences of social evaluative threat induce negative emotional and cognitive states including low social esteem and increased awareness of appearance (Dickerson & Kemeny, 2004). Regardless, these findings should be considered carefully, due to the fairly arbitrary allocation of individuals into reactor vs. non-reactor categories, which may not indicate a true representation of physiological reaction to stress. Considering the large body of literature on stress, there is considerable disagreement and mixed results when assessing the link between emotion and physiological stress (see Dickerson & Kemeny, 2004 for meta-analysis). As such, findings from this study may suggest there is no direct association between body-related envy and physiological response of stress.

4.4. Body-related envy as mediator of predictors and stress appraisal

It was hypothesized that body-related envy would be a significant mediator between theoretical body image constructs (body dissatisfaction, appearance importance, physical self-worth, trait body shame, physical self-discrepancies) and stress appraisal. These findings were partially supported, since body-related envy assessed using the dispositional body-related envy measure was a significant mediator in some models yet envy assessed using the phenomenological measures (i.e., state) was not a significant mediator.

4.4.1. Body image constructs and stress appraisal: the mediating role of body-related envy

As expected, dispositional body-related envy was a significant mediator between body dissatisfaction and stress appraisal, as well as appearance importance and stress appraisal. This finding is consistent with past research findings showing strong links between body dissatisfaction, social comparisons and stress appraisal (Holle, 2004; Kowalski et al., 2006; Page, 1991). Research evidence also highlights the utility of personal salience of physical appearance
in influencing affective reactions, which can prime negative cognitions and cause higher stress appraisals (Oliver & Brough, 2002). Also consistent with cognitive-behavioural models, personal investment in body image includes cognitive schemas and appraisals, which regulate affective emotions regarding the body (Cash, 1994). This theoretical evidence may also support the notion that negative body-related emotions can harmfully shape cognitive schemas about the self, causing individuals to be more attuned to situations that may threaten the global self (i.e. experience higher negative appraisal to stressful stimuli). A similar explanation can account for the significant link between body dissatisfaction and stress appraisal through body-related envy. Furthermore, these links have been supported in qualitative examinations of body-related envy (Pila et al., submitted). Findings from semi-structured interviews suggest that individuals who discussed feeling content with the size, shape and appearance of their body and/or described low personal salience of physical appearance also spoke of seldom experiencing body-related envy. Becoming aware of an upward social comparison target was usually met with appropriate coping mechanisms that prevented strong elicitation of envy. These coping strategies may be indicative of healthy coping strategies and management of obtrusive cognitions that may influence individuals to appraise situations stressfully.

Contrary to the hypothesis, indirect relationships with physical self-worth, trait body shame and physical self-discrepancies were not significantly associated with stress appraisal in a mediation model of body-related envy. However, there were significant direct effects in the expected directions between physical self-worth and stress appraisal, and trait body shame and stress appraisal. This finding may reveal that although body-related envy was not a mediator, there could potentially be an undiscovered mediator variable that explains the direct association. Again, it is plausible to assume that maladaptive coping strategies, such as dissociation or
avoidance coping (Lazarus & Folkman, 1984) may lead individuals to appraise a potentially stress-provoking situation more negatively. On the other hand, no significant direct paths existed with self-discrepancies, despite that actual self-perceptions were negatively correlated to body-related envy and stress appraisals. This finding may be explained by consulting literature on cognitive biases and physical self-discrepancies (Baker, Williamson, & Sylve, 1995; Kulbartz, Florin, & Pook, 1999), which suggests that actual physical self-perceptions may be reactive to negative emotion and stress, while ideal self-perceptions are relatively stable. As such, it is plausible that situational/state experiences of negative body-related emotions and stress are predictive of actual physical self-perceptions. Specifically, an individual may negatively appraise the physical self in a biased manner, if in a threatening situation that elicits body-related envy. Specifically, these individuals may differentially attend to stimuli and alter their actual self-perception in response to a negative emotional or stressful experience (Baker et al., 1995).

Overall, findings from this study suggest a complex relationship between physical self-discrepancies, body-related envy and stress that is not supported in the proposed mediation model.

Similarly, assessing all mediation relationships using the phenomenological envy measure as a mediator yielded non-significant results in all mediation models. It is possible that phenomenological envy simply does not mediate the relationship between body-related psychological constructs and stress appraisal. For example, even though physical self-worth shows a significant negative link with stress appraisals, body-related envy may not be the key mediator in this relationship. Additionally, it may be that the state-nature of this phenomenological measure precludes an association between stable body image constructs and proneness to stress appraisals.
4.4.2. Body-related envy as mediator of predictors and physiological stress response

Due to non-significant associations between cortisol values and body-related envy, physiological stress was not evaluated as an outcome in the proposed mediation model. Since limited research exists regarding body-related emotions and biological stress, it is unclear if the results are specific to this study or if they can be attributed to a lack of relationship between these variables. Most of the existing literature surrounding body image concerns and stress has primarily focused on psychological variables and researchers (Johnson & Wardle, 2005; Putterman & Linden, 2006) examining biological stress components have reported mixed findings. For example, in an experiential study of dietary restraint and cortisol, Putterman and Linden (2006) found that importance of appearance combined with body dissatisfaction were significant predictors of afternoon, but not morning, cortisol responses. Interestingly, Putterman and Linden (2006) found no association between stress appraisal and cortisol response, which highlights the possibility that biological markers of stress do not conform to the same patterns of psychological stress appraisals (Pennebaker, 1982). The authors suggest the possibility that stress appraisal is not related to the HPA-axis activation of cortisol, since stress appraisal assesses a more stable proneness to stress, while cortisol may be easily influenced by changes in HPA activation (Kirschbaum & Hellhammer, 1989). Overall, this suggests that stress appraisal may be more dispositional and less sensitive to daily fluctuations that are associated with a biological measure. Assuming that physiological response to stress was assessed in a valid manner using a standardized stress-induction protocol (Kirschbaum et al., 1993), and was still not significantly related to body-related envy, it is important to discuss alternate mechanisms to body image concerns and stress. Acute laboratory research has suggested that stress-induction tasks may
elicit a physiological response of stress independent of emotional processes (Feldman et al., 1999).

In summary, this study provides a preliminary analysis in the associations between envy, body image and stress in young adult women. Findings from this study suggest specific functions for the utility of both, a state phenomenological, and a dispositional body-related envy measure. Results mostly support the hypothesis that body-related envy is predicted by body dissatisfaction, physical self-discrepancies, high importance of physical appearance, low physical self-worth and high body shame. Similarly, body-related envy predicted psychological stress appraisals, however it was not associated with physiological response of stress. In addition, there was limited support for a mediation model between the body image constructs and stress, through body-related envy.

4.5. Limitations

Despite the noteworthy contributions of this empirical study as the first to examine body-related envy, several limitations need to be considered. These limitations include generalizability, sample size, cross-sectional design, issues in measurement, and stress-induction protocol. As this study was focused on young adult females, results are not generalizable to male populations or other age groups. This was an important consideration considering the gender differences with body-related emotions (Tangney & Salovey, 1999) and social comparison tendencies (Fredrickson & Roberts, 1997; Myers & Crowther, 2009). Additionally, given the use of a sensitive physiological marker of stress, inclusion criteria was limited to females in an effort to reduce confounding effects of hormonal differences (Kudielka & Kirschbaum, 2005). Also, as with any study examining psycho-physiological constructs, a challenge in this study was using a sample size that was small enough for practicality (i.e. saliva collection) yet large enough to
detect sufficient power in associations between psychological constructs. The small sample size meant that separate linear regressions of each independent variable were needed, due to low power. This consideration may limit the inferences in the findings, in that combined variance accounted for in envy and/or stress by all theoretical predictors was not possible.

Another important limitation concerns the cross-sectional design when assessing psychological constructs, limiting inferences of causality. Although theoretical underpinnings suggest that dispositional body image constructs predict body-related envy, the potential for bidirectionality cannot be ruled out. For example, although these findings support the theoretical notion that body-related envy is a predictor of body dissatisfaction, it is possible that negative body-related affect predicts body dissatisfaction (Cash & Smolak, 2011). This association is supported by experimental studies, which show increased body dissatisfaction after exposure to images of ideal physiques (Croesz, Levine & Murnen, 2002; Leahey, Crowther, & Mickelson, 2008). A further explanation is that a complex relationship exists between body-related envy and body dissatisfaction, in that both the affective and cognitive dimensions develop and manifest concurrently. Despite the direction of any of the body image constructs, these findings underscore the importance of considering the role of psychological body image constructs on body-related emotions, such as envy.

Several limitations in terms of measurement also warrant consideration. First, despite the utility of phenomenological ratings in assessing body-related envy, using composite scores of multiple ratings disguises possible daily variability and fluctuations, which may conceal within-person differences. Secondly, since envy was assessed on alternating days in an effort to reduce participant burden, this may limit the comprehensive understanding that may be achieved from a full weeklong analysis. Future phenomenological assessment of envy should consider examining
between and within participant differences in daily scores using hierarchical multilevel modeling. In addition, phenomenological ratings of envy may also be problematic considering the inclusion of ‘jealousy’ as one of the four items. In fact, envy researchers suggest omitting the use of ‘jealousy’ altogether when measuring experiences of envy (Smith et al., 1999), since jealousy concerns an additional dimension to envy, such as a loss of an important relationship to a perceived superior rival (Parrott & Smith, 1993). For the purposes of the present study, the composite phenomenological envy measure was utilized to circumvent issues of lacking a standardized trait envy scale specific to the body. Thirdly, it is essential to note that a standardized scale like the Appearance Schemas Inventory (Cash, 1996) was not used to measure individual importance of appearance and weight. In an effort to reduce participant burden, two items were utilized to assess the personal significance of being perceived as physically attractive and attaining a desired weight. These items have been used successfully in assessing importance of physical appearance in influencing body-related guilt and shame in adolescents (Pila, Castonguay, Kowalski, Mack, Wilson & Sabiston, 2012).

