An Investigation of the Relationship Between Stress and Body Image in Australian Youth

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Declaration

I declare that this thesis reports my original work, that no part has been previously accepted or presented for the award of any degree or diploma from any university, and that to the best of my knowledge, no material published or written by any other person is included, except where due acknowledgement is given.

[Signature]

Kristen Murray
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Abstract

Adolescence and young adulthood are periods of rapid development associated with significant psychological stress. While this has been implicated in a number of mental health concerns, it has not been investigated in body image disturbance. Specifically, body dissatisfaction is reported to peak during adolescence and persist into young adulthood. Despite the inclusion of stress management training in prevention programs for body image disturbance in adolescence, limited empirical efforts have aimed at understanding this specific relationship. As such, the current research program examines the relationship between stress and body dissatisfaction in female and male adolescents and young adults.

Three studies were conducted assessing the following research questions: (a) the nature and direction of the relationship between stress and body dissatisfaction, including the differential role of stressor subdomains; (b) the role of moderating variables such as gender; (c) the role of mediating influences such as the psychological constructs of self-esteem, depressive symptoms and body importance; and (d) the relevance of stress to an additional body image dimension, body change strategies to decrease body size and increase muscularity. The research program utilised multiple methodologies to explore these research questions, including cross-sectional and longitudinal self-report surveys and experimental designs. Results across all three studies supported a strong link between stress and body dissatisfaction, specifically in the peer domain, in both females and males. Longitudinal self-report data supported a predictive relationship between adolescent stress and body dissatisfaction, and found that both self-esteem and body importance mediate this link proximally and over time. Experimental investigation in young adults also revealed support for a causal effect of
interpersonal (peer-related) stress on state body dissatisfaction. Specifically, stress was revealed to enhance an individual’s vulnerability to body image concerns, with males reporting general body dissatisfaction under a personality-based peer rejection condition, and those who placed a low importance on the body in self-evaluations reporting increased weight dissatisfaction under an appearance-based peer rejection condition. Young adult females generally reported dissatisfaction with the body regardless of the nature of interpersonal interactions. The research program did not display a significant association between stress and body change strategies to decrease body size or increase muscularity in adolescents.

Taken together, the findings of the current research program support hypotheses that stress plays a predictive role in body dissatisfaction during adolescence and young adulthood for both females and males, and that this is particularly relevant to the peer domain. Furthermore, it appears to increase vulnerability to body image concerns through its relationship with self-esteem and appearance importance. These findings hold theoretical and clinical implications for models of body image and eating disorders, and suggest stress management modules tailored to the peer domain are a warranted inclusion in prevention programs in addition to self-esteem enhancement and reducing the importance of the body in self-evaluations. Limitations and future directions of the research program are also considered.
Chapter 1

Stress and Body Dissatisfaction in Adolescence and Young Adulthood

Adolescence is a developmental period characterised by a cascade of novel and unfamiliar changes in all aspects of a young person’s life. This transition from childhood to adulthood incorporates changes in social, emotional, cognitive, physical, and psychological domains (Shatkin, 2009; Stroud et al., 2009). Key milestones during this time include the development of a sense of self, physical maturation, capacity for abstract thought, management of competing demands between school and leisure activities, and changes in family and peer relationships (Compas, Hinden, & Gerhardt, 1995; Offer & Schonert-Reichl, 1992; Petersen, 1988; Simmons, 1987).

The transitions that take place during adolescence offer growth and development opportunities to a young person, with statistics suggesting that 80% of adolescents adjust effectively (Offer & Schonert-Reichl, 1992). However, the changes of this developmental period can also be overwhelming and lead to increased risk of morbidity and mortality (Compas et al., 1995; Shatkin, 2009). While constituting a minority of the adolescent population, figures indicate that 20% of young people do not adapt successfully to the demands of adolescence, which has implications for the increase in mental health concerns during this time (Heaven, 1996; Offer & Schonert-Reichl, 1992). In fact, research from Australia indicates that most mental disorders have their onset in adolescence, and that the prevalence of mental disorders in youth is 14% for those under the age of 18 years (i.e., children and adolescents), and 27% for 18 to 24 year olds (i.e., young adults). Globally, data indicate that approximately 1 in 4 young people suffer at least one mental disorder each year (Patel, Flisher, Hetrick, & McGorry, 2007). Further studies report an increase in rates of mental disorders particularly for females during this time, from 13.5% between the ages of four to 11 years to 21.8% for...
12 to 16 year old females compared to 19.5% and 18.8% respectively for males (Offer & Schonert-Reichl, 1992). Concerns regarding the rise in mental health concerns during adolescence are compounded further by research displaying strong correlations between symptoms in adolescence and young adulthood (Achenbach, Howell, McConaughy, & Stanger, 1995). Understanding the bases of mental health difficulties during adolescence is vital for the design of effective prevention and intervention programs promoting psychological health and well-being in adolescence and into adulthood (Offer & Schonert-Reichl, 1992).

Two key aspects of mental health during adolescence and young adulthood are stress and body image, which have both been shown to peak at this time. The Mission Australia National Survey of Young Australians in 2011 revealed that body image and stress rate in the top three personal concerns for young people aged 11 to 24 years in Australia; with approximately a third rating these as a major concern in their life (Mission Australia, 2011). Body image was also rated among the top three personal concerns to young people in 2009 and 2010 (Mission Australia, 2009, 2010). Stress and body image are also closely associated with clinical psychological disorders whose onset has been pinpointed to the adolescent period, specifically eating disorders and major depression (Hankin, 2006; Stice, 2002; Stice, Marti, Shaw, & Jaconis, 2009). However, despite receiving empirical attention in their own right, the interface between stress and body image has been subjected to only limited investigation.

The current research program aims to address this gap in the research by further understanding the nature and direction of the relationship between stress and body image disturbance, specifically dissatisfaction with the body in adolescents and young adults, and the implications of this relationship for programs promoting psychological health and adjustment in young people. This chapter provides an introduction to the two constructs in the context of adolescence and young adulthood, reviewing their
3 Stress and Body Image
definition, rates of prevalence, associated morbidities, and existing evidence suggestive of a relationship between them. The structure of the current thesis will then be discussed.

**An Introduction to Body Image and Stress**

**Definition of Body Image and Stress**

*Body image.* The body image construct refers to an extremely complex representation of the physical self. It is multidimensional (Banfield & McCabe, 2002; Pruzinsky & Cash, 2002; Smolak, 2004) and incorporates cognitive, affective, and behavioural assessments of physical attributes (such as one’s shape, weight, body parts or facial characteristics), fitness, health, and strength (Marcotte, Fortin, Potvin, & Papillon, 2002; Muth & Cash, 1997; Pruzinsky & Cash, 2002; Wertheim, Paxton, & Blaney, 2009). While related to the physical body, ‘body image’ does not necessarily equate to objective characteristics (Presnell, Bearman, & Stice, 2004; Pruzinsky & Cash, 2002; Ricciardelli & McCabe, 2001a). More than 16 definitions have been described, including satisfaction with the body generally or with respect to specific body parts or characteristics such as weight or shape; size perception; appearance evaluation and orientation; and body esteem, concern, dysphoria, dysmorphia, and distortion (Pruzinsky & Cash, 2002). Despite this diversity, research often focuses on the measurement of *evaluative body image*, which refers to one’s attitudes towards or satisfaction with the body (Croghan et al., 2006; Muth & Cash, 1997; Smolak, 2004). This dimension has received the majority of attention in past research, with studies in females and males often measuring the body image construct exclusively through assessment of body dissatisfaction (Thompson, 2004).
Given the preponderance of research focusing on body dissatisfaction and its relationship with mental health, the current research program and literature review focuses specifically on this dimension in order to conceptualise and test its link with stress. However, the importance of considering multiple dimensions of body image in empirical research, particularly within single studies, has been highlighted (Thompson, 2004). It follows that in order to improve body image, it is necessary to understand the role of stress in body dissatisfaction as well as other dimensions of the construct.

Therefore, the current research program also utilises additional measures of body image which are incorporated in the literature review where relevant. One of these additional dimensions, body change strategies, is outlined below due to its inclusion as a dependent variable in the research program. A second additional body image dimension, body importance, is discussed in Chapter 2 due to its inclusion as an independent variable in the research program.

*Body change strategies* are operationalised in terms of the frequency of thoughts, feelings, and behaviours aimed at altering the size and/or shape of an individual’s body (Ricciardelli & McCabe, 2002). This construct is useful because it captures a unique dimension of body image which is salient for both females and males given that it assesses preferences to lose weight and/or increase body size respectively (Cohane & Pope Jr., 2001; Kostanski & Gullone, 1998; Levine & Smolak, 2002; McCabe & Ricciardelli, 2004; Muth & Cash, 1997; Ricciardelli & McCabe, 2002; Ricciardelli, McCabe, Mussap, & Holt, 2009). Assessment of both ideals is important for males who have been observed to use both of these body change strategies to achieve ‘lean muscularity’ (McCabe & Ricciardelli, 2001b, 2003b, 2004; Ricciardelli & McCabe, 2002). Furthermore, while general body dissatisfaction is evident in males and associated with distress (Cohane & Pope Jr., 2001), many measures of this
construct do not address the desire to increase body size or muscularity and hence may not be appropriate for males (Cafri & Thompson, 2004).

**Stress.** Psychological stress is a concept which has proved difficult to define (Compas, Orosan, & Grant, 1993). It is conceptualised as an unpleasant emotional state characterised by intense physiological arousal (S. Cohen, Janicki-Deverts, & Miller, 2007) including increased heart rate and blood pressure, delayed digestion, sweating, increased respiration, and hormonal changes (such as increased cortisol) (Torres & Nowson, 2007). These physical effects, especially when prolonged, have been implicated in physical health issues including cardiovascular disease, gastrointestinal disorders, lowered immune responses, and musculoskeletal disorders (Semmer, Grebner, & Elfering, 2003). While the effect of stress on an individual is partly focused on physiological reactions, empirical assessment of the construct in the context of health most frequently utilises self-report measures assessing one's subjective perception of stress (Pearlin, Menaghan, Lieberman, & Mullan, 1981). However, substantial debate exists regarding the nature and precipitants of stress and how it should be measured, specifically whether it results from exposure to stressful stimuli or an interactive cognitive process undertaken by an individual in response to the environment (S. Cohen, Kamarck, & Mermelstein, 1983). Holmes and Rahe (1967) theorised that stress results from an accumulation of events in the external environment which act on the individual and impair adjustment processes (Holmes & Rahe, 1967). From this perspective, stressors are defined as, “environmental events or chronic conditions that objectively threaten the physical and/or psychological health or well-being of individuals of a particular age in a particular society” (Grant et al., 2003, p. 449). However, vast individual differences have been observed in the impact, exposure, and response to stressors in research (Mullis, Youngs, Mullis, & Rathge, 1993). On this basis, a transactional theory of stress was supported (Lazarus, 1999).
Lazarus and Folkman (1984) hypothesised that psychological stress results from dynamic transactions between an individual and their environment, involving exposure to a ‘stressor’ and a cognitive appraisal of the perceived threat this poses to the individual. According to this theory, psychological stress is defined as, “a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being” (Lazarus & Folkman, 1984, p. 19). The key expansion of this model relates to the inclusion of a continuous evaluative process relating to the meaning and significance of stressors in the environment, according to two forms of cognitive appraisal. *Primary appraisals* refer to evaluations of the immediate relevance, and degree of threat, harm, loss or challenge associated with a stressor; while *secondary appraisals* incorporate decision-making relating to the available strategies to manage or cope with a stressor. Despite continuing debate regarding conceptions of psychological stress, the ability of transactional models to account for individual differences in response to stress encounters has led to their favour in life events theory and research (Mullis et al., 1993). This is especially important given the discordance identified between physiological measures of stress and self-report assessments which support a more complex stress process compared to exposure alone. For example, subjective, physiological, and behavioural responses to stressors have been shown to differ based on individual appraisals of threat, challenge and uncertainty, as well as situational demands such as the potential to actively cope (Tomaka, Blascovich, Kelsey, & Leitten, 1993). Furthermore, discordance between cognitive self-report and physiological arousal has been reported in individuals displaying emotion regulation deficits, such as in alexithymia in which subjective reports are persistently higher than physiological responses regardless of events in the environment (Connelly & Denney, 2007), and for those with anorexia nervosa compared to those reporting alexithymia and depression,
who display a reduced stress response physiologically compared to subjective reports (Nandrino et al., 2012). The current research program will draw from transactional models of psychological stress, assessing both the presence and cognitive appraisal of the perceived stress associated with transitions during adolescence, and include both physiological and subjective reports of stress in young adults given their potential discordance.

Prevalence of Body Dissatisfaction and Stress in Adolescence and Young Adulthood

Body dissatisfaction. Empirical investigations of body image have grown significantly over the past 50 years (Pruzinsky & Cash, 2002), with prevalence estimates supporting an increase in disturbances for females and males over the past 25 years (Cash, 2002b). While a vulnerability to dissatisfaction with the body is established early in life (Littleton & Ollendick, 2003; Paxton & Phythian, 1999; Ricciardelli & McCabe, 2001a), and reported in children as young as five years old (Dohnt & Tiggemann, 2006), adolescence is considered a period of increased risk. Research documents that dysfunctional or disturbed body image peaks during this time (Gowers & Shore, 2001; Littleton & Ollendick, 2003) and has been described as a “normative discontent” in this population (Dohnt & Tiggemann, 2006; Levine & Smolak, 2002; Neumark-Sztainer, 2005; Smolak, 2004). Furthermore, significant body dissatisfaction is also reported in young adulthood, suggesting that these concerns persist beyond the adolescent period (Grogan, 2011). Importantly, the prevalence and nature of body dissatisfaction is influenced by a number of individual characteristics, specifically gender, age, and body mass.

Gender. Gender is one of the most salient variables in body image research, and efforts to understand the construct have historically centred on females (Smolak, 2004).
Compared to males, females have been shown to report greater dissatisfaction with their bodies in adolescence (Bearman, Presnell, Martinez, & Stice, 2006; Rodriguez-Tome et al., 1993; Verplanken & Velsvik, 2008), and young adulthood (Lewinsohn, Seeley, Moerk, & Striegel-Moore, 2002), with some research suggesting twice the rate of body image concerns in females (Muth & Cash, 1997; Nowak, 1998). For example, studies have reported that 46% of adolescent females and 26% of adolescent males are dissatisfied with their body (Neumark-Sztainer, 2005), while others report rates of 40% and 22% (Muth & Cash, 1997) and 80% and 40% (Kostanski & Gullone, 1998) respectively. In young adult samples, prevalence rates also display gender differences, with 69% of females reporting appearance concerns compared to 56% of males (Harris & Carr, 2001). The manifestation of body dissatisfaction also differs markedly by gender and is discussed in more detail in Chapter 2. Briefly, females generally report a preference to be thinner, and males report a desire to both lose weight and/or increase muscularity (Cohane & Pope Jr., 2001; Kostanski & Gullone, 1998; Levine & Smolak, 2002; McCabe & Ricciardelli, 2004; Muth & Cash, 1997; Ricciardelli et al., 2009). Not surprisingly, reports of body change strategies to lose weight or increase body size/muscularity follow these preferences (Ricciardelli & McCabe, 2002). The complex and dualistic nature of male body image has posed challenges in accurately assessing and comparing levels of satisfaction across genders. However, with increasing recognition of the unique body image experience in males, research has reported prevalence rates of body dissatisfaction ranging between 50 to 70%, and suggested these figures are also increasing (Ricciardelli, McCabe, & Banfield, 2000). Furthermore, the use of appropriate assessment tools for the male population has led researchers to conclude that, contrary to previous suggestions, the absolute prevalence (but not type) of body dissatisfaction might be equivalent between males and females (McCabe & Ricciardelli, 2004).
Age. Changes in body dissatisfaction with age have been investigated in a number of studies. Findings have yet to identify a clear trend, though some suggest an increase in disturbances with age during adolescence. For example, some studies have reported that body dissatisfaction emerges at age 14 years, persists at 15 to 16 years (Bearman et al., 2006), and that the greatest levels of body dissatisfaction compared to preadolescents were apparent in 14 and 15 year olds (L. Sim & Zeman, 2006).