The last set of limitations to consider regards the stress-induction protocol. Given the practical challenges associated with acute physiological response to laboratory stressors (Dickerson & Kemeny, 2004), a series of plausible explanations could explain the non-significant association between body image constructs, envy, and cortisol. For example, due to the various and extensive restrictions placed on participants the day of testing (e.g. fasting, sleep, exercise, alcohol/smoking), there is a high chance of low participant adherence and contamination of saliva samples. Although protocols were set in place to circumvent this issue (e.g. rationale provided to participants, reminder emails, confirmation on testing day) the possibility of non-adherence and artifact cortisol values cannot be ruled out. In addition, a few
limitations should be considered with the stress-induction task. For example, although the methods carefully followed a standardized stress test protocol (Kirshbaum et al., 1993), it is possible that the stress-induction was ineffective at stimulating a physiological response to stress. Even though the combination of public speaking and difficult cognitive task is regarded as an effective activator of the HPA axis (Dickerson & Kemeny, 2004), it is possible that some individuals in our sample were particularly comfortable with public speaking or mental arithmetic. Future research may circumvent issues confronted in this study by examining stress in daily life, using repeated cortisol measures in a longitudinal design (e.g. daily diary of psychological stressors and physiological responses). In summary, although all possible efforts to evade methodological issues were attempted, limitations need to be considered in interpretation of the empirical evidence and influence direction for future research.

4.6. Study Implications

The evidence from this research provides one of the first examinations of body-related envy. From a theoretical perspective, this work examined meaningful associations of envy with various body-related constructs, which broadens the scope of self-conscious emotion and body image research literatures. Specifically, this research provides support for self-conscious emotions contextualized to the physical self (Harter, 2012; Sabiston et al., 2010) and answers a call for the examination of domain-specific self-conscious emotions (Else-Quest et al., 2012; Tangney & Tracy, 2012). Additionally, this research provides evidence for a strong theoretical association when merging theories of social comparison (Festinger, 1954), self-discrepancy (Higgins, 1987) and social self-preservation theory (Dickerson et al., 2004). Furthermore, the study findings provide additional support to an emerging body of literature that has begun to link
body-related emotion to psychobiological correlates (Sabiston et al., 2009; Martin Ginis et al., 2012).

From a measurement perspective, this study is the first to examine a domain-specific measure of envy. Researchers (Else-Quest et al., 2012) have urged the development of specific self-conscious emotion measures that may tap into particular domains of the self, and expand our knowledge of self-conscious emotions. This study utilized a self-reported phenomenological narrative and adjective rating scale (Tangney et al. 1996) to examine personal experiences of body-related envy. This study was the first to examine daily measures of envy from a phenomenological perspective aggregated over the week. In addition, this work provides support for the modification of the Dispositional Envy Scale (Smith et al, 1999) as a preliminary guide to measuring disposition to envy specific to the body and physical self. This modified scale should be used as a guide to prompt future research on body-related envy.

This research has practical implications for intervention strategies and clinical practice considering the strong link between body-related envy and psychological appraisals of stress. The detrimental effects of negative self-conscious emotions have been well documented (Fuchs, 2002; Tiggerman & Noll, 2003; Tangney et al., 1992), including consequences of envy (Gallo & Matthews, 2003; Smith, Glazer, Ruiz & Gallo, 2004; Smith & Kim, 2007; Suls & Bunde, 2005). As such, this research strongly encourages the development of intervention strategies to reduce the burden of negative emotions such as body-related envy. Drawing on the findings from the second research question in this study, the psychobiological burden of negative body-related emotions such as envy may be reduced with strategies aimed at reducing body dissatisfaction, physical self-discrepancies and self-worth (Cattarin, Thompson, Thomas, & Williams, 2000; Heinberg & Thompson, 1995; Neumark-Sztainer, Paxton, Hannan, Haines & Story, 2006). For
example, the most commonly prescribed intervention aimed to prevent and reduce body dissatisfaction consists of cognitive behavioural therapy, which targets perceptions, cognitive, affective and behavioural dimensions (Farrell, Shafran, & Lee, 2006; Rosen, Reiter, & Orosan, 1995; Strachan & Cash, 2002). In order to target physical self-discrepancies and reduce the incongruity between actual and ideal self, intervention strategies should encourage the development of healthy and realistic perceptions of the physical self in order to reduce associated body-related envy experiences. And in an effort to combat societal standards of physical appearance, psycho-educational programs may aid to increase awareness of marketing tactics and media manipulations of idealized portrayals of the female physique (Prosavac, Prosavac & Weigel, 2001). In addition, effective interventions may also aim to increase physical self-worth. For example, school-based preventative educational programs that target self-esteem have shown significant improvements in body image perceptions (O’Dea & Abraham, 1999).

4.7. Conclusion

In conclusion, due to the emergent associations between disturbances in body image affect and experiences of stress in women, studying the affective domain of body image will have important implications in understanding unique emotions tied to the body, such as envy. It is especially important to understand body-related envy due to the adverse health outcomes associated with this specific emotion (Smith et al., 1999) and with body image disturbances on their own (Grogan, 2008).

Acknowledging that women experience prevalent experiences of body-related envy is an important step in the process of conceptualizing and improving women’s overall health and well-being. Furthermore, findings from this study will help to expand conceptualizations of both self-conscious emotion and body image literatures, advance theory and even inform future practice.
Implications for practice are especially imperative considering the rising rates of body image disturbances as a ‘normative discontent’ (Neighbors & Sobal, 2007). By targeting emotional experiences associated with this ubiquitous trend of body image disturbance, research can aid to lessen the burden of the “green-eyed monster” on women’s overall health and well being.
REFERENCES


Cambridge University Press.


FEMALE PARTICIPANTS NEEDED

For a study examining:

*Body Language & Hormones*

We are hoping to better understand how differences in women’s personality traits affect body language and hormones during various presentation tasks. We are also examining personality factors and daily attitudes over a *one-week period*.

You may be eligible to participate in the study if you are:

- 18 – 25 years old
- Currently taking oral contraceptives
- Available to fill out online daily questionnaires for 7 days

If you are interested in participating, you will be asked to fill out short daily questionnaires at the end of every day for 7 days via an online survey. Then you will come to the laboratory once for approximately 90-minutes to fill out a series of questionnaires, provide 8 saliva samples and undergo a body language assessment.

In return for your participation you will be compensated $50

*For questions or info* contact Eva:

eva.pila@mail.utoronto.ca, 647-464-6407
Appendix B – Online Questionnaire

Phenomenological Measure

DAY 1, 3, 5, 7
Think of one of instance that occurred TODAY where you compared your body or physical appearance to someone who you think is better than you in some way. Describe the incident in as much detail as you can. Explain what happened to make you compare, what you were thinking and feeling and what you did.

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

DAILY
Recalling how you felt when you made comparisons to others who were better than you related to the body, please indicate how much you experienced each of the following feelings on the scale provided:

<table>
<thead>
<tr>
<th>Feeling</th>
<th>Never</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-conscious</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Like I did something wrong</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Mad at self</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Laughable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Disgraced</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Like I was blushing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Resentful</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Like I wanted to hide</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Ashamed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Humiliated</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Inappropriate</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Longing for</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Jealous</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Embarrassed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Covetous (you wanted what someone else had)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Regret</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
THANK YOU FOR AGREEING TO PARTICIPATE IN THIS RESEARCH PROJECT

Your name is not required anywhere in this package. There are no “right” or “wrong” answers. Please be as honest and as accurate as you can in answering each question. You are not obligated to answer any questions that make you feel uncomfortable or that you do not wish to answer.

Thanks for your participation!

ALL ANSWERS WILL REMAIN PRIVATE AND CONFIDENTIAL

1. What is your age (in years)? __________
2. What is your gender? __________
3. What is your marital status? (please check the boxes that apply):
   - □ Single
   - □ Divorced
   - □ Widowed
   - □ Married
   - □ Separated
   - □ Common-law
4. What is your current level of education/employment? (please check the boxes that apply):
   - □ Undergraduate Student
   - □ 1st year
   - □ 2nd year
   - □ 3rd year
   - □ 4th year
   - □ A Graduate Student
   - □ Masters
   - □ Ph.D.
   - □ Employed Full-time
   - □ Employed Part-time
5. What is your cultural background? (please check the box that applies to you):
   - □ Aboriginal
   - □ Caucasian
   - □ African-Canadian
   - □ Asian
   - □ Arab/West Asian
   - □ South Asian
   - □ Other_____________________
6. What prescribed medication are you currently taking? Please indicate type and name, i.e. Alesse (birth control pill). Please note: A requirement for participating in this study is that you are currently taking oral contraceptives. This decreases the chance of normal fluctuations in hormonal levels.
Multidimensional Body-Self Relations Questionnaire  
(MBSRQ; Cash & Pruzinsky, 1990)

Please indicate the extent to which you agree with each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Definitely disagree</th>
<th>Mostly disagree</th>
<th>Neither disagree nor agree</th>
<th>Mostly agree</th>
<th>Definitely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I like my looks just the way they are</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>My body is sexually appealing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Most people would consider me good looking</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I like the way I look without clothes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I like the way my clothes fit me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I dislike my physique</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I am physically unattractive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Appearance & Weight Importance Items**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Definitely disagree</th>
<th>Mostly disagree</th>
<th>Neither disagree nor agree</th>
<th>Mostly agree</th>
<th>Definitely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is important for me to be physically attractive and look my best</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>My body weight and shape are important to who I am</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Dispositional Envy Scale
(DES; Smith et al., 1999)

Please indicate the degree to which the following items apply to you, generally.
1 – strongly disagree, 2 – mostly disagree, 3 – neither, 4 – mostly agree, 5 – strongly agree

1. I feel envy every day
   1 2 3 4 5

2. The bitter truth is that I generally feel inferior to others.
   1 2 3 4 5

3. Feelings of envy constantly torment me.
   1 2 3 4 5

4. It is so frustrating to see some people succeed so easily.
   1 2 3 4 5

5. No matter what I do, envy always plagues me.
   1 2 3 4 5

6. I am troubled by feelings of inadequacy.
   1 2 3 4 5

7. It somehow doesn’t seem fair that some people seem to have all the talent.
   1 2 3 4 5

8. Frankly, the success of my peers make me resent them.
   1 2 3 4 5
Dispositional Envy Scale - Modified to the body  
(DES; Smith et al., 1999)

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Moderately Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Moderately Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>When it comes to thoughts about my body/physique, I feel envy every day</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The bitter truth is that I generally feel inferior to others when I think about my body/physique</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Feelings of body-related envy constantly torment me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>It is so frustrating to see some people who have great bodies/physiques with little effort</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>No matter what I do, body-related envy always plagues me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I am troubled by feelings of inadequacy about my body/physique</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>It somehow doesn’t seem fair that some people seem to have the “perfect” body/physique</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The body-related success of others around me makes me resent them</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Objectified Body Consciousness Scale: Body Shame Subscale  
(OBCS; McKinley & Hyde, 1996)

Please circle a number to indicate the extent to which you agree with each statement.