Satisfaction with body parts and overall appearance also declines significantly between 12 to 15 years for adolescent females (Levine & Smolak, 2002), specifically in relation to the hips, thighs, waist, and body weight (Rosenblum & Lewis, 1999). It is suggested that the increased preoccupation with the body during adolescence could reflect developmental changes in physical appearance, cognitive abilities, and increased capacity for introspection (Rosenblum & Lewis, 1999). In contrast, no clear age trends have been elucidated for males (Levine & Smolak, 2002), which could reflect limited investigations in this gender as well as their alternation between preferences to lose weight and increase muscularity (McCabe & Ricciardelli, 2001a, 2001b, 2004; Ricciardelli & McCabe, 2002). Research investigating body change strategies has revealed that these are evident at 12 years of age (McCabe & Ricciardelli, 2001b), while studies in adults reveals greater body dissatisfaction and investment in the body in young adults compared to older age groups (Grogan, 2011).

Body mass. The prevalence of body dissatisfaction has also been linked to body mass - described as the most consistent biological influence on body image (D. C. Jones, 2004). Investigations of these effects frequently employ assessment of body mass index (BMI = weight [kg]/height [m²]), a quantitative measure of body proportions. BMI has been negatively associated with body satisfaction and self-confidence in overweight adolescent females (Buddeburg-Fischer, Klaghofer, & Reed, 1999) and body satisfaction more generally in adolescents (Paxton, Eisenberg, &
Neumark-Sztainer, 2006a) and young adults (Lewinsohn et al., 2002). However, findings in this domain during adolescence are inconsistent, with a predictive link demonstrated for adolescent girls but not boys (Presnell et al., 2004), and others failing to display any association (Bearman et al., 2006). Important differences in the relationship between BMI and body dissatisfaction are also evident by gender. A linear relationship has been identified between BMI and body dissatisfaction for adolescent females, but a curvilinear link for males (Muth & Cash, 1997; Ricciardelli et al., 2009; Sinton & Birch, 2006; Smolak, 2004). This linear link for females has also been shown in young adults (Lewinsohn et al., 2002). Furthermore, while females report concerns about body fat independent of BMI, males have been shown to only report concerns with body fat when they possess a high BMI (Smolak, 2004), therefore suggesting a more accurate assessment of the body in males compared to females. Research has also highlighted the importance of objective physical characteristics that oppose cultural ideals. For example, puberty has been implicated as a period of risk for females because the associated physical changes (i.e., increased fat deposits) draw them away from the ‘thin ideal’ (Levine & Smolak, 2002). In contrast, puberty can be a protective factor for males because physical development results in growth (i.e., increased body size and muscle bulk) which is consistent with ‘masculine’ body ideals (Offer & Schonert-Reichl, 1992; Petersen, 1988). Research assessing the association between body size and the related dimension of body change strategies to lose weight has indicated greater endorsement of strategies in females and males who are overweight (McCabe & Ricciardelli, 2001b, 2003a, 2003b; McCabe, Ricciardelli, & Holt, 2005; McCabe, Ricciardelli, Waqa, Goundar, & Fotu, 2009; Paxton, Eisenberg, et al., 2006; Presnell et al., 2004). Given these findings, the ability for a young person to incorporate the physical changes of adolescence into a stable and accepting assessment of the body.
Stress and Body Image

is a vital developmental competency (Rodriguez-Tome et al., 1993), and thus important inclusion in research.

**Stress.** The nature and prevalence of stress in adolescence and young adulthood has been a topic of debate for some time (Offer & Schonert-Reichl, 1992; Simmons, 1987). However, children and adolescents experience aversive and psychologically threatening events, and there is strong evidence that, like adults, these impact upon their physical and mental health (Mullis et al., 1993). It is hypothesised that the frequency and intensity of transitions during adolescence act as antecedents to psychological stress (Hampel & Petermann, 2006; Youngs Jr, Rathge, Mullis, & Mullis, 1990). In particular, the presence of simultaneous and novel transitions prior to the development of appropriate coping skills, or changes in multiple life domains at once, are both believed to overwhelm coping resources and impede the capacity of a young person to adjust (Simmons, 1987). Researchers have also suggested that adolescents might be more physiologically disrupted by stressors and respond more negatively to environmental events than other age groups (Spear, 2000). Conversely, the transition to young adulthood carries similar challenges across all life domains, and is also associated with significant stress (Schulenberg & Maggs, 2002). Some authors have argued that the period of adolescence extends into young adulthood because of these similarities, thereby highlighting the importance of considering both adolescents and young adults in the link between stress and mental health (Arnett, 1999).

Stress in young people has received increasing attention in recent years. However, while a substantial effort has been made to understand its relationship with mental and physical health, prevalence rates have been less frequently described. Some have reported endorsement of the belief that adolescence is a stressful period by 72% of their sample of adolescents (Holmbeck & Hill, 1988). A more recent study in Sweden reported that 30% of their sample with a mean age of 16 years endorsed a high degree
of stress, while 8.2% or participants endorsed chronic stress (Schraml, Perski, Grossi, & Simonsson-Sarnecki, 2011). Two key individual (demographic) variables have been shown to be associated with the prevalence of stress during adolescence, that is, gender and age.

**Gender.** Gender is an important discriminant in stress research. Studies have consistently revealed that females report significantly more stress during adolescence and young adulthood compared to males (Compas et al., 1995; Grant et al., 2006; Holmbeck & Hill, 1988; Wagner & Compas, 1990). For example, Siddique and D'Arcy (1984) report that 27.5% of females report significant stress in adolescence, while Schraml et al. (2011) found 45.9% and 20.5% of females and males reported high levels of stress respectively. However, one study reported no difference in levels of objective stress (i.e., exposure to stressful events) in adolescence, revealing instead a difference in the relevance of stressor domains in adolescent females and males (Rudolph & Hammen, 1999). Specifically, interpersonal stressors (e.g., parent-child, family, and peer domains) are noted as particularly distressing to females, while non-interpersonal or self-relevant stressors (e.g., in the school or performance domain) are believed to be particularly relevant to males (Rudolph, 2002; Rudolph & Hammen, 1999). These specific differences will be discussed in more detail in Chapter 2. Thus, as with research on body dissatisfaction in adolescence, it is unclear whether stress is necessarily a greater concern in adolescent females compared to males, at least across all domains.

**Age.** Adolescence has been associated with a significantly greater report of stress compared to preadolescence (Rudolph & Hammen, 1999). However, within adolescence, age has been associated with the level and timing of particular stressors. A recent review revealed that age significantly moderated the relationship between adolescent stress and mental health outcomes in 30 of the 60 studies included (Grant et al., 2006). Early adolescence has been highlighted as a period of increased stress due to
the exposure to simultaneous and cumulative transitions (Heaven, 1996; Simmons, 1987). However, others have indicated that impending adulthood, emergent sexuality, and the pressures of further study and employment (Heaven, 1996) place older adolescents and young adults at substantial risk of stress (Hampel & Petermann, 2006). Therefore, the moderating effect of age on stress is unclear, and while it displays some evidence of an association with stress, current findings conflict as to the developmental periods of greatest risk and what this risk specifically relates to. It is possible that different subdomains of stress are relevant at different ages throughout adolescence and young adulthood, and thus a focus on general stress shrouds these differences.

**Morbidity Associated with Body Dissatisfaction and Stress in Adolescence**

**Body dissatisfaction.** Despite its frequency and description as a 'normative discontent' during adolescence, the importance of not viewing this trend of body dissatisfaction as an acceptable part of adolescence has been highlighted (Neumark-Sztainer, 2005), with some describing its frequency as a public health concern (Paxton, 2002). Of particular interest is its associated short- and long-term health implications (Levine & Smolak, 2002). For example, negative body image has been consistently associated with clinical and subclinical eating disorders, and other psychological symptoms. These are briefly outlined below, highlighting the importance of understanding and attenuating body dissatisfaction in females and males during adolescence and young adulthood.

Body dissatisfaction is recognised as the most consistent predictor of eating disorder pathology (Stice, 2002; Stice & Shaw, 2002; Wertheim et al., 2009). These symptoms range from unhealthy eating practices such as severe caloric restriction, smoking, use of meal supplements, binge eating, skipping meals, and food preoccupation, to inappropriate and extreme compensatory behaviours such as excessive
or compulsive exercising, purging, and laxative and diet pill use to lose weight (Littleton & Ollendick, 2003; Ricciardelli & McCabe, 2001a). Muscle-building strategies such as steroid misuse or food supplements are also classified as unhealthy and extreme body control strategies and are particularly relevant to males (Smolak, 2004). Disordered eating practices are disproportionately common in adolescence (Striegel-Moore & Bulik, 2007), with 12% of teenage girls engaging in these at some point (Stice et al., 2009). Additional research indicates that over one-half of teenage girls and nearly one-third of teenage boys report unhealthy weight control strategies, while 12% and 5% respectively report extreme weight control strategies (Neumark-Sztainer, 2005). One-week prevalence rates of disordered eating are reported as 7.4% for adolescent females and 3.1% for males, and 0.5% and 2.3% respectively for steroid use (Neumark-Sztainer, Story, Falkner, Beuhring, & Resnick, 1999). The use of unhealthy and extreme weight control strategies entail significant health implications, including the maintenance of eating problems, chronic body image issues, weight cycling, obesity, and eating disorders (Bearman et al., 2006; D. C. Jones, 2004; Neumark-Sztainer, 2005; Ricciardelli & McCabe, 2001a), while the physical and psychological impacts of steroid use and food supplements are reported as unknown (Smolak, 2004).

Body dissatisfaction also plays an integral role in the development and maintenance of clinical eating disorders (Bunnell, Cooper, Hertz, & Shenker, 1992; Gowers & Shore, 2001). These are extremely complex illnesses which are difficult to treat and associated with significant physical and psychological morbidity and mortality (Kenardy, Brown, & Vogt, 2001; Smolak, 2004; Stice et al., 2009; Striegel-Moore & Bulik, 2007). These disorders affect 1 to 4% of the population (Hudson, Hiripi, Pope Jr., & Kessler, 2007), with a peak onset period between the ages of 17 and 18 years (Stice et al., 2009). These illnesses are particularly common in females in Western
societies (Fairburn & Harrison, 2003), with improvement of body dissatisfaction highlighted as a vital component of successful recovery from eating disorders (Paxton & McLean, 2010).

Body dissatisfaction is also linked with numerous psychological concerns. For example, dysfunctional body image has been associated with disruptions in self-concept and worth (Bunnell et al., 1992; D. C. Jones, 2004; Petersen, Schulenberg, Abramowitz, Offer, & Jarcho, 1984; Ricciardelli & McCabe, 2001a), maladjustment, social disengagement (Neumark-Sztainer, 2005), poor quality of life, difficulties in interpersonal relationships (Pruzinsky & Cash, 2002; Wertheim et al., 2009), and deficits in well-being over time (Wertheim et al., 2009). It has also been implicated in depressive symptoms and anxiety (Lewinsohn et al., 2002; Stice, 2002; Stice & Shaw, 2002; Wertheim et al., 2009), including the development of major depression over four years (Stice, Hayward, Cameron, Killen, & Barr Taylor, 2000), and is suggested to account for observed gender differences in psychological disorders including depression and self-esteem issues. For example, research has reported that differences in these symptoms between females and males disappeared once body image was controlled (Siegel, Yancey, Aneshensel, & Schuler, 1999). Therefore, body dissatisfaction could play a key role in attenuating common mental disorders, particularly in females, underscoring the importance of understanding its aetiology.

Body change strategies have also been linked with eating disorder pathology and psychological symptoms. Research has highlighted that these strategies predict increases in the use of more extreme strategies over time (McCabe & Ricciardelli, 2003a, 2003b; Ricciardelli & McCabe, 2002), and have been linked to self-esteem and depressive symptoms in males and females (McCabe & Ricciardelli, 2001b, 2003b; McCabe et al., 2005; Muris, Meesters, van de Blom, & Mayer, 2005; Ricciardelli & McCabe, 2001b).
**Stress.** A substantial empirical effort has attempted to understand the association between stress and mental illness, with over 1500 studies conducted in this area over the past 15 years (Grant et al., 2003). Stress has been implicated in the increase in psychological disorders during adolescence, with a recent review reporting that 53 out of 60 studies yielded support for the impact of stressful life events on internalising and externalising psychological symptoms (Grant, Compas, Thurm, McMahon, & Gipson, 2004). Research has identified links between stress and physical health indicators including risky behaviours such as smoking (Byrne & Mazanov, 1999, 2001, 2003; Croghans et al., 2006), health complaints (Torsheim & Wold, 2001), and sleep disturbances (Schram et al., 2011). An association has also been found between stress and both depression and anxiety (Grant et al., 2004; McLaughlin & Hatzenbuehler, 2009; Turner & Lloyd, 2004), poor self-esteem (Marcotte et al., 2002; Youngs Jr et al., 1990), the tendency to evaluate self-worth only on performance (Schram et al., 2011), and eating disorder pathology (Bekker & Boselie, 2002). In adulthood, consistent links between stress and depression (Hankin & Abramson, 2001; Lewinsohn, Rohde, Klein, & Seeley, 1998), as well as eating disturbances (Bennett & Cooper, 1999), have also been reported. These relationships are dynamic and complex (Grant et al., 2004; McMahon, Grant, Compas, Thurm, & Ey, 2003), and a review by Grant et al (2004) indicates that recent stressors exert the strongest influence on mental health symptoms in children and adolescents. However, they also note that distal events can be influential depending on their nature, severity, and controllability. For example, while the effect of some stressors may be attenuated over time by protective factors, severe and uncontrollable stressors may elicit distress long-term due to the insufficient capacity of short-term coping mechanisms (for instance, the use of avoidant coping to deal with sexual abuse) (Grant et al., 2004). Therefore, the impact of stressors in the short- and
long-term reflects a dynamic interactive relationship between the person and their environment.

Distinctions have also been made between types of stressors in order to understand their links with mental health, with three outlined below.

**Normative versus non-normative stressors.** The first distinction, between normative and non-normative events, is of particular relevance to the current research program. *Normative* stressors refer to events experienced universally (e.g., developmental changes in adolescence and young adulthood), while *non-normative* stressors can occur at any time of an individual’s life (Grant et al., 2004; Heaven, 1996). The cumulative effect of normative events has been linked to poorer mental health in adolescence (Heaven, 1996). In particular, puberty has received attention as an important stressor during this time, particularly in females (Offer & Schonert-Reichl, 1992; Petersen, 1988). The impact of physical changes on an individual’s self-view and experiences (Petersen, 1988), as well as the timing of puberty (specifically when it is significantly early in females and late in males), have been linked to psychological symptoms (Siegel et al., 1999; Simmons, 1987). The current research program particularly focuses on normative stressors during adolescence, and young adulthood, to assess their relationship with body image given the transitional nature of these life periods.

**Acute versus chronic stressors.** *Acute stressors* are rare events with a discrete onset and significant impact on an individual. In contrast, *chronic stressors* are ongoing or cumulative events in the environment which can be severe in nature (e.g., poverty) or relatively minor, such as environmental noise (Compas et al., 1993). While major life events have been associated with significant upheaval and maladjustment (Heaven, 1996; Kanner, Coyne, Schaefer, & Lazarus, 1981), some have argued that chronic stressors, specifically the subtype of *daily hassles*, exert a more consistent and
debilitating influence on mental health (Heaven, 1996; Kanner et al., 1981; Williams & McGillicuddy-De Lisi, 2000). These hassles are defined as irritating, frustrating, and distressing daily demands which exert a cumulative effect on an individual (Kanner et al., 1981; Williams & McGillicuddy-De Lisi, 2000). Furthermore, daily hassles have been shown to mediate the impact of major life events on mental illness (Kanner et al., 1981).