1. Strongly Agree  
2. Agree  
3. Somewhat Agree  
4. Neither agree nor disagree  
5. Somewhat Disagree  
6. Disagree  
7. Strongly Disagree

When I can’t control my weight, I feel like something must be wrong with me.
1  2  3  4  5  6  7

I feel ashamed of myself when I haven’t made the effort to look my best.
1  2  3  4  5  6  7

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

I would be ashamed for people to know what I really weigh.
1  2  3  4  5  6  7

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

When I’m not exercising enough, I question whether I am a good enough person.
1  2  3  4  5  6  7

Even when I can’t control my weight, I think I’m an okay person.
1  2  3  4  5  6  7

When I’m not the size I think I should be, I feel ashamed.
1  2  3  4  5  6  7
The Physical Appearance Comparison Scale  
(PACS; Thompson, Heinberg, & Tantleff, 1991)

*Using the following scale please select a number that comes closest to how you feel:*

<table>
<thead>
<tr>
<th>Never</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. At parties or other social events, I compare my physical appearance to the physical appearance of others.

   1   2   3   4   5

2. The best way for a person to know if they are overweight or underweight is to compare their figure to the figure of others.

   1   2   3   4   5

3. At parties or other social events, I compare how I am dressed to how other people are dressed.

   1   2   3   4   5

4. Comparing your "looks" to the "looks" of others is a bad way to determine if you are attractive or unattractive.

   1   2   3   4   5

5. In social situations, I sometimes compare my figure to the figures of other people.

   1   2   3   4   5
Physical Self-Description Questionnaire  
(PSDQ; Marsh et al., 1994)

In this section you will be asked to think about yourself physically. Answer each sentence quickly as you feel now. Please do not leave any sentences blank. Choose your answer to a sentence and put a circle around the number under the answer you choose.

<table>
<thead>
<tr>
<th></th>
<th>False</th>
<th>Mostly False</th>
<th>More False than True</th>
<th>More True than False</th>
<th>Mostly True</th>
<th>True</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am satisfied with the kind of person I am physically.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Overall, most things I do turn out well.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Physically, I am happy with myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>I don’t have much to be proud of.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>I feel good about the way I look and what I can do physically.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>I feel that my life is not very useful.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Physically I feel good about myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Overall, I’m no good.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>I feel good about who I am and what I can do physically.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Most things I do, I do well.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>I feel good about who I am physically.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Overall, I have a lot to be proud of.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Overall, I’m a failure.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Nothing I do ever seems to turn out right.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Page 119
Physical Self-Discrepancy Scale  
(PSDS; Brunet et al., 2012)

Read each of the descriptor words and indicate on the rating scale how much each word describes you now, what you would like to be, and what you think you should be. For example:

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Somewhat</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OUTGOING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I would like to be</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I should be</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

These responses suggest that I am not overly outgoing, I would like to be more outgoing and I feel that I should be somewhat more outgoing.

NOW IT'S YOUR TURN…

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Somewhat</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ATTRACTION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I would like to be</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I should be</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>THIN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I would like to be</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I should be</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>ATHLETIC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I would like to be</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I should be</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>FIT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I would like to be</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I should be</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Perceived Stress Scale  
(PSS; Cohen et al., 1994)

_The questions in this scale ask you about your feelings and thoughts _during the past week._
0 – Never, 1 – Almost Never, 2 – Sometimes, 3 – Fairly Often, 4 – Very Often

1. In the last week, how often have you been upset because of something that happened unexpectedly?
   0 1 2 3 4

2. In the last week, how often have you felt that you were unable to control the important things in your life?
   0 1 2 3 4

3. In the last week, how often have you felt nervous and "stressed"?
   0 1 2 3 4

4. In the last week, how often have you felt confident about your ability to handle your personal problems?
   0 1 2 3 4

5. In the last week, how often have you felt that things were going your way?
   0 1 2 3 4

6. In the last month, how often have you found that you could not cope with all the things that you had to do?
   0 1 2 3 4

7. In the last week, how often have you been able to control irritations in your life?
   0 1 2 3 4

8. In the last week, how often have you felt that you were on top of things?
   0 1 2 3 4

9. In the last week, how often have you been angered because of things that were outside of your control?
   0 1 2 3 4

10. In the last week, how often have you felt difficulties were piling up so high that you could not overcome them?
   0 1 2 3 4
Multidimensional Perfectionism Scale
(MPS; Frost et al., 1990)

Please circle the number that best corresponds to your agreement with each statement below.
1 – strongly disagree, 2 – mostly disagree, 3 – neither, 4 – mostly agree, 5 – strongly agree

1) My parents set very high standards for me.
   1  2  3  4  5

2) Organization is very important to me.
   1  2  3  4  5

3) As a child, I was punished for doing things less than perfectly.
   1  2  3  4  5

4) If I do not set the highest standards for myself, I am likely to end up a second rate person.
   1  2  3  4  5

5) My parents never tried to understand my mistakes.
   1  2  3  4  5

6) It is important to me that I be thoroughly competent in everything I do.
   1  2  3  4  5

7) I am a neat person.
   1  2  3  4  5

8) I try to be an organized person.
   1  2  3  4  5

9) If I fail at work/school, I am a failure as a person.
   1  2  3  4  5

10) I should be upset if I make a mistake.
    1  2  3  4  5

11) My parents wanted me to be the best at everything.
    1  2  3  4  5

12) I set higher goals for myself than most people.
    1  2  3  4  5

13) If someone does a task at school/work better than me, I feel like I have failed the whole task.
    1  2  3  4  5

14) If I fail partly, it is as bad as being a complete failure.
    1  2  3  4  5

15) Only outstanding performance is good enough in my family.
16) I am very good at focusing my efforts on attaining a goal.
1 2 3 4 5

17) Even when I do something very carefully, I often feel that it is not done quite right.
1 2 3 4 5

18) I hate being less than the best at things.
1 2 3 4 5

19) I have extremely high goals.
1 2 3 4 5

20) My parents have expected excellence from me.
1 2 3 4 5

21) People will probably think less of me if I make a mistake.
1 2 3 4 5

22) I never felt like I could meet my parents’ expectations.
1 2 3 4 5

23) If I do not o as well as other people, it means I am an inferior human being.
1 2 3 4 5

24) Other people seem to accept lower stands from themselves than I do.
1 2 3 4 5

25) If I do not do well all the time, people will not respect me.
1 2 3 4 5

26) My parents have always had higher expectations for my future than I have.
1 2 3 4 5

27) I try to be a neat person.
1 2 3 4 5

28) I usually have doubts about the simple everyday things I do.
1 2 3 4 5

29) Neatness is very important to me.
1 2 3 4 5

30) I expect higher performance in my daily tasks than most people.
1 2 3 4 5

31) I am an organized person.
1 2 3 4 5
32) I tend to get behind my work because I repeat things over and over.
   1 2 3 4 5

33) It takes me a long time to do something “right”.
   1 2 3 4 5

34) The fewer mistakes I make, the more people will like me.
   1 2 3 4 5

35) I never felt like I could meet my parents’ standards.
   1 2 3 4 5
Appendix D – Ethics Certificates

UNIVERSITY OF
TORONTO

OFFICE OF THE VICE PRESIDENT, RESEARCH

PROTOCOL REFERENCE # 28182

October 16, 2012

Dr. Catherine Sabiston
FACULTY OF PHYSICAL EDUCATION AND HEALTH

Dear Dr. Sabiston,

Re: Your research protocol entitled, "Exploring daily experiences and physiological stress response of body-related envy"

<table>
<thead>
<tr>
<th>ETHICS APPROVAL</th>
<th>Original Approval Date: October 16, 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expiry Date: October 15, 2013</td>
</tr>
<tr>
<td></td>
<td>Continuing Review Level: 1</td>
</tr>
</tbody>
</table>

We are writing to advise you that the Health Sciences Research Ethics Board (REB) has granted approval to the above-named research protocol under the REB’s delegated review process. Your protocol has been approved for a period of one year and ongoing research under this protocol must be renewed prior to the expiry date.

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 in the research 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 current ethics approval. Note that annual renewals for studies cannot be accepted more than 30 days prior to the date of expiry.

If your research is funded by a third party, please contact the assigned Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your research.

Yours sincerely,

Judith Friedland, Ph.D.
REB Chair

Daniel Gyewu
REB Manager

OFFICE OF RESEARCH ETHICS
McMurrich Building, 12 Queen's Park Crescent West, 2nd Floor, Toronto, ON M5S 1S8 Canada
Tel: +1 416 946-3223 • Fax: +1 416 946-5763 • ethics.review@utoronto.ca • http://www.research.utoronto.ca/researchers-administrators/ethics/
Research Ethics Board II
Certificate of Ethical Acceptability of Research Involving Humans

REB File #: 30-0612

Project Title:

Principal Investigator: Eva Pila

Department: Kinesiology and Physical Education

Status: Master’s Student

Supervisor: Prof. Catherine Sabiston

Co-Investigators/Other Researchers: Angela Stamiris

This project was reviewed by Full Review

Fred Genesee, Ph.D.
Chair, REB II

Approval Period: 28 June 2012 to 27 June 2013

This project was reviewed and approved in accordance with the requirements of the McGill University Policy on the Ethical Conduct of Research Involving Human Subjects and with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans.

* All research involving human participants requires review on an annual basis. A Request for Renewal form should be submitted 2-3 weeks before the above expiry date.
* When a project has been completed or terminated a Study Closure form must be submitted.
* Should any modification or other unanticipated development occur before the next required review, the REB must be informed and any modification can't be initiated until approval is received.
Daily Attitudes & Body Language Study

INFORMED CONSENT

Researcher: Eva Pila, MSc. Student
Supervisor: Dr. Catherine Sabiston, Ph.D.

Introduction
You are being asked to participate in a research study examining how young women’s body language and attitudes are related. We are asking you to participate in this research so that we can better understand daily attitudes and personality characteristics and how these relate to body language and hormones. Women between the ages of 18 to 25 years of age may join this study. Results from this study will be presented at scientific conferences and will be published in a Master’s thesis and academic journals. This consent form explains the research study and your part in the study.

Purpose of the Study
To better understand the relationship between body language, daily attitudes and personality characteristics in young adult females.

Study Procedures
The survey will take approximately 10 minutes to complete. You will be asked questions about your attitudes, thoughts and feelings. There are no “right” or “wrong” answers. Please be as honest and as accurate as you can in answering each question. You are not obligated to answer any questions that makes you feel uncomfortable or that you do not wish to answer.