**Independent versus dependent stressors.** Independent stressors are events that take place in the environment outside of an individual’s control and which require a reaction or response. In contrast, dependent stressors are events to which an individual contributes (Daley et al., 1997; Rudolph & Hammen, 1999). While the focus in research has previously been on independent stressors, dependent events have been increasingly highlighted as relevant for mental health (L. H. Cohen, Burt, & Bjorck, 1987; Daley et al., 1997; Grant et al., 2004). Research has identified an increase in dependent stressors during adolescence, particularly in peer relationships, compared to preadolescence in which independent events dominate (Rudolph & Hammen, 1999).

**Evidence for a Relationship Between Stress and Body Image Disturbance**

Despite the significance of body dissatisfaction and stress in adolescent and young adult mental health, and their shared associations with self-esteem, depression and eating disorder pathology, no explicit investigation of their interface has been undertaken. This is surprising given that a link has been theorised between the two constructs (Levine & Smolak, 2002). Limited research in body dissatisfaction and eating disordered behaviours provides evidence of a direct association between stress and body dissatisfaction in adolescence. Furthermore, the inclusion of stress management training in programs designed to improve body image and prevent
disordered eating provides additional support for consideration of this relationship (McCabe, Ricciardelli, & Karantzas, 2010; McVey & Davis, 2002; McVey, Davis, Tweed, & Shaw, 2004; McVey, Tweed, & Blackmore, 2007; O'Dea & Abraham, 2000).

**Research in Stress, Body Dissatisfaction and Eating Disorder Pathology**

Research investigating the association between stress and body dissatisfaction (and related variables such as eating concerns) has been limited, and almost exclusively focused on females. A cumulative stressor model of eating disturbances in adolescence has been hypothesised, suggesting that the occurrence of synchronous normative stressors - specifically, puberty, dating, and increased academic demands - leads to disturbed eating behaviours. Smolak and colleagues (1993) found that in adolescent females, the onset of menstruation and dating in the same year predicted greater reports of eating disturbances and body dissatisfaction one year later. Furthermore, the occurrence of each of these stressors individually was not significantly associated with eating disturbances or body dissatisfaction (Smolak, Levine, & Gralen, 1993). A second study by Levine et al. (1994) replicated these results, finding that the coincidence of menstruation and dating onset predicted greater weight management efforts in females compared to those who had not commenced these transitions. Furthermore, the addition of increased academic pressures compounded the association with dieting (Levine, Smolak, Moodey, Shuman, & Hessen, 1994). In other studies, body dissatisfaction has been significantly correlated with low self-esteem, stress, and depression in young adult and adolescent females (Johnson & Wardle, 2005; Marcotte et al., 2002). One recent study also showed a moderating role for stress in the relationship between fat talk and body dissatisfaction, such that fat talk predicted body dissatisfaction only in young adult females reporting low levels of stress (Warren, Holland, Billings, & Parker, 2012). The authors of this study argued that this finding
reflected ceiling effects in body dissatisfaction for those reporting high levels of stress. While focused on female samples, these limited studies offer support for a direct relationship between stress in adolescence and young adulthood, and body dissatisfaction, worth investigating.

One previous known study has specifically explored the association between stress and body dissatisfaction in adolescent females and males and contributes to the basis of the current research program (K. M. Murray, Byrne, & Rieger, 2011). This study surveyed 533 male and female adolescents in grades 7 to 10 in Canberra, Australia. Results revealed a strong relationship between stress and body dissatisfaction, with female gender, low self-esteem, and greater reports of general stress significantly associated with body dissatisfaction, but depressive symptoms did not contribute to the model. Furthermore, the stressor subdomains of peer pressure and school attendance related significantly to body dissatisfaction in females and males, and future uncertainty and romantic relationships displayed significant negative and positive links respectively to body satisfaction in males.

These findings provide support for further investigation into the general and specific relationship between stress and body dissatisfaction in adolescence. However, it possesses a number of limitations which should be acknowledged. First, its cross-sectional design precludes any conclusions relating to the direction of the relationship between stress and body dissatisfaction. Prospective and experimental designs are needed in order to understand the implications of the stress-body dissatisfaction link in prevention programs and in particular, elucidate causal pathways to inform design paradigms. Second, one measure of body dissatisfaction was utilised in the study which did not account for the tendency of males to report a desire to increase muscularity, therefore limiting the generalisability of the findings to the male population. Third, the study only tested self-esteem and depressive symptoms as psychological constructs of
interest in the stress-body image link. Additional psychological and demographic (e.g., age) variables need to be assessed to more fully understand the relationship and its implications for prevention and treatment, as well as its applications to the young adult population. Relatedly, while a dimensional assessment of stressor domains was undertaken, these subdomains were not tested alongside psychological and demographic variables in regression analyses, meaning that the strength of their association with body dissatisfaction alongside established variables remains unclear. Finally, the use of only self-report data highlights the need to consider multiple methodologies, such as experimental designs and objective assessments of stress to investigate the relation of physiological stress indicators compared to subjective reports.

Further support for an investigation of the stress-body image association can be identified in the related area of eating disorder pathology. These findings are relevant to research exploring the relationship between stress and body dissatisfaction because of its centrality in eating disorders (Stice, 2002). Stressful life events have been shown to be positively associated with extreme weight control behaviours and binge eating in older adolescent and young adult males and females (Loth, van den Berg, Eisenberg, & Neumark-Sztainer, 2008). Similarly, studies in adolescent females have shown links between stress, emotion-focused coping (i.e., use of strategies to alter emotional responses to stress rather than address the problem itself, such as relaxation or distraction), and low self-esteem in eating disordered attitudes (Fryer, Waller, & Stenfert Kroese, 1997), high interpersonal stressors (in addition to high interpersonal perfectionism, low interpersonal self-efficacy, and high weight/shape self-efficacy) have been associated with increased dieting proximally (Cain, Bardone-Cone, Abramson, Vohs, & Joiner, 2008) and over time (with the exception of perfectionism) (Cain, Bardone-Cone, Abramson, Vohs, & Joiner, 2010), while stressors in the family (Horesh
et al., 1996) and school environment (McVey, Pepler, Davis, Flett, & Abdolell, 2002) have also been associated with disordered eating.

Despite some evidence of a predictive relationship between stress and disordered eating, other studies have not supported this directionality. For instance, the effort to change one’s body and maintain an ideal body weight has itself been identified as a source of stress (O'Dea & Abraham, 1999). Furthermore, a study over four months by Rosen, Tacy, and Howell (1990) found a proximal relationship between stress and dieting, but dieting was found to predict increases in stress over time, leading the authors to conclude that stress mediates the relationship between dieting and psychological symptoms. Arguing for the converse relationship, it has been hypothesised that eating disorder pathology represents an effort to regulate the emotions associated with stress (Ball & Lee, 2002; Loth et al., 2008). This suggestion has been supported by experimental studies examining the effect of stress on eating behaviours. Acute stress has been implicated in reduced food intake, and chronic stress in increased consumption of energy dense foods (Torres & Nowson, 2007; Wallis & Hetherington, 2009), although these latter effects appear to be greater for individuals who typically restrain eating (Wallis & Hetherington, 2004) or eat in response to emotional states (Oliver, Wardle, & Gibson, 2000). Interpretation of these findings has emphasised eating as an effort to regulate stress by focusing on the immediate environment (Rutledge & Linden, 1998) and escaping or shifting attention away from aversive (especially self-oriented) stimuli (Wallis & Hetherington, 2004).

Research in body dissatisfaction and eating disorder pathology provides support for a direct association with general and specific subdomains of adolescent and young adult stress. However, the focus on female samples highlights the need to expand these studies to understand how stress relates to body dissatisfaction and eating outcomes in females and males too. While research in body/eating disturbance supports further
examination of the link between stress and body dissatisfaction in both genders, implications regarding the directionality of the relationship remain unclear.

**Prevention Research in Body Image and Eating Disorder Pathology**

Programs designed to prevent and intervene early in eating disorders are frequently implemented in adolescence. The focus of these interventions often targets body dissatisfaction, overconcern with weight and shape, and dieting which are believed to exist on a spectrum, with clinical eating disorders anchored at the extreme (Levine & Smolak, 2006). While many aspects of these disorders are not fully understood, it is argued that there is sufficient knowledge to intervene early and prevent the onset of these difficulties (Neumark-Sztainer et al., 2006), particularly given the complexity of treating established eating disorders (Kenardy et al., 2001). Body image has formed the primary focus of many of these prevention programs because of its role in eating disorders and other psychological difficulties (Levine & Piran, 2004; Stice & Shaw, 2002). Despite very limited studies supporting a role for stress in body image, a number of these programs have also included a focus on stress management. Following is a brief discussion about prevention programs generally, and then a specific review of programs including stress management training.

The design of prevention and early intervention programs for body image disturbance and eating disorders during adolescence has been a topic of debate. One aspect that is debated is whether these programs should target all adolescents (universal programs) or only individuals reporting symptoms (targeted or specific programs) (Levine & Smolak, 2006). Paxton, Eisenberg, and colleagues (2006) conducted a five year longitudinal study in 12 to 16 year olds and found that body image is static during early adolescence, but that during mid-adolescence it becomes more stable and can predict the persistence of symptoms more reliably over time (Paxton, Eisenberg, et al.,
These findings suggest that universal programs could be ideally targeted early in adolescence prior to the establishment of risk or vulnerability factors, while selected or targeted programs could be most appropriately implemented in late adolescence when specific symptoms are apparent.

There have been a multitude of universal prevention programs targeting body image during adolescence (Levine & Smolak, 2006; Littleton & Ollendick, 2003; Stice & Shaw, 2004). However, many programs aimed at improving body image and preventing the development of eating disorder pathology have not reported long-term success (Paxton, 2002), with the exception of the Student Bodies program which is a combined universal and targeted program which has shown sustained reductions in symptoms of eating disorder pathology in young adult women (Barr Taylor et al., 2006; Jacobi et al., 2007; Jacobi, Volker, Trockel, & Taylor, 2012; Winzelberg et al., 2000). Although there is limited research in the relationship between stress during adolescence and body dissatisfaction, a number of programs have incorporated stress management training. Justification for the inclusion of stress has drawn from recognition of stress as a non-specific vulnerability factor in a multitude of psychopathological outcomes. Additional support has been drawn from research linking eating disorders to stressors associated with normative (e.g., puberty, dating onset) and non-normative (e.g., sexual harassment) events during adolescence (Levine & Smolak, 2006). In general, programs including stress management training can be classified as health promotion programs fostering positive self-image by targeting schools at the level of students, staff, and the family (Levine & Smolak, 2006).

Gail McVey and colleagues have tested a number of programs focusing on self-esteem and body image enhancement which include stress management training through modules focusing on life skills. An initial evaluation of the program in early adolescent females revealed no significant program effect, with both the intervention and control
groups displaying declines in body dissatisfaction and eating problems (McVey & Davis, 2002). However, an updated version of the program utilising an ecological approach (for instance, training for teachers and staff, parental education sessions, and student discussion groups) did yield significant intervention effects in terms of improved body satisfaction and global self-esteem, as well as reductions in dieting attitudes. Yet, these gains were not maintained at the 12-month follow-up (McVey et al., 2004). The most recent iteration - namely, “Healthy Schools-Healthy Kids” - was tested in early adolescent females and males, with positive effects found on measures of internalisation of media ideals in females and males, and in reducing disordered eating in female students. However, while general program effects were not maintained at 6-month follow-up, high-risk students (i.e., who indicated that they were currently trying to lose weight or increase muscularity) showed significant reductions in internalisation of media ideals, body dissatisfaction, and disordered eating which were maintained over time (McVey et al., 2007).

O’Dea and Abraham (2000) have also tested a self-esteem enhancement program entitled “Everybody’s Different” which incorporated stress management training within an ecological framework. Evaluated in early adolescent males and females, significant improvements were found in body satisfaction, self-esteem, and the importance of social acceptance, athletic ability, and reductions in the importance of physical appearance compared to the controls. In addition, these changes in body image and other attitudes remained significant at the 12-month follow-up (O’Dea & Abraham, 2000). Finally, McCabe, Ricciardelli, and Karantzas (2010) tested a “Healthy Body Image Program” in early adolescent males but this did not show changes at post-intervention or follow-up.

While a number of universal prevention programs have been developed and tested in adolescent populations, one key criticism of these programs must be
acknowledged. Specifically, these programs may entail the risk of iatrogenesis, that is, the inadvertent promotion of eating disordered attitudes or behaviours. This is a significant concern for researchers designing prevention efforts given the physical and psychological health impacts of adopting unhealthy and extreme weight control behaviours in adolescence. The potential for iatrogenesis in well-intentioned prevention programs highlights the need to refine the content of training modules and consider the ethical implications of implementing these programs in early adolescence. One empirical test of prevention programs for eating disorders found no iatrogenic effects of universal programs (Stice & Shaw, 2004). In contrast, a review by Levine and Smolak (2006) noted the possibility of some negative effects of these programs. However, the authors argued that rather than cease all universal programs, studies should focus on refining the implementation and design of these programs, akin to that undertaken in relation to psychological therapies and psychopharmacological treatments. In sum, further studies are needed to refine prevention work in body image and eating disorders, including the role of stress in order to enhance the efficacy of these programs.

Research evaluating prevention and intervention programs that have included stress management training to improve body dissatisfaction and prevent eating disorders have shown some success in adolescent females and males. In doing so, they provide indirect but compelling evidence of a relationship between these constructs which is worthy of further investigation. Moreover, a greater understanding of the specific association between stress and an individual’s assessments of their physical appearance could lead to its inclusion in a targeted risk factor approach rather than as part of a general vulnerability program (Levine & Smolak, 2006).
Structure of the Thesis

Body dissatisfaction and stress represent important psychological constructs that peak in adolescence and are implicated in a number of mental health issues during this time and young adulthood. No explicit series of investigations into the relationship has been undertaken, but support for this is apparent in the body/eating disturbance and prevention programs literature. This thesis will explore the relationship between general and specific stress and body dissatisfaction (and the related dimension of body change strategies) and has the potential to improve theoretical accounts of eating disorders and therefore prevention programs. Stice (2002) conducted a meta-analysis of risk factors in eating disorder pathology and concluded that accepted risk factors (such as body dissatisfaction) display only modest effect sizes. Therefore, he emphasised a need to identify new risk and maintenance factors (such as stress), and assess their relationship with established risk factors. Given that stress demonstrates an association with eating disorder pathology and has been included in prevention work, examination of its relationship with body dissatisfaction provides potential insight for theoretical accounts of body image and eating disorder pathology which can lead to improved prevention programs in this domain.

Three sequential studies are undertaken in the current research program in order to understand the relationship between stress and body dissatisfaction and its implications for theoretical accounts of eating disorder pathology and prevention programs. In order to direct these empirical investigations, Chapter 2 provides a theoretical and conceptual discussion of the relationship between stress and body dissatisfaction (and body change strategies) in the context of empirical research in both domains, and outlines specific research questions used to explore the relationship in the current research program. Chapters 3 to 6 present drafted papers discussing results from
three empirical studies examining the relationship between stress and both body
dissatisfaction and body change strategies using multiple methodologies, including
cross-sectional, longitudinal, and experimental studies in samples comprising
adolescent and young adult females and males. Chapter 7 draws these findings together
in a general discussion of the implications of these studies for the link between stress
and body dissatisfaction (and body change strategies), and theoretical and prevention
models in these domains. The limitations and future directions of the current research
program are also discussed, followed by a conclusion summarising the findings of the
research program.
Chapter 2

Conceptualising the Relationship Between Stress and Body Dissatisfaction

Previous research on risk factors for poor body image has emphasised the role of individual/demographic variables (such as age, gender, or the role of psychological symptoms including self-esteem) in generating feelings of discontent or increased vulnerability; sociocultural forces (particularly the family, peers, and the media) in transmitting cultural ideals and objectifying the body; and the influence of biological or physical markers (such as body size or pubertal development) (Levine & Smolak, 2002; Paxton & McLean, 2010; Smolak, 2004). There has been surprisingly little work focusing on theoretical models of body image disturbances, with the construct more frequently examined as a component in models of eating disorder behaviours. Stress has been implicated in the rise of psychological symptoms during adolescence, and its shared link with eating disorder pathology makes it a strong candidate in expanding current understandings of the risk factors for dissatisfaction with physical appearance. Theories relating to both stress and body/eating disturbance are valuable in providing a framework for exploring the relationship between stress and body dissatisfaction. This chapter begins by outlining the general stressor-psychopathology model as the primary framework for analyses undertaken in the current research program, and then discusses the tripartite influence model and transdiagnostic theory of eating disorders to identify key variables for consideration within the stressor-psychopathology framework. Following these discussions, research in body dissatisfaction and stress is considered to provide insight into their relationship and guide the empirical studies undertaken in the current research program. Specifically, three domains are outlined as key considerations in examining the relationship between stress and body dissatisfaction;
gender, interpersonal relationships, and psychological factors (i.e., self-esteem, depressive symptoms, body importance).

Theoretical Underpinnings of the Association Between Stress and Body Dissatisfaction

General Stressor-Psychopathology Model

The general stressor-psychopathology model was developed to better understand the dynamic and complex relationship between stress and mental health (McMahon et al., 2003). It depicts a direct relationship between stress and psychopathology (a) in which two key mechanisms intervene: moderating (b) and mediating variables (c) (see paths annotated in Figure 2.1). Moderators are variables that affect the direction and/or strength of the relationship between a predictor (independent variable) and outcome (dependent) variable (Baron & Kenny, 1986). This means that moderating variables either accentuate or attenuate the association between two constructs (Grant et al., 2006). These are considered pre-existing characteristics of an individual, often characterised by demographic variables such as age or gender, or processes in the environment such as social support (Grant et al., 2003; Grant et al., 2006). In contrast, mediators account for or explain the relationship between a predictor and an outcome variable; both conceptually and statistically (Baron & Kenny, 1986; Preacher & Hayes, 2008). These forces are believed to be activated by stressors and explain observed outcomes by becoming part of the individual or response of the social network. Commonly tested mediating influences include coping strategies, and cognitive appraisals or interpretations of events (Grant et al., 2003; Grant et al., 2006).

Moderating and mediating variables are important considerations in any examination of
the relationship between stress and psychopathology. Through these analyses, prevention and intervention programs can be more effectively designed.

![General stressor-psychopathology model](diagram)

*Figure 2.1. General stressor-psychopathology model as depicted in McMahon et al., (2003, p. 110)*

The general stressor-psychopathology model provides insight for an investigation into the relationship between stress and one particular aspect of psychopathology, namely, body image disturbance. This will be used as the framework for the current research program because stress is primarily conceptualised as a risk factor in body dissatisfaction and its associated outcomes. In order to identify additional variables for consideration in the present research program using this framework, two models drawn from the body image and eating disorder literature are now outlined. These models elucidate the stress-body dissatisfaction relationship by informing the inclusion of moderating and mediating variables in the link and the nature of stress in the context of body image in youth.

**Tripartite Influence Model**

The tripartite influence model accounts for the multifactorial risk factors for body dissatisfaction and eating disorders (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). It proposes that three primary sociocultural influences (i.e., peers, parents
and the media) impact upon body dissatisfaction through two key mediating mechanisms (i.e., appearance comparison and internalisation of cultural ideals around appearance). In turn, body dissatisfaction is hypothesised to lead to disturbed eating behaviours, specifically dietary restriction and bulimia, and psychological dysfunction in the form of depression and low self-esteem (see Figure 2.2). The nature of the direct influences include teasing, investment or modelling behaviours in interactions with peers and parents, and exposure to images or body change methods in the media (Keery, van den Berg, & Thompson, 2004). This model has been tested and validated in samples including adolescent and young adult females, and young adult males, and is believed to outline central predisposing constructs for body image issues and eating disordered behaviours (Keery et al., 2004). In a test in adolescent females aged 11 to 15 years, the model supported full mediation of peer influences on body dissatisfaction, but only partial mediation for media influences in the sample (Keery et al., 2004). Replication of this study also yielded support for the peer and media influences on body image, concluding these may be more salient to adolescent females than parents (Shroff & Thompson, 2006). Tests in young adult females have also supported the model, with the exception of global psychological functioning which appeared to predict body dissatisfaction as opposed to the hypothesised reverse relationship. The authors of this study concluded a need to further understand the role of global psychological functioning in body dissatisfaction and eating behaviours given their potential contributions to prevention programs (van den Berg, Thompson, Obremski-Brandon, & Coover, 2002). Studies in young adult males have tested an extended quadripartite version of the model, in which dual pathways from dissatisfaction with muscularity and body fat were tested. The model suggested that these aspects of dissatisfaction predicted muscularity enhancement strategies and disordered eating respectively (Tylka, 2011), reflecting the tendency of males to be more accurate and selective in body
assessments and change strategies (McCabe & Ricciardelli, 2004; Ricciardelli et al., 2009; Smolak, 2004). Internalisation of mesomorphic ideals was identified as the key mediator in the model, in addition to the two body dissatisfaction items, with friends, family, the media and dating partners supported as key direct influences. Interestingly, appearance comparison was not supported in the model (Tylka, 2011).

The tripartite influence model provides an important theoretical account of body dissatisfaction and eating disturbances in adolescents and young adults. However, there are important limitations in studies testing the model, notably their cross-sectional designs which preclude statements regarding the temporal sequencing of the model (Keery et al., 2004; Shroff & Thompson, 2006). This is especially problematic given the directional assumption between the two mediating variables included in the model, that is, appearance comparison predicting internalisation of cultural ideals around the body. Additional criticisms of the model include the lack of investigation in adolescent males and the proposed unidirectional nature of the pathways between variables included in it. However, the model has been described as a framework requiring further development through research (van den Berg et al., 2002). One possible inclusion could be consideration of stress as part of the psychological functioning component in the model. Based on the findings of van den Berg et al., (2002) and in line with research linking stress with body dissatisfaction and eating disorder pathology described in Chapter 1, stress may be conceptualised as a predictive influence preceding body dissatisfaction and eating disorder pathology. It is also possible that stress, along with the originally hypothesised roles for self-esteem and depression, is an outcome of the processes in the model. Exploring how stress relates to body dissatisfaction can help to clarify whether it should be considered as part of the tripartite influence model, and its implications for prevention. Given the nature of sociocultural influences on body
dissatisfaction, stress may also be conceptualised as part of the direct influence of these variables.

![Sociocultural influence: Peers, Parents, Media](Image)

**Figure 2.2.** Tripartite influence model as depicted in Keery et al., (2004, p. 238)

**Transdiagnostic Model of Eating Disorders**

The transdiagnostic theory of eating disorders is an extension of the CBT model of bulimia nervosa (Fairburn, Cooper, & Shafran, 2003). The model proposes that the core psychopathology of eating disorders is an overvaluation of weight and shape, and that this leads to the cycles of dietary restriction, bingeing, and compensatory behaviours characteristic of the disorder. The transdiagnostic extension of this model incorporates four additional maintaining mechanisms linked to all eating disorders, specifically core low self-esteem, mood intolerance, interpersonal difficulties, and clinical perfectionism. This model has been utilised to direct the treatment of clinical eating disorders, and has been shown to be efficacious in clinical settings (Wilson, Grilo, & Vitousek, 2007). While body dissatisfaction is recognised as the most consistent predictor of eating disorder pathology (Stice, 2002), it is not specified in its own right within the transdiagnostic model. Instead, it is classified as part of the overvaluation of weight and shape component. Nevertheless, the transdiagnostic model
of eating disorders is also useful in elucidating a role for stress in body dissatisfaction. For example, the inclusion of mood intolerance and interpersonal difficulties as precipitants of disordered eating behaviours provide potential pathways for the influence of stress on these symptoms. While females represent a majority of cases diagnosed with eating disorders (Hudson et al., 2007), comparable aetiological models for both eating disorders and muscle dysmorphia have been proposed (S. Murray, Rieger, Karlov, & Touyz, in press), lending support for consideration of factors in this model to both genders.

**Implications for the Current Research Program**

The tripartite influence model and transdiagnostic theory of eating disorders identify a possible role for stress as a precipitant, correlate and/or consequence of body dissatisfaction. The tripartite influence model and transdiagnostic model of eating disorders also highlight a number of variables which should be considered in an examination of stress and body dissatisfaction, namely gender, interpersonal relationships, and various aspects of psychological functioning including self-esteem, depression, and the importance of the body to an individual. In addition to their theoretical relevance, these variables also display empirical support in the body dissatisfaction and stress literature. Much of these studies have focused on adolescents, and therefore these findings are prominent in the following discussion, with evidence pertaining to young adults reported where possible. Using the stressor-psychopathology model as a guide (McMahon et al., 2003), research pertaining to each of these areas is presented below, arguing for consideration of:

1. Gender as a key moderator of the stress-body dissatisfaction link
2. Interpersonal relationships as a specific domain of stress relating to body dissatisfaction
3. Psychological maladjustment in the form of low self-esteem and depressive symptoms, as well as high degree of importance placed on the body, as key mediating variables explaining how stress relates to body dissatisfaction.

**Gender and the Stress-Body Dissatisfaction Link**

Gender role development is a key competency in adolescence. It affects all transitions during this time, and it is recognised that as gender roles intensify with increasing age, differences between females and males follow (Galambos, Almeida, & Petersen, 1990). Typical traits associated with the female gender role, or traditional ‘femininity’, include expressivity and nurturance. In contrast, ‘masculinity’ is associated with instrumental characteristics such as independence and dominance (Galambos et al., 1990). These gender role stereotypes are initiated and maintained through socialisation processes in the family, peers, and media. While females and males present with attributes characteristic of both genders, they tend to display an imbalance in favour of their own gender (Galambos et al., 1990) and engage in more activities consistent with this during adolescence (McHale, Kim, Whiteman, & Crouter, 2004). Not surprisingly, gender is a key moderating variable of psychological symptoms in this period, including the prevalence, manifestation, and outcomes of both body dissatisfaction and stress. Therefore, it represents a vital consideration in their relationship.

**Gender and Body Dissatisfaction**

Gender is one of the most salient variables in body dissatisfaction, with research revealing associations with its prevalence, nature, risk factors, developmental course, and consequences (Littleton & Ollendick, 2003; Smolak, 2004). Gender is believed to
be the strongest influence on body dissatisfaction (Kostanski & Gullone, 1998) and meta-analyses suggest this emerges in early to mid-adolescence (Feingold & Mazzella, 1998) and persists into adulthood (Grogan, 2011). Chapter 1 presented information on the prevalence of body image issues among females and males in adolescence. However, the nature and implications of these issues are also important to discuss.

The nature of body dissatisfaction in females and males differs significantly and has been linked to unique socialisation processes. In line with cultural ideals equating thinness with attractiveness, females tend to report a preference to lose weight (Kostanski & Gullone, 1998) regardless of their current weight, and report concerns about excess body fat or a large body size (L. R. Jones, Fries, & Danish, 2007). Compared to males, body image assessments in females appear to be more differentiated and focused on body parts (L. R. Jones et al., 2007), with greater self-ideal discrepancies (Muth & Cash, 1997). In contrast, male body preferences tend to be evenly split between a desire to lose weight and a desire to increase body size and/or muscularity (L. R. Jones et al., 2007; Ricciardelli et al., 2000). Males therefore engage in strategies to lose weight and increase muscularity in order to achieve cultural ideals regarding the ‘male’ form as being lean and muscular with broad shoulders (Ricciardelli & McCabe, 2011). Gender differences relating to body image preferences have been shown to emerge as a unique trend in adolescence (Smolak, 2004). Interestingly, assessments of the body in males have been shown to be more closely related to objective size and shape than in females (Ricciardelli et al., 2000, 2009). For example, body satisfaction is reported only in females who are objectively thin, but in males it is apparent in those of average body size (Bearman et al., 2006). However, it is important to note that males have been reported to focus more on their height or muscularity in body assessments than their weight (Rosenblum & Lewis, 1999). Research also
indicates that males display greater accuracy in assessments of their weight status compared to females (Lemon, Rosal, Zapka, Borg, & Andersen, 2009).

Gender differences in body dissatisfaction have also been identified in relation to the meaning and experience of the body. Compared to males, adolescent females have been shown to be more invested in their physical appearance (Muth & Cash, 1997), report stronger negative emotions relating to body parts (Levine & Smolak, 2002), and more frequent body dysphoria (Muth & Cash, 1997). Across the lifespan, females have also been shown to report greater body disparagement, feelings of fatness, weight/shape salience, and appearance and health orientation compared to males (Paxton & Phythian, 1999). Research has historically indicated that affective measures of body image display the greatest gender differences compared to evaluation and investment assessments (Muth & Cash, 1997). However, the development of assessment tools appropriate for both females and males has led researchers to argue for parity in the prevalence of body dissatisfaction (McCabe & Ricciardelli, 2004). Therefore, gender differences across dimensions of body image need to be re-evaluated.

The implications of body dissatisfaction during adolescence are also moderated by gender. In line with body preferences, research indicates that females report intentions for weight loss while males desire muscle gain in response to body dissatisfaction (Muris et al., 2005). In females, this has been associated with dieting (which in turn has been linked to weight gain over time) (Bearman et al., 2006; Lemon et al., 2009), as well as depressive symptoms and low self-esteem (Marcotte et al., 2002). In addition, eating disorders and subclinical eating disorder pathology are also more prevalent in adolescent and young adult females compared to males (Lewinsohn et al., 2002; Stice, 2002), with body dissatisfaction and greater body importance hypothesised as risk and maintenance factors in these eating problems in females (Muth & Cash, 1997). In contrast, males have been shown to respond to body image through
active strategies to lose weight and increase muscularity (Muris et al., 2005). These typically include exercise or steroid use (Smolak, 2004), which have been shown to progress from more normative to extreme strategies over time (McCabe & Ricciardelli, 2003a). Interestingly, in young adulthood excessive exercise has been reported as the only eating disorder symptom more frequent in males compared to females (Lewinsohn et al., 2002). While less well understood, it is hypothesised that efforts to increase muscularity in males are as common as symptoms of anorexia nervosa in females (Smolak, 2004). However, it is hypothesised that females act on body dissatisfaction more promptly and at lower levels of dissatisfaction than males, which means that they are particularly vulnerable to distress and adverse outcomes (Smolak, 2004).