Benefits and Risks to Participants:
- There are no foreseeable risks associated with your involvement in this study.
- You will receive $35 for the completion of these daily online questionnaires (and $15 for the laboratory portion). Compensation will be received either at the end of the lab portion, or at the point in time if you choose to withdraw.

Confidentiality
Information gathered during the interview will be used for research purposes only, and the identity of individual participants will not be revealed at any time. Results from this study will be used only in the preparation of academic research publications and presentations, and in
fulfillment of a Master’s thesis. No persons other than the primary researcher and academic supervisor will have access to the questionnaire data, the online surveys or any other supporting documentation, which will be securely stored for a minimum of five years as required by University of Toronto. After this time, the principal investigator will destroy all related study documents.

Participant Concerns:
- You are under no obligation to participate in this study. Also, you will be advised of any new information that may influence your decision to participate in the study.
- You are free to withdraw from this study at any time with absolutely no penalty.
- You may refuse to respond to any item(s) during the online surveys.
- You do not waive any legal rights by signing this consent form.
- There are no known conflicts of interest on the part of the researchers or University of Toronto.

Contact information about the rights of research subjects:
If you have any concerns about the rights of research participants, you may contact the Office of Research Ethics 416-946-3273.

Contact information about the study:
If you have any questions concerning the procedures of this study or desire further information please contact the principal investigator, Dr. Catherine Sabiston, at: 416-978-5837, catherine.sabiston@utoronto.ca or Eva Pila, at 647-464-6407, eva.pila@mail.utoronto.ca.

CONSENT:
Your online indication of acceptance to complete this study indicates that:
- You have been informed of the objectives and procedures of this research study, as outlined above.
- You have the ability to print a copy of this consent form for your records.
- You consent to participate in this project, as outlined above.
Exploring body language and hormones in young adult females

INFORMED CONSENT

Researchers: Eva Pila, MSc. Student
Supervisor: Catherine Sabiston, Ph.D

Introduction

You are being asked to participate in a research study examining how young women’s body language and hormones are related in social situations. We are asking you to participate in this research so that we can better understand the daily attitudes and personality characteristics and how this relates to body language and hormones. Women between the ages of 18 to 25 years of age may join this study. Results from this study will be presented at scientific conferences and will be published in a Master’s thesis and academic journals. This consent form explains the research study and your part in the study. Please read it carefully and ask questions about any information you do not understand.

Purpose of the Study: To better understand the relationship between body language and hormones, and daily attitudes and personality characteristics in young adult females.

Study Procedures
Your participation in this study involves:

a) Completing daily online questionnaires for 7-days prior to lab session.

b) A one-time (approximately 1.5-hour) visit to the laboratory (located in Warren Stevens Building). This visit will be scheduled during the 21-day phase of your oral contraceptive cycle, to control for normal hormonal fluctuations. During this lab visit,

i) You will be provided with a heart rate monitor to fit around your own body.

ii) You will provide a sample of saliva so we can assess your hormone levels. Then you will be asked to relax for 15-minutes while listening to music. You will then provide a second saliva sample.
III) You will complete a series of questionnaires regarding your personality, beliefs and attitudes. This will take approximately 15-20 minutes to complete.

IV) Your height and weight will then be measured and the third saliva sample will be collected.

V) You will be given a list of controversial topics to choose from, and you will have 5-minutes to prepare a 5-minute presentation regarding your opinion on your chosen topic.

VI) The research assistant (Eva Pila) along with two other research assistant will view your presentation to assess your body language.

VII) Then you will have 5-minutes to complete a mathematical task in front of the same researcher assistants.

VIII) A video camera will also record your presentation, which will be later shown to a panel of body language experts who will further assess your body language.

IX) Afterwards, the 2 research assistants will leave and you will provide another saliva sample.

X) You will then rest and listen to relaxing music for 40-minutes and the last four saliva samples will be collected, at 10-minute intervals.

**Benefits and Risks to Participants.** During this study, there exists minimal risk of experiencing anxiety and nervousness when presenting in front of an audience, and emotional discomfort in answering questions regarding attitudes, beliefs and personality. Every effort will be made to minimize this risk by trained personnel during the in-person lab session. You can also choose to stop the study at any time, with no penalty. You will receive $50 compensation for your participation in this study ($35 for the daily online questionnaires and $15 for the lab session).

**Confidentiality.** Information gathered during the interview will be used for research purposes only, and the identity of individual participants will not be revealed at any time. Results from this study will be used only in the preparation of academic research publications and presentations, and in fulfillment of a Master’s thesis. No persons other than the primary researcher and academic supervisor will have access to the questionnaire data, the online surveys or any other supporting documentation, which will be securely stored for a minimum of five years as required by University of Toronto. After this time, the principal investigator will destroy all related study documents.

**Participant Concerns:**
- You are under no obligation to participate in this study. Also, you will be advised of any new information that may influence your decision to participate in the study,
- You are free to withdraw from this study at any time with absolutely no penalty,
- You may refuse to respond to any item(s) during the in-person lab session or online surveys,
- You do not waive any legal rights by signing this consent form.
Contact information about the rights of research subjects:
If you have any concerns about the rights of research participants, you may contact the Office of Research Ethics 416-946-3273.

Contact information about the study:
If you have any questions concerning the procedures of this study or desire further information please contact the principal investigator, Dr. Catherine Sabiston, at: 416-978-5837, catherine.sabiston@utoronto.ca or Eva Pila, at 647-464-6407, eva.pila@mail.utoronto.ca.

Consent:
Your signature below indicates that
▪ You have been informed of the objectives and procedures of this research study, as outlined above
▪ You have a copy of this consent form for your records
▪ You are 18 years of age or older and consent to participate in this project, as outlined above.

I have read the above information and I agree to participate in this study

Signature: _____________________  Researcher’s signature: _____________________

Name: _____________________  Date: ________________________________________

Please return the first page to the researcher and keep the next page for your records and reference.
Appendix G – Presentation Topics

**Presentation Topics**

*Below is a list of controversial topics. Please choose one of the following topics. You can pick the topic which interests you most and present your opinion on the topic. There is no ‘right’ or ‘wrong’ answer. Act as naturally as you can. Please ensure the presentation lasts for a full 5-minutes.*

Abortion

Cannabis legalization

Death penalty

Drunk driving

Euthanasia

Global warming

Illegal immigration

Online piracy

Religion in school curriculum

Reproductive technologies

Sexual equality

Stem cell research

Videogames causing violence
Thank you for participating in this study. This study was advertised as if we were examining the relationship between body language, hormones and personality. The true purpose of the study was to examine if differences in how individuals react to stress affect the comparisons made around the body and appearance. In the lab, participants underwent a procedure that was created to cause a temporary stress response. The procedure consisted of presenting a presentation and math task in front of an audience and a video camera. The audience did not evaluate the participants body language and the video camera did not record the presentation. The audience consisted of other research assistants from the laboratory and they were not body language experts.

Because some individuals may have come to our lab already stressed about the idea of presenting in front of an audience, we did not pre-advise participants that they would be presenting in front of an audience or video camera. The saliva samples participants provided measured hormonal levels of stress. Participants filled out questionnaires regarding body image and perceptions around their body and appearance. During the week-long questionnaires, participants recorded how many times they compared their body and appearance to others and how these comparisons made them feel.

If you have any questions, feel free to contact the study coordinator, Eva Pila at eva.pila@mail.utoronto.ca, 647-464-6407. Otherwise, you can contact the principal investigator, Dr. Catherine Sabiston at catherine.sabiston@utoronto.ca, 416-978-5837.

Thank you for your participation!
Appendix I – Submitted Manuscript

To whom it may concern,

I hereby grant Eva Pila permission to submit our co-authored manuscript entitled “Body-related envy: A social comparison perspective in sport and exercise” that is submitted for publication in the *Journal of Sport and Exercise Psychology* as part of her master’s thesis.

Angela A. Stamiris  
June 20, 2013  
Date

Andree L. Castonguay  
June 20, 2013  
Date

Catherine M. Sabiston  
June 20, 2013  
Date
Body-Related Envy: A Social Comparison Perspective in Sport and Exercise

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Abstract

The three sequential studies sought to better understand experiences of body-related envy, and to examine the association with motivation and exercise behavior in young adult males and females. In the interview study, participants (N=11) discussed body-related envy within a framework of social comparison. In study two, a thematic content analysis was conducted on self-reported narratives of body-related envy experiences reported by 288 participants. Themes of body-related envy triggers, cognitions, and cognitive and behavioral outcomes were identified. Findings from studies one and two highlighted the possible link between body-related envy and exercise motivation and behavior. Study three tested these associations with males and females (N=320) who completed a self-report questionnaire. Body-related envy was associated with non self-determined motivation regulations, which were related to lower levels of exercise behavior. Taken together, the importance of body-related envy in the experience of cognitive, affective, and behavioral outcomes related to sport and exercise contexts is highlighted.

Keywords: self-conscious emotions, physical self, social comparison, self-determination theory
Body-Related Envy: A Social Comparison Perspective in Sport and Exercise

Individuals are often captivated by advantaged others who are deemed more physically attractive, fit, athletic or otherwise more desirable than themselves (Cash & Smolak, 2011). This is especially true in sport and exercise environments, which are inherently social and evaluative in nature. These environments provide extensive opportunity for emphasis on physical attributes like body shape and appearance, as well as body function such as performance and physical skill. Given these characteristics, sport and exercise environments tend to foster social comparisons focused on features such as physical attractiveness, fitness, athleticism, or other related desirable traits (Cash & Smolak, 2011; Fox, 1998; Leary, 1992). Social comparisons can be upward, where the self is compared to a perceived superior other, or downward, where the self is compared to a perceived inferior other. The latter elicits positive emotional experiences and the former is related to more negative emotional outcomes (Festinger, 1954; Major, Testa & Bylsma, 1991). Emotional experiences of envy are highly consistent with upward social comparisons (Smith, 2008) and overlooked and understudied in sport and exercise psychology research.

Envy is defined as a negatively valenced self-conscious emotion that arises from awareness of a socially desired object or trait that is possessed by another individual (Parrott, 1991). Emotional experiences of envy are characterized by a complex combination of unpleasant psychological states, such as feelings of hostility, inferiority, injustice, resentment and ill will towards the envied other (Parrott, 1991; Smith & Kim, 2007; Smith, Kim, & Parrott, 1988). Due to associations with hostility, individuals tend to underreport experiences of envy in attempt to maintain social desirability, making envy a difficult emotion to study empirically (Smith & Kim, 2007). Envy is fundamentally similar to emotions of jealousy, however researchers have maintained a conceptual separation between the two emotions (Smith et al., 1988), as jealousy
arises from a perceived threat of losing something to an advantaged other, rather than the desire to possess something that elicits envy (Parrot, 1991).