One important caveat relating to research in gender differences in body dissatisfaction is the historical focus on females (Cohane & Pope Jr., 2001; Muth & Cash, 1997; Smolak, 2004). A review of research confirms that males do suffer from significant levels of body dissatisfaction across the lifespan, including the condition ‘muscle dysmorphia’ which is unique to males and associated with reduced self-esteem, dysphoric mood, disordered eating, and steroid use (Cohane & Pope Jr., 2001; Grieve, 2007). With increasing attention being paid to male body dissatisfaction, research is only just beginning to understand this construct (Cohane & Pope Jr., 2001; McCabe & Ricciardelli, 2004). Therefore, the capacity of current methodological approaches to fully capture male body dissatisfaction is questionable (Cafri & Thompson, 2004). Although it has been argued that the same risk factors are relevant for both genders in body dissatisfaction (Bearman et al., 2006), historical biases towards females mean that research on the prevalence, nature, and implications of body dissatisfaction in adolescent males in particular must be interpreted with caution.
Gender and Stress

Gender also represents one of the most consistent moderating variables in stress and mental health research. As discussed in Chapter 1, females have been consistently shown to report more stress generally during adolescence (Grant et al., 2006; Hampel & Petermann, 2006; Moksnes, Moljord, Espnes, & Byrne, 2010; Wagner & Compas, 1990) as well as more chronic stressors (Schram et al., 2011) compared to their male counterparts. This difference has been attributed to the increased exposure of females to simultaneous stressors in adolescence, particularly at puberty (Grant et al., 2006; Heaven, 1996), which is believed to make them especially vulnerable to negative outcomes during this time (Grant et al., 2006; Wagner & Compas, 1990). Reports in adulthood have also indicated differences between males and females in stress reports, particularly in relation to the onset of depression (Hankin & Abramson, 2001; Kessler, 1997; Lewinsohn, Allen, Seeley, & Gotlib, 1999). However, recent research suggests that the nature and consequences of stress differs for females and males.

Research reveals that the experience of adolescent stress differs by gender, specifically in the relevance of stressor subdomains. The most significant differences have been highlighted in interpersonal relationships, with females reporting significantly more stressors in the family, intimate relationships, and peers compared to males (Rudolph, 2002; Rudolph & Hammen, 1999). Furthermore, this difference has been shown to be unique to adolescence, with no evidence of a gender differences evident in young adults (Wagner & Compas, 1990). In contrast, stress in non-interpersonal or self-relevant contexts has been shown to be particularly relevant for adolescent males (Rudolph, 2002; Rudolph & Hammen, 1999). These findings have been linked to divergent socialisation processes in adolescent females and males and have also been reported in young adults (Stroud, Salovey, & Epel, 2002; Stroud, Tanofsky-Kraff, Wilfley, & Salovey, 2000). In particular, the pressure and expectation
for females to establish and maintain harmonious and intimate interpersonal relationships (Siddique & D'Arcy, 1984) may result in females becoming more invested in these networks as a measure of connectedness, belonging, and self-worth, leaving them vulnerable to actual or perceived upheavals in these domains (Siddique & D'Arcy, 1984; Wagner & Compas, 1990). By comparison, males engage in larger social networks characterised by lower levels of emotional attachment, but greater autonomy and efforts to demonstrate dominance and enhance social standing (Wagner & Compas, 1990). Additional research has also indicated that females report greater school-related stressors compared to males (Offer & Schonert-Reichl, 1992; West & Sweeting, 2003).

Gender differences are also evident in the implications of stress in adolescence. A review by Grant and colleagues (2006) reveals a tendency for females to report internalising symptoms in relation to stress, but externalising symptoms in males, a trend present in 50% of the studies examining the link between stress and psychological symptoms, and which is also apparent in adults (Hankin & Abramson, 2001). For example, reports on research indicate that females have been shown to report greater issues in body image, social relationships, and the self in the context of stress, while males report more substance misuse (Offer & Schonert-Reichl, 1992). Others have found that stress in females, compared to males, is associated with greater difficulties in sleeping, lower global self-esteem, higher performance-based self-esteem, and higher demands (such as time pressures and conflicting obligations) (Schraml et al., 2011).

Section Summary and Conclusions

Gender represents a key consideration in research examining body image disturbance and stress. Research confirms its role as a moderator in the prevalence, nature, and implications of both domains in adolescence and young adulthood. Several conclusions can be made from an analysis of the fields of research on stress and body
dissatisfaction that provide insight into their relationship. First, gender is a central variable in body dissatisfaction and stress that must be taken into account in any investigation of their relationship. Second, females generally report a higher prevalence of body dissatisfaction and stress, which raises the possibility that the association between the two variables could be exclusive to females. Third, stress research provides insight into the unique experience of females and males during adolescence. Therefore, it has the potential to elucidate factors involved in the development, nature, and outcomes of body dissatisfaction during this time, which has particular benefits in gaining a greater understanding of these issues in males who have been less well researched than females. In conclusion, gender represents a possible moderating variable in the presence, strength, and nature of the relationship between stress and body image dissatisfaction.

Interpersonal Relationships and the Stress-Body Dissatisfaction Link

Interpersonal relationships represent a second area of importance emphasised in the tripartite influence model (Thompson et al., 1999) and transdiagnostic model of eating disorders (Fairburn et al., 2003). Social networks experience marked change during adolescence, with notable transitions in family roles and the intensification of peer relationships (Rudolph & Hammen, 1999). Research indicates that family relationships and friendships are key sources of help and support for a young person (Offer & Schonert-Reichl, 1992), and represent the two most valued life domains to young Australians, with 74.3% and 59% of 11 to 24 year olds surveyed in the Mission Australia Survey of Young Australians in 2011 endorsing their importance respectively (Mission Australia, 2011). While the family remains influential during adolescence, this developmental period is also characterised by increased autonomy and agency in a
young person around school, work, and social relationships (McHale, Crouter, & Whiteman, 2003). The increase in time spent with peers during adolescence makes friendships the primary domain of socialisation (Petersen, 1988; Rose & Rudolph, 2006; Rudolph, 2002) and influence (Kearney-Cooke, 2002), especially during early to mid-adolescence (Paxton, Eisenberg, et al., 2006). Belonging in interpersonal networks is vitally important for adjustment across the lifespan (Baumeister & Leary, 1995; Leary, Haupt, Strausser, & Chokel, 1998), particularly for self-esteem (Gailliot & Baumeister, 2007; Smart Richman & Leary, 2009). Furthermore, young people preferentially seek help from peers for mental health issues compared to family members and health professionals (Rickwood, Deane, Wilson, & Ciarrochi, 2005).

However, despite the importance of peer networks for young people, significant gender differences in relational style are apparent within them. Females seek connection and belonging in peer relationships, while males value dominance and status in the peer group (Rose & Rudolph, 2006). Consistent with these differences, peer networks in females are characterised by intimacy, disclosure, and emotional support (Rudolph & Hammen, 1999). These comprise long interactions (Rose & Rudolph, 2006), often in dyads (Rudolph & Hammen, 1999), in which a female receives nurturance, acceptance, trust, validation, security, and enhancement of self-worth (Rose & Rudolph, 2006). Male friendships are characterised by companionship, with lower levels of disclosure and intimacy, taking place in larger peer groups displaying a clear hierarchy (Rudolph & Hammen, 1999). It is notable that interactions in male friendships occur as frequently, but not for as long, as females (Rose & Rudolph, 2006).

Interpersonal relationships are relevant to both body dissatisfaction and stress. The influence of social approval from peers on self-esteem in adolescence grows markedly (Harter, 2006), and this is increasingly based on physical attractiveness (Harter, 1999). Furthermore, sociometer theory suggests that the importance of
belonging in social networks has significant implications for self-esteem across the lifespan. Specifically, self-esteem functions as a way to evaluate an individual’s success at belonging, and an individual will assess their success based on the particular attributes to which the sociometer is calibrated. Failures at belonging are believed to trigger low self-esteem (Gailliot & Baumeister, 2007; Leary et al., 1998). During adolescence and young adulthood, it is possible that appearance is a specific domain to which the sociometer is calibrated, leading to reductions in self-esteem if one is perceived to fail in belonging. An exploration of empirical research in relation to family and peer relationships in body dissatisfaction and stress reveals their potential to elucidate the link between the constructs.

**Interpersonal Influences on Body Dissatisfaction**

Interpersonal relationships represent central influences on body dissatisfaction during adolescence. Sociocultural research has confirmed their role in transmitting and reinforcing cultural ideals around the body (Levine & Smolak, 2002). Interactions with the family, peers, romantic partners, and the media have been associated with feelings of inadequacy and body dissatisfaction (Kearney-Cooke, 2002; Presnell et al., 2004; Sinton & Birch, 2006). Further, it has been suggested that females are exposed to greater pressures from these sources, and at a younger age (Ata, Ludden, & Lally, 2007; Muth & Cash, 1997; Ricciardelli & McCabe, 2001b; Smolak, 2004). The family and peers are particularly relevant during adolescence and display a broad influence on body dissatisfaction.

**Familial influences on body dissatisfaction.** The development of body dissatisfaction has been frequently linked to familial factors. Direct comments or pressures around the body, weight, and eating are considered the most influential forces (Levine & Smolak, 2002). Specifically, teasing has been implicated in body
dissatisfaction, particularly for vulnerable individuals (Levine & Smolak, 2002), and related in some studies to parents of the same gender as the young person (Ricciardelli et al., 2000). Comments from both parents and peers about a lack of muscularity are also linked with general body dissatisfaction and muscle dissatisfaction in adolescent males (McCreary, 2011). Numerous studies have implicated perceived maternal pressures in body dissatisfaction and weight loss strategies for both girls and boys. In contrast, perceived paternal pressure has been linked to body dissatisfaction in boys alone (Ricciardelli & McCabe, 2001b). Adolescent males report perceiving largely positive messages from their mother and female friends, which is linked to body satisfaction, while adolescent females tend to report an absence of positive messages from any source (Ricciardelli et al., 2000). Additional familial influences on body image with less empirical support include the value and emphasis placed on appearance by parents (Sinton & Birch, 2006), parental modelling of eating, weight, and shape concerns (Levine & Smolak, 2002; Littleton & Ollendick, 2003), low parental care and expectations, and poor familial communication (Littleton & Ollendick, 2003). Parents have also been implicated in body change strategies (McCabe & Ricciardelli, 2003b). It is important to note that the majority of research linking the family to body dissatisfaction have utilised cross-sectional designs (D. C. Jones, 2011). Prospective research has not supported a predictive relationship between various sociocultural influences in the family and body dissatisfaction, including perceived familial pressure, to date (Presnell et al., 2004). However, recent research has shown that muscle-related comments from parents are particularly important in predicting increased use of muscle-enhancing strategies over time, but the author was careful in highlighting that this does not undermine the influence of peers in this regard too (McCreary, 2011).

**Peer influences on body dissatisfaction in adolescence.** Peer factors are particularly salient in body dissatisfaction during adolescence (Paxton, Eisenberg, et al.,
2006; Rodriguez-Tome et al., 1993), and peer acceptance is believed to override deficits in parental support (Presnell et al., 2004); highlighting the great positive and negative potential of these networks for young people. Research has primarily focused on the latter in relation to body dissatisfaction and disordered eating during adolescence, with a multitude of peer influences implicated in their initiation and maintenance (Littleton & Ollendick, 2003), particularly in gender-specific body dissatisfaction (Helfert & Warschburger, 2011).

**Teasing.** The peer group in adolescence is described as the most frequent and influential source of teasing (Kearney-Cooke, 2002), which is generally targeted towards body shapes that are contrary to cultural ideals (D. C. Jones & Crawford, 2006). Prevalence rates suggest that 62% of adolescents report the source of teasing as peers, compared to mothers (30%), fathers (24%), brothers (41%), and sisters (22%) (Rieves & Cash, 1996 as cited in Menzel et al., 2010). A meta-analysis by Menzel and colleagues (2010) revealed a medium correlation between body dissatisfaction and weight-related teasing \((r = 0.39)\), and a medium correlation between body dissatisfaction and general appearance-related teasing \((r = 0.32)\). These associations were particularly strong for children and adolescents, specifically females (Menzel et al., 2010), but teasing has also been shown to predict body dissatisfaction over time in both genders (D. C. Jones, 2004). Furthermore, adolescent males are reported as being more likely than females to make critical and harassing comments to girls and boys about their body (Levine & Smolak, 2002). Not surprisingly, some have suggested that while important for both genders, teasing is particularly influential in body dissatisfaction in adolescent males (D. C. Jones & Crawford, 2006; Myers & Crowther, 2009; Paxton, Eisenberg, et al., 2006).

**Peer pressures.** Compared to teasing, body dissatisfaction has also been associated with less overt processes in the peer group (e.g., discussions focused on
appearances, the body, and body change techniques). These more indirect influences have been especially linked to females (Levine & Smolak, 2002), but this conclusion may reflect the historical dearth of research focusing on male body dissatisfaction. A subculture involving communication about the body through “fat talk” or “appearance conversations” has been highlighted as exerting a gradual influence on body dissatisfaction, with the frequency of these discussions increasing with age in both genders (D. C. Jones & Crawford, 2006). Furthermore, this study also reported that the prevalence of conversations relating to muscle-building in males may outnumber those focusing on dieting in females. This finding reinforces the importance of research understanding body dissatisfaction in males, and the possibility that gender differences are smaller than previously believed.

Peer group norms have also been linked to body dissatisfaction in adolescent females (Dohnt & Tiggemann, 2006). Research suggests that similarities in reports of body dissatisfaction, dietary restraint, and extreme weight loss behaviours are greater within than between female friendship groups in Grade 10 (as well as some psychological variables such as depression and self-esteem), and that a young female’s perception of her friends’ attitudes and behaviours around body image and dieting predict her own body image, dietary restraint, extreme weight loss behaviours, and binge eating (Paxton, Schutz, Wertheim, & Muir, 1999). Other studies have yielded support for this finding, reporting similarities in early to mid-adolescent female friendship groups on body dissatisfaction, weight concerns, dieting and restraint (Woelders, Larsen, Scholte, Cillessen, & Engels, 2009). However, in this study no significant prediction of individual body image or dieting was evident over one year. This finding suggests that the influences within the peer group may be short-lived, or perhaps reflect changes in peer groups over time which were not accounted for in the study. Hutchinson and Rapee (2007) also tested the influence of peer group norms in an
early adolescent sample using a design similar to Paxton et al. (1999). They found that perceived peer influences predicted individual body image concern, dieting, extreme weight loss behaviours and binge eating, but that peer groups themselves were similar only on behavioural measures and not attitudinal measures. This could reflect age differences in the two samples and earlier findings, in that body dissatisfaction is not yet stable in early adolescence (Paxton, Eisenberg, et al., 2006). Body change strategies have also been associated with the peer group in adolescent females (McCabe & Ricciardelli, 2003b) and males (Ricciardelli & McCabe, 2001b). One important limitation of these studies is the influence of selection bias within peer groups, such that individuals with body image concerns or disordered eating behaviours may be attracted to one another and form peer groups, with psychopathology leading to group membership rather than resulting from it. Therefore, there is a need to consider multiple social networks at once to assess peer group processes and their relation with body image variables (Hutchinson & Rapee, 2007; Paxton et al., 1999; Woelders et al., 2009).

Finally, appearance-based acceptance has also been highlighted as a correlate of body dissatisfaction in females (Kearney-Cooke, 2002) and males (Helfert & Warschburger, 2011). One study found that females who endorsed beliefs that thinness will improve relationships reported less satisfaction with appearance and more dieting. Specifically, beliefs about male relationships were linked to body dissatisfaction and restrained eating, while beliefs regarding female friendships were associated with restrained eating only (Gerner & Wilson, 2005). The authors suggested that peer rejection leads to body dissatisfaction and hence dieting as an attempted method of restoring acceptance and belonging (Gerner & Wilson, 2005).

**Social comparison.** Body comparisons have also been identified as potential contributors to body dissatisfaction, with social comparisons entailing the identification of others as standards by which to judge the self (Myers & Crowther, 2009). A meta-
analysis revealed that body comparisons display a moderate and significant effect size of 0.77 on body dissatisfaction. Stronger relationships have been reported for females, perhaps reflecting the tendency for females to rely on the body to evaluate self-worth and to make upward comparisons (Myers & Crowther, 2009). Further, early and mid-adolescents are considered most vulnerable to the negative effects of social comparison due to the frequency of time spent with peers during this period and limited exposure to protective messages which increase with age (Myers & Crowther, 2009). Research also shows that adolescent females who engage in more appearance conversations also engage in more social comparison one year later, and this in turn predicted body dissatisfaction over time (D. C. Jones, 2004).

Interpersonal Influences in Stress

Interpersonal relationships have also been highlighted as a source of stress during adolescence (Bakker, Ormel, Verhulst, & Oldehinkel, 2010) and young adults (Stroud et al., 2002, 2009). While these networks offer support for a young person, changes in structure, roles, and conflicting demands are known precipitants of stress and distress (Grant et al., 2006; Heaven, 1996; Petersen, 1988; Rudolph & Hammen, 1999; Siddique & D’Arca, 1984). A study in Norway revealed associations between stress related to the family and school performance with depression, and between peer stressors and emerging adult responsibility with anxiety (Moksnes et al., 2010). These networks are important for both females and males, with peer stressors especially salient during mid-to-late adolescence (Wagner & Compas, 1990).

Compared to males, adolescent females place greater value on interpersonal relationships and derive significant benefits from them. They spend large quantities of time with others, seek support, and learn about their worth and emotion regulation from these networks (Rose & Rudolph, 2006). As a result, females are more vulnerable to
actual or perceived conflict or loss, and vicarious stressors in this domain (Rose & Rudolph, 2006; Rudolph, 2002). These gender differences in interpersonal stressors have been hypothesised to account for gender disparities in psychological symptoms. Specifically, the higher prevalence of depression and anxiety in adolescent females is proposed to relate to their greater exposure to interpersonal stressors, the importance of these relationships, and increased sensitivity and reactivity to disruption in these domains (Rudolph, 2002).

Research findings have supported this hypothesis. Females report greater concerns about the status of relationships and peer evaluation (Rose & Rudolph, 2006), report significant stress in response to minor disagreements (Rudolph, 2002), and perceive more stressors in interpersonal domains compared to males (Hampel & Petermann, 2006), such as disagreements with parents, peer rejection, and relationships with the opposite sex (Hampel & Petermann, 2006; Siddique & D'Arcy, 1984). These trends are also unique to adolescent females, with greater reports of dependent parent-child stress and conflict (i.e., stressors to which they contribute), and independent (i.e., stress which occurs outside the control of the individual) and dependent peer stressors, compared to preadolescent females and males, and adolescent males. In contrast, adolescent males report the greatest dependent non-interpersonal stressors (Rudolph & Hammen, 1999). Females also display a greater reactivity to interpersonal domains, reflecting their importance (Rudolph, 2002; Rudolph & Hammen, 1999), with internalising problems such as depression and anxiety associated with interpersonal stress in females (Rose & Rudolph, 2006; Rudolph, 2002; Rudolph & Hammen, 1999). In contrast, externalising issues have been associated with both interpersonal and non-interpersonal stress in males (Kupermine, Blatt, & Leadbeater, 1997; Rose & Rudolph, 2006).
Although interpersonal relationships are particularly important to females, they are also relevant for males. Research highlights that difficulties in this domain relate to friendship issues in females, but verbal/physical victimisation or competition in males (Rose & Rudolph, 2006). The peer group is central in adolescence, with rejection described as a universal stressor (Bakker et al., 2010) associated with physiological stress indicators such as cortisol changes and increased blood pressure (Ford & Collins, 2010; Stroud et al., 2000), and subjective reports of anger, sadness, and hurt (Buckley, Winkel, & Leary, 2004). In fact, while relationship loss is associated with internalising and externalising symptoms in females, including increased food consumption in young adult females (Stroud et al., 2000), peer victimisation is associated with equivalent symptom reports across both genders (Bakker et al., 2010). The consequences of peer stressors differ markedly by gender, with concerns about relationship loss linked to dissatisfaction with the self in females, but efforts to demonstrate superior social skills and adjustment in males (Kupermine, Blatt, & Leadbeater, 1997). These findings highlight the different meaning of interpersonal relationships to females and males, and thus the importance of taking this into account when considering their implications for mental health.

Section Summary and Conclusions

Interpersonal relationships are of significant psychological importance during adolescence and young adulthood, including being associated with body dissatisfaction and stress. Sociocultural research highlights the role of the family and peers in body dissatisfaction during adolescence. Specifically, comments in the family, and teasing, peer pressures, and social comparison in the peer group have been highlighted in body dissatisfaction. Research in stress similarly highlights the importance of these social networks, particularly for females, with interpersonal concerns implicated in
psychological symptoms during this time. The salience of interpersonal relationships in both body dissatisfaction and stress provides insight for an investigation into their link. First, it suggests that stressors in this domain could display a unique relationship with body dissatisfaction, as opposed to a more general pathway. Second, the unique gender pathways between interpersonal and body image concerns could act as an extension of interpersonal theories used to account for the greater symptoms of anxiety and depression in females. Specifically, interpersonal stressors could explain the greater prevalence of body dissatisfaction and eating disorders in females during adolescence and young adulthood. Rudolph (2002) alluded to this possibility, with interpersonal stressors leading to reductions in self-worth, and body change strategies adopted to regain social approval. This suggests the possibility of gender specificity in the link between stress and body dissatisfaction (McMahon et al., 2003). Third, although non-interpersonal stressors are particularly relevant to mental health in adolescent males, interpersonal networks remain important and influential. This raises the possibility that stressors in these domains relate to body dissatisfaction in both genders, providing insight into the mechanism through which these relationships influence body dissatisfaction.

**Psychological Correlates and the Stress-Body Dissatisfaction Link**

Psychological adjustment is also a key developmental competency during adolescence with implications for young adulthood. Research reveals a number of shared psychological correlates between body dissatisfaction and stress, which are also evident in the tripartite influence model and transdiagnostic model of eating disorders. Low self-esteem and depressive symptoms have been consistently associated with both stress and body dissatisfaction, while a third variable, body image importance, is
relevant given theoretical and empirical support for its role in body dissatisfaction. This section provides an overview of self-esteem, depression, and body importance during adolescence, and then discusses their potential role further elucidating the body dissatisfaction-stress link.

**Self-Esteem, Body Dissatisfaction, and Stress**

Self-esteem is a central psychological construct in health and well-being, particularly in adolescence (Polce-Lynch, Myers, Kliwer, & Kilmartin, 2001). Some have conceptualised it as a global and stable assessment of self-worth (Rosenberg, 1965) which can be based on one’s perception of approval or disapproval from others (Zimmerman, Copeland, Shope, & Dielman, 1997). Others have conceived of it as a dimensional assessment of one’s competency in various life domains, with appearance important in this regard in adolescence (Harter, 1999, 2006) and young adulthood (Grogan, 2011). In addition, self-esteem can be measured as either a trait or state variable (Biro, Striegel-Moore, Franko, Padgett, & Bean, 2006).

Research indicates that most adolescents report consistently high global self-esteem, but that those with low self-esteem demonstrate declines in this construct over time (Zimmerman et al., 1997). Further, females have consistently been observed to report lower self-esteem compared to males (Kostanski & Gullone, 1998; Moksnes et al., 2010; Polce-Lynch et al., 2001; Zimmerman et al., 1997). This an important trend as high self-esteem is linked to academic and occupational success, psychological adjustment, effective coping skills, and stronger self-concept (Biro et al., 2006; Kupermine et al., 1997; Zimmerman et al., 1997), while low self-esteem is associated with depression (Biro et al., 2006; Marcotte et al., 2002; Southall & Roberts, 2002), substance abuse, antisocial behaviour (Biro et al., 2006), poor body image, and stress.
Global self-esteem has been consistently associated with both body image and stress in adolescence. It has been implicated in the development and maintenance of body dissatisfaction, particularly for females (Allgood-Merten, Lewinsohn, & Hops, 1990; Biro et al., 2006), and is considered to enhance a young females’ vulnerability to pressures around the body, which predicts body dissatisfaction over one year (Paxton, Eisenberg, et al., 2006). However, this relationship has also been shown to be significant in its reverse (Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006). Additional studies have supported the association between self-esteem, body dissatisfaction, and efforts to lose weight (Ricciardelli & McCabe, 2001b). These findings highlight the centrality of the body in self-evaluations for females. In fact, research has suggested that efforts to change the body reflect attempts to gain external validation for the self following poor self-evaluation (Vartanian, 2009). In contrast, self-worth in males has been linked to concrete achievements and skills (Siegel et al., 1999). Self-esteem has also been shown to moderate the impact of media pressures on strategies to increase muscularity in males, with this association only apparent for those reporting low self-esteem (Ricciardelli & McCabe, 2001b). Interestingly, the influences of environmental pressures on body dissatisfaction have been shown to occur independently of self-esteem in females (Ricciardelli & McCabe, 2001b).

Research in stress reflects these trends, particularly in adolescent females (Marcotte et al., 2002). Self-esteem has been especially linked to stressors in peer and romantic relationships, and school performance, during adolescence (Moksnes et al., 2010). Furthermore, adolescents experiencing more social stressors, and who perceive these events negatively, have been shown to report low self-esteem (Youngs Jr et al., 1990). The moderating influence of self-esteem is also evident in stress research. For
example, major depression is precipitated by a combination of high levels of stress and low self-esteem (Miller, Kreitman, Ingham, & Sashidharan, 1989). It has also been theorised that the inability to cope with external events, or events outside an individual’s control, leads to feelings of inadequacy and low self-worth (Youngs Jr et al., 1990).

Self-esteem is an important psychological construct during adolescence. Females tend to report lower levels compared to males, and it has been closely associated with body dissatisfaction and stress. Research in self-esteem provides insight into its potential role in the relationship between stress and body dissatisfaction. Specifically, Youngs et al. (1990) suggest that stressors that are uncontrollable or associated with poor coping precipitate low self-esteem. Vartanian (2009) suggests that body change efforts reflect attempts to improve self-esteem by seeking validation from others. Therefore, it is possible that the relationship between stress and body dissatisfaction is mediated by self-esteem, with the inability to cope with stress translating to unsatisfactory assessments of the self, and hence body change behaviours as a means of improving self-worth. Furthermore, the salience of female gender and interpersonal relationships in self-esteem provide further support for their roles in this relationship.

**Depression, Body Dissatisfaction, and Stress**

Depression is a psychological disorder of considerable significance in adolescence. It is characterised by symptoms including low mood and absence of pleasure, as well as psychological and physical markers such as poor concentration, fatigue, irritability, changes in appetite or sleep, feelings of helplessness and hopelessness, guilt, and suicidality (American Psychiatric Association [APA], 2000). During adolescence, the incidence of depression increases six-fold (Hankin, 2006) and
is associated with significant morbidity, mortality, and vulnerability to relapse during adulthood (Lewinsohn et al., 1999). The increase in depressive symptoms in adolescence emerges at age 13 years for both females and males (Hankin & Abramson, 2001). However, prevalence rates show a bias towards females during adolescence and adulthood, with rates twice as great as males (Hankin, 2006; Kostanski & Gullone, 1998; Lewinsohn et al., 1994; Lewinsohn, Rohde, Seeley, Klein, & Gotlib, 2000; Moksnes et al., 2010). Depression has also been linked to self-esteem (Kostanski & Gullone, 1998), with feelings of worthlessness featuring in the DSM-IV-TR diagnostic criteria for depression (APA, 2000). Both stress and body dissatisfaction have been associated with depression during adolescence and young adulthood.

Depression and body dissatisfaction display bidirectional links in females and males. Negative affect is a recognised predictor of body dissatisfaction in adolescent males (Presnell et al., 2004) and females (Stice & Whitenton, 2002), and is associated with increased attendance to negative information about the self (Bearman et al., 2006). Further, it has been shown to enhance the influence of environmental pressures relating to the body in males (Paxton, Neumark-Sztainer, et al., 2006) and females (Sinton & Birch, 2006), linked to strategies to lose weight and increase muscularity in both genders, and increases in perceived sociocultural pressures around the body (Ricciardelli & McCabe, 2001b). Induction of low mood has also been shown to create disturbances in body size perception and dissatisfaction (Taylor & Cooper, 1992), and body dissatisfaction is linked to depression in young adults (Lewinsohn et al., 2002). However, a number of studies suggest that body dissatisfaction precedes depressed mood and is responsible for gender differences in major depression (Hankin & Abramson, 2001; Hyde, Mezulis, & Abramson, 2008; Siegel et al., 1999). It is argued that the perceived failure to achieve body ideals fosters negative emotions, and eating disorder pathology represents an effort to regulate these (L. Sim & Zeman, 2006).
Furthermore, longitudinal studies have shown that body dissatisfaction predicts depressive symptoms in early adolescent females (Paxton, Neumark-Sztainer, et al., 2006; Rierdan & Koff, 1997) and mid-adolescent males (Paxton, Neumark-Sztainer, et al., 2006), while Stice and colleagues (2000) report that body dissatisfaction predicts depressive disorder in adolescent females over four years. Other studies have not shown a link between depression and body dissatisfaction (Kostanski & Gullone, 1998). However, the latter study utilised a stepwise regression in which predictors were entered in order of variance explained. Given that the study included self-esteem and anxiety, which are also closely associated with depression, it is perhaps not surprising that no additional significant contribution by depression was identified.

The association between stress and depression has received consistent support in adult and adolescent samples (Kessler, 1997; Lewinsohn et al., 1994). The risk of depressive disorder has been linked to initial symptoms of stress (Hankin & Abramson, 2001), and stress is believed to account for as much variance in depression as genetic influences. Both exposure to stress and stress-generation have been implicated in depression (Cole, Nolen-Hoeksema, Girgus, & Paul, 2006). Major stressors have been identified in the onset of depression in adolescence (Burton, Stice, & Seeley, 2004; Lewinsohn et al., 1999), with hassles in parent and peer relationships highlighted as unique predictors (Deardorff, Gonzales, & Sandler, 2003; H. Sim, 2000), as well as deficits in peer support (Burton, Stice, & Seeley, 2004). Gender differences in depression have been linked to the coincidence of pubertal development and stress at the beginning of high school (Ge, Conger, & Elder Jr, 2001), and depression has been associated with higher levels of total and episodic stress in interpersonal domains for adolescent females, and with greater chronic stress in academic domains and close friendships for males (Shih, Eberhart, Hammen, & Brennan, 2006). Interestingly, while recent stressors are linked to depressive symptoms in adolescence, it has been
suggested that rates in females and males are equivalent when body dissatisfaction and self-esteem are controlled (Allgood-Merten et al., 1990). However, gender differences have also been found to relate to stress generation, highlighting the role of depression in increasing the likelihood an individual will be exposed to stressors in the environment (Shih & Eberhart, 2008; Waaktaar, Borge, Fundingsrud, Christie, & Torgersen, 2004; Wingate & Joiner Jr, 2004), particularly interpersonal domains. For example, females diagnosed with depression have been observed to generate significant stress in their social networks through reassurance-seeking, social skill deficits, and dependency (Hankin, 2006).

Body dissatisfaction and stress both display bidirectional associations with depression. Further, Marcotte et al. (2002) reported a link between body dissatisfaction, self-esteem, negative life events, and depressive symptoms in adolescent females. This supports an investigation of depressive symptoms in research exploring the relationship between body dissatisfaction and stress, in both females and males. Stress has been consistently shown to predict depressive disorder (Hankin & Abramson, 2001) and negative affect predicts body dissatisfaction (Presnell et al., 2004; Stice & Whitenton, 2002). Thus, examination of depressive symptoms as a potential mediator of the stress-body dissatisfaction link is deemed appropriate. Furthermore, the salience of self-esteem, female gender, and interpersonal relationships reiterates their potential roles in this relationship.

**Body Importance and Body Image**

Body importance is a psychological construct and dimension of body image receiving increasing attention in body dissatisfaction and eating disorders. It forms part of the construct body image investment, which comprises body importance, as well as the meaning and influence of appearance on an individual’s life (Cash, Melnyk, &
Hrabosky, 2004; Melnyk, Cash, & Janda, 2004). The need to consider the importance of the body to an individual has been particularly emphasised as a means of understanding its influence on self-evaluations (Rieder & Ruderman, 2001). Body importance has been conceptualised as an indirect but stable measure of the internalisation of body ideals (Fairburn et al., 2003; Tiggemann, 2004), which provides a more accurate assessment of the impact of body dissatisfaction on quality of life, distress, adjustment, and behaviours to change the body (Cash, 2002a, 2002b; McCabe & Ricciardelli, 2003b; Muris et al., 2005). Studies suggest it decreases with age, making it particularly relevant to adolescence and young adulthood (Tiggemann, 2004), and that females report a greater investment and place a greater importance (Banfield & McCabe, 2002) on physical appearance compared to males (McCabe & Ricciardelli, 2001b; Muth & Cash, 1997).