Similar to other negatively valenced self-conscious emotions (e.g., shame and guilt), envy occurs in interpersonal contexts and is driven by social motives (Tangney & Salovey, 2010). Individuals have an innate drive to compare with others in order to evaluate their own attributes (Festinger, 1954). Envy can be experienced as a sense of admiration for the attributes of another, and increase motivations and intentions to improve the self (Algoe & Haidt, 2009; Lockwood & Kunda, 1997). Despite the adaptive nature of this emotion, envy can also be experienced with a sense of injustice and unfairness (van de Ven, Zeelenberg & Pieters, 2011) and results in discouraging and defeating motives to improve oneself (Lockwood & Kunda, 1997). Taken together, these findings suggest an important role of envy in motivating health behavior outcomes in sport and exercise settings.

Envy emotional experiences have been linked to a host of negative psychological outcomes, such as anger, irritability, depression, anxiety, obsessive-compulsiveness, depression, neuroticism, and resentment (Anderson & Armstead, 1995; Illesy & Baker, 1991; Stansfeld, North, White & Marmot, 1995). Due to strong links with hostility, envy has also been reported as a strong predictor of cardiovascular disease (Gallo & Matthews, 2003; Suls & Bunde, 2005), high systolic blood pressure and greater daily stress (Benotsch, Christensen, & McKelvey, 1997). Despite these implications in health and well being, there are no studies to date that have examined envy experiences specific to the body or physical self, nor explicitly studying envy in sport and exercise contexts. This is surprising given the nature of sport and exercise that is conducive to such emotional experiences – social goal-directed environments in which the body is often on display, highly visible, and a target for social comparison (Leary, 1992). It is valuable
to study envy related to the physical self to better understand emotional predictors of performance, affect, and well being in sport and exercise.

There is consistent evidence that negative body-related emotions are linked to physical activity outcomes in sport and exercise contexts. For example, Brunet and Sabiston (2009) found that social physique anxiety was related to lower levels of self-determined motivation, which was associated with lower levels of physical activity. In a physical education setting, Cox and colleagues (2011) found that social physique anxiety interacted differently with individual motivation regulations and behavior. Students with higher autonomous motivation reported more effort in class, while those with higher amotivation were more likely to avoid participating in physical education class. Similar results were noted with emotions of shame and guilt (Sabiston, Brunet, Kowalski, Wilson, Mack, & Crocker, 2010). These studies have used self-determination theory (SDT; Deci & Ryan, 1985) to help explain the association between negative body-related emotion and physical activity, specifically arguing that the social environment focused on importance of appearance and body shape fosters such emotions which are related to the least adaptive motives (e.g., non self-determined) for health behaviors such as physical activity. It is possible that body-related envy is also associated with motivation and behavior in a similar way, however this is an untested proposition.

**The Current Study**

The purpose of the three inter-related and iterative studies was to better understand experiences of body-related envy in sport and exercise contexts, and to examine the association between experiences of body-related envy, motivation, and exercise behavior in young males and females. In study one, semi-structured interviews based on a phenomenological approach (Moustakas, 1994) were conducted ($N = 11$) to better understand experiences of upward social
comparisons focused on the body and body-related envy. In study two, a thematic content analysis was conducted on 288 reported narratives of body-related envy experiences to better contextualize the emotional experiences. Findings from studies one and two highlighted the possible link between body-related envy and physical activity motivation and behavior. As such, study three was focused on testing these associations based on self-report questionnaire responses (n = 320). All studies were approved by appropriate behavioral ethics committees.

**Study 1: Experiences of body-related social comparisons and envy**

The purpose of study one was to better understand the phenomenon of body-related envy among young adult males and females involved in sport and exercise.

**Method**

**Participants and Procedures**

Healthy weight [body mass index (BMI) of 18.5 to 25 kg/m²], predominantly Caucasian (66%) undergraduate university students [N = 11; 45% female; M<sub>age</sub> = 20.27 (SD = .68) years] responded to an online university-wide poster calling for ‘individuals who frequently experience social comparisons around the body and physical appearance’. Interested participants contacted the primary researcher, who ensured that all interested participants exercised or engaged in sport at least “sometimes” as a purposeful sampling requirement. Participants were scheduled for an interview time, were given a brief verbal overview of the interview structure, and provided informed consent. The individual interviews took place on the university campus in a private room and were conducted by either the first or second authors. During the interviews, both researchers wore loose fitting athletic clothing to limit any influence on body-related discussions (Lamarche, Kerr, Faulkner, Gammage, & Klentrou, 2012). The semi-structured interview guide was constructed in an iterative process by the research team to gain a broad understanding of the
phenomena of body-related envy (Moustakas, 1994). Guiding interview questions addressed participants’ experiences of upward social comparisons in general and specific to the physical self (e.g., How often do you make comparisons with people who you think are better than you? How about with regards to the body, physical appearance or physical fitness?), and body-related self-perceptions (e.g. How do you perceive and feel about your body, physical appearance and fitness? How do these perceptions influence the comparisons you make?). The in-depth semi-structured interviews lasted approximately 60 minutes in duration and were audiotaped. Participants were compensated $20 for their participation.

**Data Analysis.** The first and second authors transcribed the interviews verbatim. Pseudonyms were assigned to each participant to ensure confidentiality. The nature of the ‘lived experience’ of social comparison and body-related envy was explored using a phenomenological approach (Creswell, 2007; Moustaka, 1994). To obtain a holistic sense of the entire interview, the first author initially read each transcript and made notes to help synthesize initial thoughts. Consistent with a phenomenological approach (Moustaka, 1994), a detailed analysis was followed to allow for an understanding of social comparison and envy experiences through an iterative process of coding, labeling codes, and the development of themes based on similar meanings. All transcripts were then re-read and further coded, as appropriate. The second, third and fourth authors reviewed the table of themes and example quotations independently and provided comments on coding, themes and interpretations. In cases of disagreement, alternative viewpoints were discussed and consensus was reached.

Following the identification of themes across all participant experiences, a table of codes was developed to summarize the themes endorsed by each participant. Commonalities across
participants were examined and collective profiles were constructed for participants with similar experiences (McDonough, Sabiston & Ullrich-French, 2011).

Results

Four main themes emerged from the analysis: (i) the importance of the physical self; (ii) the realistic nature of attainment; (iii) comparisons are motivating; and (iv) the emotional ties to social comparison. The importance of the physical self was discussed as defining one’s identity or as being relatively benign to one’s sense of self. Individuals also discussed how comparisons were realistic if they had high perceptions of control and self-efficacy for attainment, or unrealistic and unattainable if perceived control was low. Individuals endorsing this latter perspective felt it was a waste of time to make comparisons focused on attributes of appearance and body shape. The motivational attributes of social comparison were discussed as a continuum whereby some individuals suggested that they were discouraged by comparisons, and that settings such as fitness centers were avoided to limit negative emotion. Other individuals discussed the positive motivating role of comparisons at the gym and on the sports field. Finally, negative affective outcomes associated with social comparisons were discussed.

Profile Groups

There were four emergent profiles that were labeled based on a general interpretation of the social comparison and envy experience with individuals reporting: (i) body appearance and fitness are not important and body-related successes of others are unattainable; (ii) body-related successes of others are unfair and undeserved; (iii) body-related upward comparisons are motivating; (iv) body-related comparisons manifested as jealousy.

Body appearance and fitness are not important and body-related successes of others are unattainable. One male (Ian) and two females (Innis, Ina) perceived upward body-related

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comparisons to be unattainable, and did not place importance on physical appearance and fitness. Innis reported “the body is a natural thing, so you cannot change it” and she viewed social comparisons as useless and invaluable, “I will not dwell really strongly on it because, for me […] I just accept that whatever you look like and whatever your body looks like, it’s just your characteristic, it’s your own thing, it’s not my business [to compare to others].” While Innis reported always viewing the body as stable and uncontrollable, Ina discussed a time when she was a ballerina and she used to make frequent upward comparisons: “basically you are taught to compare your body to everyone else and it just made me so insecure that once I quit dance […] I kind of came to terms with my body”. Ina also discussed the negative influence these comparisons had on her exercise motivations when she was a ballerina, and the positive effects of quitting dance, “After I stopped dancing I kind of stopped [comparing] and if I was exercising more […] it was more because of other factors and it wasn’t because I wanted to look a certain way”. Generally, individuals in this profile exercised out of enjoyment or desire, as Ian indicated: “I don’t feel like I really have the need to [exercise] but I always want to. You know it’s just something extra that I could do - just kind of makes me feel better.” While Ian, Innis, and Ina felt that sport and exercise were important, they rarely made comparisons in such settings.

In summary, individuals in this profile believe that physical appearance is genetically driven and accept the limits of their bodies. These individuals tend to exercise out of enjoyment or for health related goals, and make few social comparisons related to the physical self.

**Body-related successes of others are unfair and undeserved.** Fiona, Frank and Faith were represented in this profile representing the hostile nature of envious experiences. Individuals in this profile were prone to experiencing frustration and anger in response to feeling envy. Oftentimes, these individuals felt that the body-related successes of others were unfair and
undeserved, and served as a reminder of not achieving the self’s full potential. All individuals in this profile reported that the physical self is important to their identities. They described themselves as fit and all engaged in regular physical activity and training. Unlike the other profiles, where experiences of envy are transient and short-lived, individuals in this profile described lingering experiences and ruminating thoughts from envy-inducing situations.

All individuals reported strong negative feelings associated with comparisons to others. For instance, Fiona cites feeling “self-blame, irritation and helplessness” that her sister is taller and fitter than her. She describes feeling “irked” when she is given diet advice from other girls who are thin and find it simple to change their diets. Meanwhile, Faith reported on another runner who she described as “never getting tired”… “it’s like it makes me feel like, no matter how hard I work, I’m never going to get there and I’m never going to be as good as her and I’m never going to be able to do what she does”. Frank was “frustrated” when others perform better in fitness and sport with little to no effort. He feels “…resigned” when he engages in fairly frequent social comparisons. In one example, Frank focused on doing powerlifts at the gym, and describes the only other male at the gym who also engages in the same exercise: “There’s this one dude who’s not that much bigger than me, […] and he’s about my height and he just wrecks whatever I’m trying to do. I’m having a really great workout and I see him walk in and I’m like ‘oh crap’ and then my day is ruined.” Frank also suggested that social comparisons are “disheartening” especially when in social situations and when trying to achieve a sport or fitness goal because “you’re struggling to do it in front of everyone”. The negative emotions are related to high self-presentational concerns and public self-consciousness that are characteristic of individuals in this profile. Targets of comparison were often demotivating for personal training and exercise goals, and described as “futile” (Faith).
In summary, individuals in this profile personified the hostile and resentful nature of envy. The three individuals placed a high importance on physical appearance and fitness, set high and sometimes unrealistic personal goals and tended to view the successes of others as undeserved. These individuals express high public self-consciousness and naturally perceive others as opposing hostile targets of comparison.

**Body-related upward comparisons are motivating.** Three male individuals (Mark, Mason, Mike) described experiencing upward social comparisons in a positive and constructive manner. Upon becoming aware of someone with a desired physical attribute or ability in sport and exercise environments, these individuals reported feeling inspired to achieve the desired trait. Mark was intensely aware of upward social comparison and emotions of envy, particularly in sport and exercise settings that are salient with individuals “working on improving their fitness or showcasing their physical abilities”. Mark viewed experiences of upward comparisons as sufficient for inducing behavior change. For example, he stated: “[social comparisons] definitely can lead me to exercise more. I remember my one friend went from a big rugby player, lifting weight all the time and then decided to run a half marathon and seeing this guy with a big body running marathons [...] started to make me run.” Individuals in this profile had high perceived behavioral control, and portrayed high self-efficacy in achieving physical and fitness goals: “I feel like almost anything you put your mind to you can achieve; so I think everyone has the ability to change – it’s just [a matter of taking] the initiative” (Mike).

Perhaps this high perception of control was due to the positive self-perceptions regarding fitness and appearance. Mason, Mike, and Mark all strived to exercise to maintain fitness and health and reported feeling comfortable with their bodies: “there’s certainly aspects that I wish to improve [...] and I think anybody can find flaws with their body; nobody is going to feel 100%
satisfied [but] I am very comfortable” (Mark). As a result of these realistic and positive self-perceptions, they reported admiration for others who have reached a desirable fitness and appearance goal. For instance, Mark discusses a teammate who possesses commendable attributes as a result of work ethic and motivation:

He takes off his shirt and he looks like a guy out of 300 (…). He really obviously works hard, goes to the gym, exercises a lot and therefore has the body that a lot of men would probably strive for, like a lot of muscle definition, so I think in a situation like that you watch him and you admire one his fitness and physical abilities and two the work that he’s put in to be able to have that body and have that fitness to perform at that level.

In addition to feelings of admiration, these participants also conveyed a sense of competitiveness and envy feelings when making comparisons to an individual who is perceived to be physically attractive, fit and skilled. For example, Mike repeatedly discussed working out at the gym and feeling inadequate when others are lifting heavier weights, and using this to motivate himself to lift more weight and put forth his best efforts during his workout session. Mason discussed these comparisons as an innate drive to be the “the one that’s top dog, the leader of the pack, the alpha male”. Mason even indicated that comparisons are necessary to prompt improvement: “That’s what you need to do to win. You need to compare yourself to where you need to be and then push and strive to get to their level. Or to surpass them”.

In summary, these individuals were highly competitive and motivated to use social comparison experiences to drive efforts to reach their physical appearance and/or fitness goals. They displayed positive self-perceptions that result in feelings of admiration for others who possess desirable attributes or abilities.
Body-related comparisons manifested as jealousy. Two individuals, Jenn and Jake, described experiences of upward social comparisons as synonymous with jealousy such that comparisons involved the perceived threat of losing an important other to a target with superior physical traits or abilities. While experiences of jealousy were described in sport and exercise settings, the most detailed experiences emanated from important social interactions more generally. Jenn described a typical upward social comparison experience as being triggered by someone who attracts attention based on his/her physique. For example, she describes an incident where she was at a concert with her boyfriend and an attractive girl was nearby:

She was wearing a bikini and she was really hot. And also she had this Megan Fox look to her and anyways my boyfriend would not stop checking her out and I felt so ugly I guess and like if my own boyfriend doesn’t even want to look at me or check me out or think I’m attractive or whatever then … who will?

Jenn also indicated that this type of comparison caused her negative thoughts to linger throughout the day, and to continuously feel self-conscious and to lack trust in her boyfriend.

Similarly, Jake discussed how he noticed fitness and physical attractiveness in individuals who have great social skills and are at ease in social situations. This was triggered by how others react to the target individual in the social situation. For example, he cited outgoing guys with great physiques, who get a lot of attention, to be a prime source of comparison,

[My girlfriend] mentioned to me that this one particular guy was an attractive guy, I ask her sometimes what she finds attractive in men cause I'm interested, […] so the next time that I saw him at a social setting, I tried to pay attention and note certain things like his eyes or how, I heard people mention his jaw and chin so I specifically looked at that.
In this illustration, Jake used the social comparison to gain information on what features and traits are considered attractive by the opposite sex.

The triggers and responses identified by the individuals in this profile are congruent with experiences of jealousy. When another is receiving attention or praise regarding his/her physical appearance or fitness, an upward social comparison is triggered, and the emotional and cognitive response is intensified if the target in question acts as a threat in a social situation and/or there is a large perceived physical discrepancy between the self and the target of comparison.

Summary

Results from this study provide insight into differential tendencies for experiencing social comparisons and body-related envy. Individuals in the first profile do not perceive the physical self as an important domain, appraise physical appearance to be genetically inherited and engage in limited social comparisons. Similar findings have been reported with individuals who experience body satisfaction (Greenleaf, McGreer & Parham, 2006). Individuals in the second profile most closely represent the hostile and malicious nature of envy (e.g., Parrott, 1991). Meanwhile the third profile, comprised only of males, demonstrated upward comparisons as internal motivators and the use of the successes of others as a driving force to accomplish physical fitness and appearance goals. Men are more motivated by social recognition, competition and other ego-driven factors (Kilpatrick, Hebert & Bartholomew, 2005). Furthermore, men are more than twice as likely to believe they can achieve physical perfection compared to females (Franzoi, Vasquez, Sparapani, Frost, Martin & Aebly, 2012). Lastly, individuals in the fourth profile described experiences of jealousy rather than envy when engaging in upward social comparisons (Parrott & Smith, 1993), largely based on how others (i.e. romantic interests) perceive their physical appearances or fitness abilities. Smith and colleagues
(1998) found that individuals who fit a similar profile were likely to adopt more extrinsic motives to exercise (e.g., lose weight, be physically attractive) however there are no empirical studies focused on linking envy and exercise motivation. Taken together, the findings from this study suggest that individuals have unique experiences of body-related envy. However, the defining features of these experiences are not clearly understood.

**Study 2: Understanding experiences of body-related envy**

The purpose of this study was to examine specific triggers, cognitions and behavioral outcomes of body-related envy experiences in sport and exercise settings.

**Method**

**Participants**

The sample consisted of 288 young adults ($n_{females} = 170; n_{males} = 118$) aged 17 to 23 years ($M = 18.97, SD = 2.34$) who identified primarily as Caucasian (63.8%) and healthy BMI [$M_{female} = 22.36 (SD = 3.68) & M_{male} = 23.88 (SD = 4.41)$ kg/m$^2$].

**Procedures**

Participants were recruited via in-class presentations at various vocational college and undergraduate classes in a large metropolitan city. During class time, interested participants completed a narrative writing task where they reported on a self-selected experience of body-related envy: “*Think of a time when you felt body-related envy. Describe the incident in as much detail as you can.*” To assist participants capture vivid memories of the experience, several additional prompts were provided (*i.e.*, “*Provide detail on what happened to make you feel envy*”, “*think about why it happened*”, “*describe in detail what you were thinking and feeling*”, “*what you did during the incident*”). This procedure has been used reliably in self-conscious
emotion research (Tracy & Robins, 2007; Robins & Parlavecchio, 2006) and is a modified version of a well-established relived emotion task (Ekman et al., 1983).

**Data Analysis**

The narratives were transcribed verbatim and analyzed using an inductive content analysis (Maykut & Morehouse, 1994). Two coders (first and second authors) independently read and coded each narrative to develop a list of first-order themes, and then discussed descriptive labels and the development of first order themes (Carnevale, 2002). Two independent coders (third and fourth authors) then matched selected narrative excerpts with the label categories. Each theme was organized using example quotes from the narratives to depict secondary themes and enhance transferability. The number of individuals endorsing each theme was counted, and the frequency of females and males represented within each theme were tabulated. These findings are reported as “n\textsubscript{narratives}; % of males/females” in the results section.

**Results**

Of the total narratives, 64.2% (n = 185; 73% females) were included in the analysis, after excluding participants who reported no experience of envy (11.4%) or did not provide enough information to code the envy experience [20.4%; “At the gym, when I wanted to do as much weight as the other guy” (P62, male)]. Following the inductive content analysis, seven first order themes and twenty-two second order themes emerged under the dimensions of triggers, cognitions and outcomes (see Figure 1).

Participants reported experiencing body-related envy in either physical fitness/performance or appearance contexts. Specifically, experiences of envy were reported in fitness or competitive environments when comparing muscle strength, flexibility, endurance or physical skills. Appearance based comparisons involved body shape, weight and clothing fit. Appearance
contexts appeared to be more salient for females ($n_{\text{females}} = 50; 75\%$, $n_{\text{males}} = 17; 25\%$), while males were more likely to experience body-related envy in physical fitness and performance contexts ($n_{\text{females}} = 18; 33\%$, $n_{\text{males}} = 37; 67\%$).

**Triggers.** The most frequently reported trigger of body-related envy was a discrepancy in physical comparisons ($n_{\text{narratives}} = 57; 58\%$ females): “No matter how many people tell me I'm tiny, I have a different body shape that I would rather have” (P238, female). The second most commonly reported trigger was an internalization of physique ideals ($n_{\text{narratives}} = 53; 54\%$ females), which included an awareness and endorsement of muscularity for males: “I just see their perfectly sculpted bodies and feel like if I want one too” (P149, male), and thinness for females: “Most of the girls [I work with] are stick-finger thin and so look great in just about anything. I am envious of them for that” (P23, female). Both discrepancies in physical comparisons and internalization of physique ideals triggers of envy were typically experienced in performance salient contexts, such as fitness centers, physical education class and sports competitions ($n_{\text{narratives}} = 55; 67\%$ males), or physique salient contexts such as changing rooms, beach, swimming pools ($n_{\text{narratives}} = 51; 27\%$ males).