The inclusion of body importance in body dissatisfaction research is consistent with, and provides an extension of, the tripartite influence model (Thompson et al., 1999) and transdiagnostic model of eating disorders (Fairburn, Cooper, & Shafran, 2003) which both view variables aligned with body importance, namely internalisation of body ideals and the overvaluation of weight and shape, as key mechanisms in body dissatisfaction and eating disorders. As a result, intervention programs have emphasised the need to lower the importance placed on appearance to prevent the onset and maintenance of body dissatisfaction and eating disorder symptoms (Banfield & McCabe, 2002; Dohnt & Tiggemann, 2006; Lawrence, Fauerbach, & Thombs, 2006; McVey & Davis, 2002; McVey et al., 2004; McVey et al., 2007). While this offers some indirect support for its role in both body dissatisfaction and other eating disorder pathology, there have been surprisingly few empirical efforts to understand the construct (Banfield & McCabe, 2002; Rieder & Ruderman, 2001).
Limited research suggests a close, but distinct, relationship between body importance and evaluation (i.e., body dissatisfaction) dimensions (Giovannelli, Cash, Henson, & Engle, 2008; Rieder & Ruderman, 2001; Tiggemann, 2004). Studies in adolescents reveal a bidirectional relationship between body importance and body dissatisfaction (McCabe & Ricciardelli, 2003b), and suggest that body importance determines the impact of perceived self-ideal discrepancies (Banfield & McCabe, 2002). Adolescents who rate weight as important have also been shown to report lower global self-esteem and appearance and weight satisfaction (Mendelson, Mendelson, & Andrews, 2000). Body importance and body dissatisfaction have been particularly associated with self-esteem and dysphoric mood respectively (Rieder & Ruderman, 2001). Males who endorse the importance of physical strength and athletic abilities have been observed to report a higher drive for muscularity (Smolak & Stein, 2006), and a focus on body shape and appearance have been linked to more frequent grooming and dieting behaviours (Banfield & McCabe, 2002). It has been shown to predict body image affect in combination with body dissatisfaction, leading to suggestions that investment in appearance fosters dysfunctional attitudes and evaluations of the body, and subsequent dysphoric body experiences (Muth & Cash, 1997). Not surprisingly, body importance has been shown to predict body change strategies to lose weight and increase muscularity in adolescent females and males (McCabe & Ricciardelli, 2001b, 2003b; Muris et al., 2005), lending support to a model in which importance predicts dissatisfaction, with subsequent affective changes in the experience of the body experience and efforts or intentions to change it as a result. Studies in adults reveal similar trends; body weight contingent self-worth has been shown to mediate the link between internalisation of ideals, body dissatisfaction, and dieting (Vartanian, 2009); purging has been shown to be predicted by high body importance and body dissatisfaction (Rieder & Ruderman, 2001); and the importance of physical appearance
has been shown to moderate the relationship between burn scar severity and body esteem (Lawrence et al., 2006). These findings highlight the influence of the importance of the body on evaluations of physical appearance, its implications in both adolescents and adults, and the need to consider it in research assessing body dissatisfaction.

Body importance has received little empirical attention, but is a key consideration in terms of its possible impact on body dissatisfaction. Therefore, it offers insight for an investigation of the link between stress and body dissatisfaction, suggesting that stress may relate to body dissatisfaction only in those to whom the body is important for self-evaluations. Moreover, stress may predict an increase in body importance which leads to body dissatisfaction. Therefore, body importance can be seen as a potential mediator of the stress-body dissatisfaction link, and can assist in the design of more effective prevention and intervention programs as a result. Furthermore, the limited research in this area offers additional support for the salience of self-esteem, depressive symptoms, gender and interpersonal relationships in the association between stress and body dissatisfaction.

Section Summary and Conclusions

This section highlighted three psychological constructs of relevance to an investigation into the link between body dissatisfaction and stress in adolescence and young adulthood. A number of conclusions can be made from these findings. First, stress and body dissatisfaction share links with self-esteem and depressive symptoms, while body image importance is a new variable of empirical and theoretical relevance to body dissatisfaction. Second, the stress-body dissatisfaction link could be explained by self-esteem, depressive symptoms and/or body image importance as mediating variables accounting for their relationship, and therefore provide insight for the design of
prevention and intervention programs. Third, consistent gender differences are evident in all three areas, highlighting the potential for the relationship to be particularly relevant to females, or to broaden current limitations in understandings of males. Fourth, interpersonal relationships are also salient in each of these domains, and could be hypothesised to interact with the importance of the body in an individual’s self-view, providing further support for its potential role as a specific stressor relating to body dissatisfaction.

The Current Research Program

The current research program investigates the relationship between body image and stress. It aims to explore the nature and direction of the relationship between stress and body dissatisfaction, as well as body change strategies, in adolescent and young adult females and males, and to understand its implications for theoretical accounts and prevention programs in body image and eating disorders. It uses the general stressor-psychopathology theory as a framework for a series of studies which draw from theoretical accounts of eating disorders (namely, the tripartite influence model and transdiagnostic model of eating disorders) and empirical research to test the direct relationship between stress and body dissatisfaction. Based on past research, specifically replicating and extending the Murray et al. (2011) study, the program will investigate the general and specific relationship between stress and body dissatisfaction (and body change strategies), and the role of moderating and mediating variables as outlined in Chapter 2. The following research questions are addressed in the research program:
1. What is the nature and direction of the relationship between stress and body dissatisfaction in adolescence and young adulthood? Is there a differential role for stressor subdomains, specifically interpersonal domains?

2. What moderating variables influence the relationship, specifically gender?

3. What psychological variables account for the relationship between stress and body dissatisfaction, in particular self-esteem, depressive symptoms, and body importance?

4. How does stress relate to another dimension of body image, specifically body change strategies?

A detailed depiction of the model explored in the current research program is presented in Figure 2.3.

Figure 2.3. Theoretical model of the stress-body dissatisfaction link

Structure of the Empirical Studies

The current research program conducts three studies, each conceptualising stress as a predictor variable in body image (i.e., body dissatisfaction and body change strategies) based on identification of stress in previous studies as a predictor of psychopathology (Grant et al., 2004). However, use of multiple methodologies, including prospective and experimental designs, allows for the direction of the relationship, whether causative, consequential or correlational, to be tested (Compas et
The studies in the research program also aim to address key limitations in both body image and stress research. In relation to body image, it addresses the historical bias towards females (Muth & Cash, 1997; Smolak, 2004), limited focus on one evaluative dimension (Thompson, 2004), and need for consideration of multivariate models in prospective and experimental designs (Stice, 2002). With regards to stress research, it addresses the limited use of standardised and validated subjective assessments, use of physiological measures in addition to subjective reports, and use of multiple methodologies to assess theory-driven models (Grant et al., 2003; Grant et al., 2004). A description of the three studies performed in the current research program is below:

1. Study 1 aims to replicate and extend the study conducted by Murray et al. (2011) through a cross-sectional survey examining the role of stressor subdomains (particularly interpersonal relationships) alongside the psychological constructs of self-esteem, depressive symptoms, and body importance in body dissatisfaction and body change strategies in adolescent females and males. The effect of gender, age, and body mass index in these models are also examined to understand the relevance of additional moderator variables in these models. The results in body dissatisfaction and body change strategies are presented in Chapters 3 (Study 1a) and 4 (Study 1b) respectively.

2. Study 2 tests the direction of the relationship between stress and body dissatisfaction using a longitudinal design based on one-year follow-up data from adolescent participants in Study 1. It examines the general stress-body dissatisfaction link and tests mediation models elucidating the nature of the relationship and the role of additional explanatory variables based on findings in Study 1. These results are presented in Chapter 5.
3. Study 3 provides a causative analysis of the relationship between stress and body dissatisfaction using an experimental design in young adult females and males. It explores the effect of interpersonal stress on general and weight-specific body dissatisfaction, and the role of gender and body contingent self-worth in this relationship. These results are presented in Chapter 6.
Chapter 3

Study 1a: The Relationship Between Stress and Body Satisfaction in Adolescent Females and Males

Adolescence is a unique period of development involving transitions in social, cognitive, emotional, academic, psychological, and physical domains (Compas et al., 1995; Heaven, 1996; Offer & Schonert-Reichl, 1992). The onset of many mental disorders has been pinpointed to adolescence, with estimates of prevalence rates in Australian youth at 14% under the age of 18 years, and approximately 1 in 4 each year globally (Patel et al., 2007). Two key concerns receiving significant empirical attention during adolescence are body image and stress. However, little consideration has been given to the interface between these two constructs.

Body dissatisfaction constitutes part of the broader construct of body image disturbance. Body image entails a complex depiction of the physical self that is multidimensional in nature (Smolak, 2004), involving cognitive, affective, perceptual, and behavioural dimensions (Cash, 2002b; Pruzinsky & Cash, 2002; Wertheim et al., 2009). More than 16 definitions of the body image construct have been described (Pruzinsky & Cash, 2002), with evaluative body image - namely, attitudes towards or satisfaction with the body (Muth & Cash, 1997; Smolak, 2004) - one of the most commonly researched aspects of the body image construct (Giovannelli et al., 2008).

During adolescence, body dissatisfaction has been described as ‘normative’ (Dohnt & Tiggemann, 2006; Levine & Smolak, 2002; Neumark-Sztainer, 2005; Smolak, 2004). Research indicates that 50 to 80% of adolescent females in developed countries would like to be thinner (Levine & Smolak, 2002), and 46% of females and 26% of males report feeling dissatisfied with their bodies (Neumark-Sztainer, 2005). The nature of this discontent is strongly associated with gender, with females generally
reporting a preference to be thinner, and males reporting a desire to lose weight and/or increase muscularity (Cohane & Pope Jr., 2001; Kostanski & Gullone, 1998; Levine & Smolak, 2002; McCabe & Ricciardelli, 2004; Muth & Cash, 1997; Ricciardelli et al., 2009). In addition, with research only now beginning to understand the complexity of male body image concerns and utilising assessment tools valid for the male population, it is suggested that rates of dissatisfaction may in fact be equivalent between the genders (McCabe & Ricciardelli, 2004).

Findings indicating pervasive body dissatisfaction among adolescents are of grave concern given the role of body image in identity development and psychological adjustment in adolescence (Levine & Smolak, 2002; Neumark-Sztainer, 2005). Body image disturbance is also associated with unhealthy and sometimes extreme weight control behaviours (e.g., skipping meals, fasting, vomiting, and laxative abuse) (Littleton & Ollendick, 2003; Neumark-Sztainer, 2005; Ricciardelli & McCabe, 2001b), steroid use (Nowak, 1998; Ricciardelli & McCabe, 2001b; Smolak, 2004), poor self-esteem and depression (Allgood-Merten et al., 1990; Paxton, Eisenberg, et al., 2006; Paxton, Neumark-Sztainer, et al., 2006; Smolak & Stein, 2006; Stice et al., 2000). Furthermore, a review by Stice (2002) concluded that body dissatisfaction is one of the strongest and most consistent predictors of eating disorder pathology (Stice, 2002; Stice & Shaw, 2002).

Substantial efforts have been made to identify risk and protective factors for body dissatisfaction in adolescence, primarily highlighting the role of sociocultural factors (particularly the family, peers, and media) in transmitting cultural ideals and objectifying the body, and the role of individual/demographic factors (such as psychological status, body mass index, age, and gender) in body discontent (Levine & Smolak, 2002). One model has attempted to account for the sociocultural factors in body dissatisfaction and eating disorder pathology: the tripartite influence model.
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(Thompson et al., 1999). This hypothesises that body dissatisfaction is predicted by influences from peers, parents, and the media, with this relationship mediated by appearance comparison processes and internalisation of cultural standards around appearance, a construct reflecting the importance of the body in an individual’s life (Cash, 2002b; McCabe & Ricciardelli, 2003b; Muris et al., 2005). The tripartite model is believed to account for eating disorder symptoms and key aspects of psychological maladjustment (i.e., self-esteem and depression), and has received support in adolescent females and young adult females and males (Keery et al., 2004; Shroff & Thompson, 2006; Tylka, 2011; van den Berg et al., 2002). A second theory, the transdiagnostic theory of eating disorders, also highlights body importance as the core psychopathology of these illnesses (specifically, the overvaluation of weight and shape), and highlights a role for life stress in interpersonal domains, low self-esteem, and mood difficulties as maintaining factors in these disorders (Fairburn et al., 2003). Such theoretical accounts of body dissatisfaction and eating disorders are important in the context of prevention programs. However, there remains a need for a greater understanding of body dissatisfaction and its predictors, especially in males, in order to expand theoretical models and enhance the efficacy of prevention programs (Stice, 2002).

One construct worth considering in terms of yielding a more comprehensive understanding of the predictors and/or consequences of body dissatisfaction, and improving prevention programs, is psychological stress. It has been proposed that the quantity and intensity of transitions during adolescence generate significant stress for a young person (Hampel & Petermann, 2006; Youngs Jr et al., 1990). A review of research indicates that adolescent stress is, in turn, a significant factor in the increase of psychological problems during this developmental period (Grant et al., 2004), including depression and anxiety (Grant et al., 2003; McLaughlin & Hatzenbuehler, 2009; Turner & Lloyd, 2004), poor self-esteem (Youngs Jr et al., 1990), health risk behaviours such
as smoking (Byrne & Mazanov, 1999, 2001, 2003; Croghan et al., 2006), and poor physical health (Torsheim & Wold, 2001). Gender is also an important moderating variable in adolescent stress, with females consistently reporting higher levels of stress compared to males (Grant et al., 2006; Hampel & Petermann, 2006; Moksnes et al., 2010; Wagner & Compas, 1990). However, research also suggests differences in the relevance of stressor subdomains in adolescent females and males, with interpersonal stressors highlighted in females and non-interpersonal (or self-relevant) stressors in males (Rudolph, 2002; Rudolph & Hammen, 1999).

Research investigating the association between stress and body dissatisfaction (and related variables such as eating concerns) has been limited. Smolak and colleagues (1993) tested a cumulative stressor model of body dissatisfaction and eating disturbance, and found that synchrony in the stressors of puberty, dating onset, and increased academic demands predicted dieting and body dissatisfaction one year later (Smolak et al., 1993). Levine and colleagues (1994) similarly found a stronger effect on dieting when stressors were synchronous, as opposed to sequential or singular events (Levine et al., 1994). Research has also identified a strong relationship between body dissatisfaction, self-esteem, depression, and stress (Johnson & Wardle, 2005), and correlational studies have identified a link between stress and body dissatisfaction (Marcotte et al., 2002), stress and dieting (Rosen, Tacy, & Howell, 1990), and interpersonal stressors and dietary restraint in undergraduates both cross-sectionally (Cain et al., 2008) and over time (Cain et al., 2010).

These studies provide cross-sectional and longitudinal support for a relationship between general and specific stress and body dissatisfaction, but they are limited in their reliance on female samples. In light of the limited attention to male body image (Muth & Cash, 1997; Smolak, 2004), investigation of a stress-body dissatisfaction link across genders is needed. One previous study explored this association in male and female
adolescents and found a strong relationship between stress and body satisfaction in both genders (K. M. Murray et al., 2011). In addition, a differential link between subdomains of stress and body dissatisfaction was observed by gender: stressors in the peer environment and compulsory school attendance related negatively to body satisfaction for both females and males, whereas stressors relating to future uncertainty and romantic relationships displayed negative and positive associations with body satisfaction respectively for males only.