**Cognitions.** The narratives contained frequent reports of self-attributions ($n_{\text{narratives}} = 100; 74\%$ females) during recollections of envy experiences. Individuals made attributions to unstable factors, with beliefs that physical outcomes cannot be controlled: e.g. “…seeing girls with more fit bodies or simply having what I want but can’t because my body is just different” (P244, female). Participants also reported attributions with an external locus of control ($n_{\text{narratives}} = 23; 69\%$ females), and lower perceived behavioral control ($n_{\text{narratives}} = 77; 75\%$ females). Individuals with low perceived control also tended to report a greater sense of injustice and helplessness, characterized by emotions of anger and frustration, “I envy people who don’t
workout and yet are twice my size, can run faster and longer. It makes me angry that I work so hard for what I get” (P7, male).

Alternatively, individuals with narratives that depicted them as having higher perceived control described the envied target as an admirable individual who has achieved desired body or physical fitness through effort, and reported the physical appearance and abilities of others as achievable, realistic and motivating, “I see other girls looking fit and toned, makes me feel envious and guilty that I don’t work out enough to look like that. I tell myself that I will start working out and improve my eating habits” (P222, female).

Another common cognition during body-related envy experiences was adopting cognitive distortions \( (n_{narratives} = 65; 85\% \text{ females}) \). Individuals utilized cognitive distortions to explain uncomfortable thoughts, feelings and behaviors. For instance, in response to an unachievable envy experience one participant adopted a rationalization technique:

One time I was shopping and I saw this girl with long legs and with great hair. For a moment I wish that I could have her body, but I stopped because I did not know what was going on in the life of the person. Maybe she is beautiful, but she may have problems, so I am always grateful for the life that I got (P93, female).

Mostly females also reported negative thoughts in 34 of the narratives (71%). For example, while envying others with bigger breasts, a female participant noted, “It makes me sad and I feel helpless because apart from plastic surgery there is nothing I can do” (P181).

**Outcomes.** Individuals responded using cognitive \( (n_{narratives} = 39; 62\% \text{ females}) \) or behavioral strategies \( (n_{narratives} = 28; 68\% \text{ females}) \). Unlike cognitive distortions, which were used to explain the envy experience, cognitive strategies were used to cope with the feelings of envy, using either avoidance (e.g., “I felt pretty out of the circle with all the "beautiful" people...”)
there. I tried to draw as little attention to myself as possible”, P71, male), acceptance (e.g., “I accepted [my height] knowing everyone grows and matures differently. I didn't let others tear me down”, P213, male), reassuring self-talk (e.g. “When I see one of these girls at the gym, I remind myself that I just need to train more and lose weight to get the body I want”, P101, female), or minimizing importance of events (e.g., “I was on the beach going surfing and [...] my suit didn’t fit me well because my body is not muscular as real surfers [...] but I told myself I’m not a surfer.. I’m a musician and I hope it’s part of the charm”, P193, male).

In terms of behavioral strategies, motivation to change diet and exercise ($n_{narratives} = 20; 70\%$ females) and attempts to change exercise ($n_{narratives} = 8; 63\%$ females) were reported. For example, a female participant compared herself to her family members: “…I feel like a freak I should stop eating or do something at the very least”. Similarly, a female participant discussed watching her friends play volleyball at the beach in bikinis, and how she “kept thinking "I could look like that if I keep exercising - must go running!". A male participant wrote how an upward comparison motivated him to exercise more intensely: “I wanted to look like the muscular guy on TV and since then I got a gym pass and I am training hard at the gym to get results”. In summary, individuals displayed a variety of more adaptive and maladaptive outcomes in response to body-related envy experiences.

Summary

Findings from study two provided insight on commonalities and differences in triggers, cognitions and outcomes experienced in body-related envy in both physical performance and appearance contexts. In line with the findings of this study, theorists have described failure to measure up to one’s ideal expectations (Salovey & Rodin, 1991) and body-related self-discrepancies (Tiggermann & McGill, 2004) to be main predictors of social comparisons and
envy. Furthermore, envy experiences have been linked to cognitive and emotional outcomes (Parrot, 1991), as well as limiting or enhancing health behavior motivation (Bessenoff, 2006).

The findings highlight the evident gender differences supported in the literature, with females experiencing body-related envy more prominently in physical appearance domains (Else-Quest et al., 2012; Saad & Gill, 2005), endorsing drive for thinness (Tiggerman & Pickering, 1996), negative cognitive distortions (Cash & Smolak, 2011) and responding in more negative outcomes such as avoidance and negative emotion (Kowalski, Mack, Crocker, Niefer, & Fleming, 2006). Alternatively, males experience body-related envy predominantly in contexts of physical performance and competition (Cohn & Adler, 1992), endorse drives for muscularity (McCreary & Sasse, 2000), engage in more positive cognitions such as acceptance (Grogan & Richards, 2002), and have positive outcomes such as higher participation in physical activities (e.g., Brunet & Sabiston, 2009; Cox et al., 2011). Taken together, a range of triggers, cognitions and emotions, and cognitive and behavioral outcomes associated with body-related envy experiences are often reported as linked to performance and/or appearance in sport and exercise contexts. The consistent findings that body-related envy appears to be both a motivator and demotivator to health behaviors such as physical activity across both study one and two suggest that further work is needed to examine the association between envy experiences, motivation, and exercise.

**Study 3: Body-related envy and exercise motivation**

This study examined the association between body-related envy, motivation for exercise, and exercise behavior. Based on theoretical tenets (e.g., Deci & Ryan, 1985), previous research findings with other negative self-conscious emotions (e.g., Sabiston et al., 2010) and social physique anxiety (Brunet & Sabiston, 2009; Cox et al., 2011; Cox, Ullrich-French, & Sabiston, in press), it was hypothesized that body-related envy would be positively related to the least self-
determined motivational regulations (external and introjected) and negatively related to the self-
determined (identified and intrinsic) motivation regulations and exercise. A secondary purpose
was to examine gender differences in body-related envy experiences, and it was expected that
females would report higher body-related envy compared to males.

Method

Participants & Procedures
Following informed consent procedures, three hundred and twenty males ($n = 114$) and
females ($n = 206$), with a mean age of 19.71 ($SD = 2.01$) years completed self-report surveys in
class time at local colleges and universities. Participants self-reported as primarily Caucasian
(77.2%) and Asian (22.1%), having a high school diploma and some post-secondary education
(83.2%), and never married (99.1%). Average body mass index was 23.24 ($SD = 4.16$) kg/m$^2$
($BMI_{\text{male}} = 23.66 \pm 4.14$ kg/m$^2$; $BMI_{\text{female}} = 23.01 \pm 4.17$ kg/m$^2$).

Measures

Body-related envy. Participants were asked: We are interested in your body-related
feelings. This scale consists of a number of words that describe different feelings and emotions
that you may have about your body (in particular, your physique/figure, body composition,
physical appearance). Read each item and then select the appropriate answer next to that word.
Indicate to what extent you have felt this way about your body during the past week, with
responses ranging from 1 = “very slightly or not at all” to 5 = “extremely”. The list of 15
emotions was consistent with Lazarus’ core list (Lazarus, 1991), including envious. The single
item assessing body-related envy was used in the current study.$^1$

Exercise Motivation. The Behavioral Regulations in Exercise Questionnaire-2
(Markland & Tobin, 2004) was used to assess amotivation (4 items), external (4 items),
introjected (3 items), identified (4 items), and intrinsic (4 items) motivational regulations.
Responses to each item are reported on a 5-point scale ranging from 0 (*not true for me*) to 4 (*very true for me*). The BREQ-2 scale scores have been deemed reliable and valid (Thøgersen-Ntoumani & Ntoumanis, 2007; Wilson, Sabiston, Mack, Blanchard, 2012). In the present study, Cronbach’s alpha coefficients ranged from .74 (extrinsic regulation) to .93 (intrinsic motivation). Amotivation was highly skewed, with no transformation aiding in the distribution properties. For this reason, amotivation was not examined further in the current study.

**Exercise Behavior.** The first item of the Leisure-Time Exercise Questionnaire (LTEQ; Godin & Shephard, 1985) was used to assess exercise behavior. The quantity of weekly strenuous, moderate, and light exercise in at least 15-minute bouts was measured, and a total score was calculated by multiplying the weekly frequencies of strenuous, moderate, and light activities by nine, five, and three, respectively, for a total metabolic equivalent intensity value.

**Analysis**

Using the SPSS software package, data were screened for patterns of missingness, outliers, and violations of the assumption of normality (Tabachnick & Fidell, 2007) and descriptive statistics were computed for main study variables. An independent sample *t*-test was used to compare the mean scores on body-related envy for males and females. In LISREL and PRELIS, independent maximum likelihood confirmatory factor analysis (CFA) were run to estimate factor scores for the motivation regulations that were saved and used in the main analyses (i.e., path analysis) to reduce model complexity (Brown, 2006). For the main analyses, a path analysis using maximum likelihood estimation was used to investigate the associations between body-related envy, motivational regulations and exercise behavior. In line with the simplex pattern proposed among the motivation regulations (Deci & Ryan, 1985), the
correlations among the adjacent regulations were specified in the models. Two models were estimated to examine a direct effect of envy on physical activity and an indirect effect via the motivational regulations. Adequate model fit was determined using several indices (Hu & Bentler, 1999): (a) Comparative Fit Index (CFI; values approximating .95), (b) Non-Normed Fit Index (NNFI; values approximating .95); (c) Root Mean Square Error of Approximation (RMSEA; values approximating .06 with small 95% confidence interval (CI)); and (d) non-significant chi-square ($\chi^2$) values.

**Results**

Participants reported low-to-moderate mean scores for experiencing body-related envy ($M = 2.02, SD = 1.09$). Females reported a non-significant higher mean for envy compared to males ($M_{\text{females}} = 2.08, SD = 1.11; M_{\text{males}} = 1.89, SD = 1.02; t(323) = 1.47, p = 0.13$). Means, standard deviations, and bivariate (Pearson) correlation coefficients are presented in Table 1.

The data for the path models are presented in Table 2. In the main analysis, the indirect effects model was deemed a better fit to the data ($\chi^2(3) = 7.29, p = 0.06, \text{RMSEA} = 0.06; 95\% \text{ CI} = 0.01 \text{ to } 0.11, \text{NNFI} = 0.94, \text{CFI} = 0.99, \text{SRMR} = 0.03; R^2 = 0.16$) compared to the direct effects model ($\chi^2(2) = 7.25, p = 0.02, \text{RMSEA} = 0.09; 95\% \text{ CI} = 0.03 \text{ to } 0.16, \text{NNFI} = 0.89, \text{CFI} = 0.99, \text{SRMR} = 0.03; R^2 = 0.16$) given the model non-significance and the non-significant direct path from body-related envy to exercise behavior and in spite of no change in CFI value.

As can be seen in Figure 2, body-related envy was significantly associated with external and introjected motivation regulations. External motivation regulation was significantly negatively associated with exercise behavior, whereas identified and intrinsic motivation regulations were significantly positively associated with exercise behavior.

**Summary**
Consistent with the qualitative findings, study three provided preliminary cross-sectional evidence for an association between body-related envy and exercise motivation and behavior. Positive associations with external and introjected regulations are consistent with other negative self-conscious emotions such as shame and guilt (Sabiston et al. 2010). Furthermore, the link between identified and intrinsic motivation to exercise is consistent with previous research (Wilson, Rogers, Blanchard, & Gessel, 2003; Sabiston et al., 2010; Standage, Sebire, & Loney, 2008), as is the relationship between external regulations and exercise (Pelletier, Fortier, Vallerand, & Briere, 2001). Body-related envy was not significantly different for males and females on the single item envy measure, in spite of females reporting more frequent emotional experiences. Taken together with findings from studies one and two, these results provide insight into the complex relations between body-related envy, exercise motivation and behavior.

**General Discussion**

The collective findings of this mixed-methods research provide the first examination of body-related envy experiences among young adults in sport and exercise contexts. In study one and two, body-related envy was reported most frequently as a target of physical fitness, performance or appearance. It is proposed that body-related self-conscious emotions are experienced in contexts that elicit a discrepancy between actual and ideal self-representations and subsequent evaluation and internalized self-representations (Castonguay et al., 2012; Tangney & Dearing, 2002). Sport, exercise, and physical education contexts have been shown to elicit similar evaluative emotional experiences such as social physique anxiety (Cox et al., 2011; in press; Sabiston, Sedgwick, Crocker, Kowalski & Mack, 2007), body shame, and guilt (Bessenoff & Snow, 2006; Sabiston et al., 2010). Envy may be an additional, often overlooked, self-conscious emotion that should be targeted in research and practice.
In each of the three studies, findings on differential cognitive and affective appraisals and influences on motivation highlight the complexity of body-related envy experiences and upward social comparison processes. Females tended to make attributions to unstable factors and reported low perceived behavioral control, which co-occurred with negative and consuming emotions of injustice, frustration and helplessness. Having a lack of control or envying a target with perceived unattainable traits is characteristic of theoretical definitions of envy (Smith, 2008) and is likely to negatively influence motivation to change behavior. Alternatively, individuals with higher perceptions of control experienced admiration towards the envied other and reported feelings of inspiration and motivation, which may influence more self-determined motivation regulations. These distinct experiences of envy may be described theoretically as benign and malicious envy (van de Ven, Zeelenberg, Pieters, 2009). Benign envy can be perceived as admiration and can be intrinsically motivating, while malicious envy is accompanied by a sense of injustice where individuals feel that the envied other does not deserve what they have, and it is surrounded by negative feelings, cognitive distortions, and perceived lack of control (van de Ven, Zeelenberg, & Pieters, 2011) and may lead to non self-determined motivation regulations for behavior change. Further research is needed to better understand the distinctions and implications associated with experiences of benign and malicious envy.

Collectively, the mixed-method studies provided insight on behavioral outcomes including motivations and attempts to change behavior. The endorsement of positive behavioral strategies such as increased motivation to change exercise and attempts to change diet may show promise for envy as an adaptive emotion that induces motivation (Hill & Buss, 2008; van de Ven, Zeelenberg & Pieters, 2011). However, other commonly adopted strategies for body-related envy were more maladaptive cognitive strategies including avoidance and minimizing importance of
comparison. These findings were supported in study three, whereby body-related envy was positively linked to the least self-determined motivation regulations. It is likely that envy might be similar to other negatively valenced self-conscious emotions, such as social physique anxiety, in that it is motivating for some individuals and not others (Brunet & Sabiston, 2009; Cox, Ullrich-French & Sabiston, in press). Researchers are urged to uncover the conditions under which body-related envy may be adaptive or maladaptive for physical activity behaviors such as participation in sport, exercise, or physical education.

In the current studies, females reported more negative cognitions, affect, and outcomes. Generally, females are evolutionarily more envious than men in most domains (Saad & Gill, 2005), are more likely to experience more malicious envy (van de Ven, Zeelenberg, & Pieters, 2009), and that females experience more negative body-related emotions (Cash and Smolak, 2012). While female responses to the interview questions and narratives support this empirical evidence, there was no significant difference in reported body-related envy experience in the third study. This may be due to the measurement of body-related envy and future studies are needed to examine these differences in the spectrum of envy experiences (including triggers, cognitions, outcomes, and types of envy endorsed).

While the findings from the qualitative and quantitative studies highlight an important and highly overlooked emotion in sport and exercise psychology, there are limitations that need to be discussed. All participants volunteered for the studies and represent convenience or purposeful samples, thus limiting the generalizability of the findings. Also, a single-item envy measure was used in study three since there are no known reliable and valid measures of body-related envy\(^1\). More research is needed to develop and validate appropriate measures to assess body-related self-conscious emotions such as envy experiences in sport and exercise psychology.
In conclusion, the three studies provided an overview of the nature of body-related envy, a negatively valenced self-conscious emotion that is typically overlooked in sport and exercise psychology research. Centered within a social comparison (Festinger, 1954) and self-determination (Deci & Ryan, 1985) framework, the complex emotional experience of body-related envy was associated with both adaptive and maladaptive cognitions and behaviors such as external motivation regulations and avoidance as well as motivation to engage in exercise. Future studies are needed to expand on this research and investigate other antecedents and health-related consequences of body-related envy. These efforts may aid in the development and advancement of interventions targeting emotions to help increase the mental and physical health of young adults in sport and exercise.

Note

1 In a validation study of young adults (n = 103; Mean age = 21 years) with similar sample characteristics, the single item “envious” about one’s body was correlated with an 8-item dispositional envy scale (Smith, Parrott, Diener, Hoyle & Kim, 1999) modified to the body (sample items = “The bitter truth is that I generally feel inferior to others” was modified to “The bitter truth is that I generally feel inferior to others when I think about my body/physique” and “It is so frustrating to see some people succeed so easily was modified to “It is so frustrating to see some people who have great bodies/physiques with little effort”) at r = 0.54 (p < 0.001). The modified dispositional envy scale items had a Cronbach’s alpha coefficient of α = .93. The single item was also highly correlated to a measure of phenomenological envy (r = 0.83, p < 0.001, which included individuals reporting on adjectives of longing for, covetous, resentful, jealous and α = .85) and physical appearance social comparison tendencies (r = 0.44, p < 0.001, α = .70), measured using a standardized measure (Physical Appearance Comparison Scale; Thompson, Heinberg & Tantleff, 1991). Emotion researchers have highlighted the utility of single-item measures when used in conjunction with various multiple-item measures of emotion (Larsen & Fredrickson, 1999).
References


Cox, A. E., Ullrich-French, S., & Sabiston, C. M. (in press). Using motivation regulations in a person-centered approach to examine the link between social physique anxiety in physical
education and physical activity-related outcomes in adolescents. *Psychology of Sport and Exercise.*


Figure 1. Thematic analysis of body-related envy narratives with frequencies of first order themes among 288 older adolescent and young adult males (n = 118) and females (n = 170) in Study 2.
Table 1

*Descriptive statistics and Pearson correlations for young adult females (n = 206) and males (n = 118) in Study 3.*

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>1</td>
<td>Body-related envy</td>
<td>2.02 (1.00)</td>
<td></td>
<td></td>
<td>0.16**</td>
<td></td>
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<tr>
<td>2</td>
<td>External regulation</td>
<td>1.49 (0.54)</td>
<td>0.16**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Introjected regulation</td>
<td>2.33 (0.86)</td>
<td>0.22**</td>
<td>0.26**</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>Identified regulation</td>
<td>3.14 (0.70)</td>
<td>0.05</td>
<td>-0.01</td>
<td>0.51**</td>
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</tr>
<tr>
<td>5</td>
<td>Intrinsic regulation</td>
<td>3.18 (0.80)</td>
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<td>-0.13*</td>
<td>0.21**</td>
<td>0.67**</td>
</tr>
<tr>
<td>6</td>
<td>LTEQ Total</td>
<td>40.40 (26.65)</td>
<td>-0.02</td>
<td>-0.16**</td>
<td>0.21**</td>
<td>0.32**</td>
</tr>
</tbody>
</table>

*Note:* LTEQ = Leisure Time Exercise Questionnaire

* p < 0.05
Table 2

Direct and indirect effects of body-related envy and motivation regulations on exercise among young adults (N=320) in Study 3.

<table>
<thead>
<tr>
<th>Direct Effect</th>
<th>Unstandardized Coefficients (SE)</th>
<th>Standardized Coefficients</th>
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<tr>
<td></td>
<td>Direct Effects</td>
<td>Indirect Effects</td>
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<tr>
<td>Model</td>
<td></td>
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<tr>
<td>Body-Related</td>
<td></td>
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<tr>
<td>Envy</td>
<td>-0.22 (1.22)</td>
<td>0.06 (0.61)</td>
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<tr>
<td>External Regulation</td>
<td>-6.70 (2.50)*</td>
<td>-</td>
</tr>
<tr>
<td>Introjected</td>
<td>3.05 (1.88)</td>
<td>-</td>
</tr>
<tr>
<td>Identified</td>
<td>7.23 (2.98)*</td>
<td>-</td>
</tr>
<tr>
<td>Intrinsic</td>
<td>5.42 (2.18)*</td>
<td>-</td>
</tr>
<tr>
<td>Regulation</td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Indirect Effect</th>
<th>Unstandardized Coefficients (SE)</th>
<th>Standardized Coefficients</th>
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<tr>
<td>Model</td>
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<td></td>
</tr>
<tr>
<td>Body-Related Envy</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>External Regulation</td>
<td>-6.75 (2.48)*</td>
<td>-0.14*</td>
</tr>
<tr>
<td>Introjected</td>
<td>2.99 (1.85)</td>
<td>-</td>
</tr>
<tr>
<td>Identified</td>
<td>7.24 (2.98)*</td>
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</tr>
<tr>
<td>Intrinsic</td>
<td>5.44 (2.17)*</td>
<td>-</td>
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<tr>
<td>Regulation</td>
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</table>

* t-value > 1.96
Figure 2. Path model illustrating the associations among body-related envy, motivation regulations, and physical activity in 320 young adults in Study 3. 
* p < 0.05