Despite limited investigations of stress and body dissatisfaction, training in coping with stress effectively has been incorporated into universal prevention programs for eating disorders (McVey & Davis, 2002; McVey, Davis, Tweed, & Shaw, 2004; McVey, Tweed, & Blackmore, 2007; O’Dea & Abraham, 2000). These programs have reported improvements in body satisfaction, self-esteem, dieting, and the importance of the body in self-evaluation among females and males, but long-term improvements were only reported in one study (O’Dea & Abraham, 2000) and in females deemed to be at high risk in another (McVey et al., 2007). Gaining a better understanding of the relationship between stress and body dissatisfaction could lead to improvements in the long-term efficacy of these programs.

The present study aims to replicate and extend previous research by testing the general and specific relationship between adolescent stress and body dissatisfaction alongside established psychological (i.e., self-esteem, depressive symptoms, body importance) and demographic (i.e., gender, age, body mass index [BMI]) risk factors outlined in theoretical accounts of body image and eating disorders. The current study tests the following hypotheses pertinent to the research program:

1. Stress will display a strong association with body dissatisfaction.
2. Gender will be an important moderator in the model, with females reporting significantly greater body dissatisfaction compared to males.
3. In line with the tripartite influence model and transdiagnostic theory, stressors in the interpersonal domain (i.e. in the family, peers or romantic relationships) could represent a subdomain of stress specifically relevant to body dissatisfaction.

4. Self-esteem, depressive symptoms and body importance will be correlated with body dissatisfaction.

Age and BMI are also included as possible moderating variables based on inconsistent findings in past research pertaining to age (Levine & Smolak, 2002) and the stronger link reported between body dissatisfaction and certain weight categories (e.g., overweight adolescents) (McCabe & Ricciardelli, 2003b; McCabe et al., 2005; Paxton, Eisenberg, et al., 2006). In summary, the current study sought to investigate the nature of the relationship between adolescent stress and body satisfaction; the role of self-esteem, depressive symptoms, body importance, body mass index, gender, and age in this model; and the differential role of stressor domains.

Method

Participants

The present study surveyed 515 adolescents in Grades 7-10 in three non-government coeducational high schools (one Independent, two Catholic) in Canberra, Australia. The sample included 256 females and 259 males with a mean age of 14.40 years ($SD = 1.18$) for females and 14.60 years ($SD = 1.21$) for males. The grade level breakdown was $n = 169$ (Grade 7), 97 (Grade 8), 129 (Grade 9), 117 (Grade 10), and 3 unknown. There was a mean age for Grade 7 of 13.15 ($SD = 0.36$), for Grade 8 of 14.14 ($SD = 0.36$), for Grade 9 of 15.09 ($SD = 0.32$), and for Grade 10 of 16.13 ($SD = 0.37$), with ages ranging from 12 to 16 years. Power analyses revealed that a minimum
sample size of \( N = 320 \) was necessary to detect at least a medium effect size in a model including all independent variables tested in the study. Permission to conduct the study was obtained from the Australian National University Human Research Ethics Committee (protocol number 2009/390) and the Catholic Education Office (See Appendix A respectively).

**Measures**

All participants in the study had their height and weight measured by the researcher to calculate Body Mass Index (BMI = \( \text{kg/m}^2 \)). Participants reported their gender, age (in years and months), and grade level (Grade 7, 8, 9 or 10) in addition to completing the following self-report measures (see Appendix B):

**Adolescent stress.** Adolescent stress was measured by the Adolescent Stress Questionnaire (ASQ) (Byrne, Davenport, & Mazanov, 2007), a 58-item measure assessing exposure and appraisal of stressors in a wide range of domains relevant to the adolescent period. Items correspond to 10 subscales with responses in reference to the preceding year provided on a 5-point Likert scale ranging from ‘not at all stressful or irrelevant to me’ (1) to ‘very stressful’ (5). The original version of the ASQ displays concurrent criterion validity, demonstrated by significant correlations with anxiety, depression, and self-esteem measures (Byrne et al., 2007). One-week test-retest correlation coefficients for each subscale have been shown to range between \( r = 0.68 \) and 0.88, with seven subscales exceeding \( r = 0.80 \) (Byrne et al., 2007). With the permission of the author of the ASQ, two items from the scale were excluded from the current analyses, resulting in a total score range of 56 to 280 (as opposed to 58 to 290) for the measure. These two items, “satisfaction with how you look” and “changes in physical appearance with growing up”, were removed as they were deemed confounds given the DV tested (i.e., body satisfaction). A correlation of \( r = .999 \) (\( p < .01 \)) was
identified between the original and amended versions of the ASQ, and of $r = 0.96 (p < 0.01)$ between the original (7-item) and amended (5-item) Peer Pressure subscale which also included these items. Cronbach’s $\alpha$ in the present study was found to be 0.96 for the total sample (0.97 for females, 0.96 for males). All subscales exceeded $\alpha = 0.7$ except the Adult Responsibility subscale for the total, female, and male samples. However, these exceeded the criterion suggested as acceptable for the purpose of research (Gregory, 1992; Nunnally, 1978). The Cronbach alphas for each ASQ subscale in the present study are shown in Table 3.1.

Table 3.1

*Cronbach’s $\alpha$ Scores for ASQ Subscales*

<table>
<thead>
<tr>
<th>Adolescent Stress Questionnaire Subscale</th>
<th>Total</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Life (e.g., Living at home)</td>
<td>.89</td>
<td>.90</td>
<td>.88</td>
</tr>
<tr>
<td>School Performance (e.g., Keeping up with schoolwork)</td>
<td>.86</td>
<td>.88</td>
<td>.83</td>
</tr>
<tr>
<td>School Attendance (e.g., Going to school)</td>
<td>.77</td>
<td>.77</td>
<td>.77</td>
</tr>
<tr>
<td>Romantic Relationships (e.g., Getting along with your boy/girlfriend)</td>
<td>.83</td>
<td>.83</td>
<td>.82</td>
</tr>
<tr>
<td>Peer Pressure (e.g., Pressure to fit in with peers)</td>
<td>.85</td>
<td>.85</td>
<td>.85</td>
</tr>
<tr>
<td>Teacher Interaction (e.g., Not being listened to by teachers)</td>
<td>.85</td>
<td>.84</td>
<td>.86</td>
</tr>
<tr>
<td>Future Uncertainty (e.g., Concern about your future)</td>
<td>.78</td>
<td>.78</td>
<td>.77</td>
</tr>
<tr>
<td>School/Leisure Conflict (e.g., Having too much homework)</td>
<td>.84</td>
<td>.82</td>
<td>.86</td>
</tr>
<tr>
<td>Financial Pressure (e.g., Pressure to make more money)</td>
<td>.79</td>
<td>.82</td>
<td>.75</td>
</tr>
<tr>
<td>Adult Responsibility (e.g., Employers expecting too much from you)</td>
<td>.66</td>
<td>.64</td>
<td>.68</td>
</tr>
</tbody>
</table>

**Body satisfaction.** Body satisfaction was measured using the Body Image subscale from the Self-Image Questionnaire for Young Adolescents (SIQYA) (Petersen et al., 1984). This subscale measures satisfaction with the body and is suitable for females and males (Smolak, 2004). It consists of 11 items (e.g., ‘I am not satisfied with
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my weight’), but the current study modified one item with the permission of the author to account for gender differences in body dissatisfaction. Specifically, the item ‘I am not satisfied with my weight’ was included twice with adjustments made to specify ‘because I am too light’ and ‘because I am too heavy’ respectively. As a result, in the current study the scale included 12 items which were completed by all participants. Respondents use a 6-point Likert scale ranging from ‘describes me very well’ (1) to ‘does not describe me at all’ (6), with total scores between 12 and 72 indicating low to high body satisfaction. The original scale displays internal consistencies of $\alpha = .81$ and .77 for males and females respectively (Petersen et al., 1984), and $\alpha = .85$ (Polee-Lynch et al., 2001). In the present study, the modified version displayed Cronbach’s alphas of .82, .82, and .80 for the total, female, and male samples respectively.

**Body importance.** Body importance was assessed using three questions from the Body Image and Body Change Inventory (Ricciardelli & McCabe, 2002). These items assess the importance of weight, body shape, and the size and strength of muscles compared to other aspects of one’s life. Seven items focusing on the importance of body areas (e.g., hips, thighs, shoulders, and arms) were not used since an examination of body parts was not deemed pertinent in the present analysis. Each item is responded to using a 5-point Likert scale ranging from 1 (‘extremely important’) to 5 (‘not important at all’), with high scores indicating lower body importance. The three item scale displayed acceptable internal consistency in the present study, with Cronbach’s alphas of .75, .74, and .85 for the total, female, and male samples respectively.

**Depressive symptoms.** Depressive symptoms were measured by the Feelings Scale II, a 15-item scale assessing depressive symptomatology (Byrne et al., 2007). The instrument was developed with reference to the symptoms of depression defined by the *Diagnostic and Statistical Manual – Fourth Edition Text Revision* (APA, 2000) and existing self-report questionnaires (e.g., the Zung Self Rating Depression Scale).
Respondents indicate the extent they have experienced depressive attributes in the past week (e.g., ‘I have felt sad or unhappy’) on a 5-point Likert scale from ‘never’ (0) to ‘always’ (4). The final score is the sum of all responses from 0 to 60, with higher scores indicating greater depressive symptoms. The scale has a high internal consistency in adolescents (Cronbach’s $\alpha = .91$) (Byrne et al., 2007). Respective convergent and discriminant validity has been demonstrated through significant correlations with an anxiety measure ($r = .67$) and the Rosenberg Self-Esteem Scale ($r = -.63$) (Byrne et al., 2007). In the present study, Cronbach’s $\alpha$ was .91 for the total sample, and .92 and .89 for females and males respectively.

**Self-esteem.** Global self-esteem was measured using the Rosenberg Self-Esteem Scale (RSE) (Rosenberg, 1965). This is an established measure of global self-esteem, with individuals responding to items such as ‘On the whole I am satisfied with myself’ on a 4-point Likert scale from ‘strongly disagree’ (0) to ‘strongly agree’ (3). Scores range from 0 to 30 with higher scores denoting higher self-esteem. The measure displays strong internal consistency ($\alpha = .88$) in adolescents (Gray-Little, Williams, & Hancock, 1997; Polce-Lynch et al., 2001), and has test-retest reliability ranging between $\alpha = .88$ and .90 over four years (Robins, Hendin, & Trzesnieski, 2001), and of .82 over one week (Fleming & Courtney, 1984). The RSE demonstrates construct validity with the Single-Item Self-Esteem Scale (Robins et al., 2001) and the Self-Rating Scale (Fleming & Courtney, 1984). Cronbach’s $\alpha$ in the current study was .89 for the total sample, .91 for the females, and .83 for the males.

**Procedure**

A passive consent procedure was approved and employed in all three schools which was deemed appropriate given the low risk nature of the research. Accordingly, unless a parent/guardian actively withdrew their child from participating in the current
study, students were allowed to take part if they provided their own consent. Participants were recruited according to the availability of classes whose teachers nominated to participate on days of data collection in each school. Parental information and consent forms were distributed to students in these classes two days prior to data collection. Data was collected in whole class groups with teacher supervision. Students whose parents had not withdrawn them from the study prior to data collection were given a brief verbal introduction describing the areas of enquiry and the voluntary and anonymous nature of the study (including measurement of height and weight). Students provided written consent before they could take part.

Height and weight were measured in private by the researcher during survey completion. Measurements were taken without shoes and with pockets emptied and heavy clothing (e.g., coats) removed. Students were blind weighed and asked to attend to an optical illusion placed on the wall in front of them to ensure they did not see their weight. The survey took one class period (approximately 50 minutes) with up to two class groups taking part at one time. At the conclusion of data collection, students were verbally debriefed, and a debrief sheet describing the aims of the study and contacts for students encountering difficulties was distributed (see Appendix C for student and parent consent forms and information sheet).

**Statistical Analysis**

All statistical analyses were conducted using SPSS 20.00. Exploration of the nature of the relationship between stress and body satisfaction involved constructing regression models as follows: (1) assessment of the linear relationship between all categorical and continuous independent variables and body satisfaction, (2) significant linear predictors were entered in a multiple ‘main effects’ model, (3) significant main effects entered into a ‘final model’ with two-way interactions to test for moderation
effects. Different domains of stress were entered in (2) to explore their differential link with body satisfaction. All categorical variables were dummy coded at levels of 0 and 1. An α-level of \( p < .05 \) was set to determine statistical significance.

**Results**

Data were examined in accordance with recommendations to ensure their suitability for statistical analysis (Tabachnick & Fidell, 2007). Eight cases possessing more than 5% missing data and three with inconsistent responses were removed. No variable contained more than 5% missing data. Mean substitution for missing data was used for each continuous variable with the exception of the ASQ which was imputed with 1 (indicating no stress or irrelevant to the individual). Significant positive skewness was identified on BMI and the Adult Responsibility subscale of the ASQ. Transformations were not deemed appropriate because BMI is an objectively measured scale in the current study and tests of transformations revealed significant kurtosis values, leading to a decision to retain raw data for analysis. Ten cases with multivariate outliers (nine male, one female) were identified and removed. The final sample comprised \( N = 496 \), with the number of female and male participants in each grade shown in Table 3.2.
Table 3.2

*Number of Female and Male Participants in Per Grade for the Final Sample*

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>496</td>
<td>251</td>
<td>245</td>
</tr>
<tr>
<td>Grade 7</td>
<td>161</td>
<td>85</td>
<td>76</td>
</tr>
<tr>
<td>Grade 8</td>
<td>95</td>
<td>52</td>
<td>43</td>
</tr>
<tr>
<td>Grade 9</td>
<td>124</td>
<td>60</td>
<td>64</td>
</tr>
<tr>
<td>Grade 10</td>
<td>113</td>
<td>53</td>
<td>60</td>
</tr>
<tr>
<td>Missing grade</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Bivariate correlations were examined to determine suitability for regression analyses (see Table 3.3). Results display significant relationships supporting the inclusion of all variables in regression analyses. Importantly, stress displayed significant correlations at $p < .01$ for the total, female, and male samples in relation to body satisfaction.
Table 3.3

**Correlation Matrix for Continuous Variables**

<table>
<thead>
<tr>
<th>Sample</th>
<th>BMI</th>
<th>Dep</th>
<th>SE</th>
<th>Stress</th>
<th>BS</th>
<th>Blmp</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
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<tr>
<td>Females</td>
<td>-</td>
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</tr>
<tr>
<td>Males</td>
<td>-</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Dep</td>
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<tr>
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<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
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<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Males</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>SE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>-.10*</td>
<td>-.67**</td>
<td>-</td>
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<td></td>
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<tr>
<td>Females</td>
<td>-.10</td>
<td>-.74**</td>
<td>-</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Males</td>
<td>-.11</td>
<td>-.52**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>.10*</td>
<td>.61**</td>
<td>-.49**</td>
<td>-</td>
<td></td>
<td></td>
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<tr>
<td>Females</td>
<td>.10</td>
<td>.66**</td>
<td>-.56**</td>
<td>-</td>
<td></td>
<td></td>
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<tr>
<td>Males</td>
<td>.10</td>
<td>.49**</td>
<td>-.34**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>-.15**</td>
<td>-.60**</td>
<td>.69**</td>
<td>-.49**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Females</td>
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<td>-.61**</td>
<td>.71**</td>
<td>-.53**</td>
<td>-</td>
<td></td>
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<td>-.51**</td>
<td>.61**</td>
<td>-.36**</td>
<td>-</td>
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</tr>
<tr>
<td>Blmp</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>.40**</td>
<td>-.41**</td>
<td>.49**</td>
<td>-</td>
</tr>
<tr>
<td>Females</td>
<td>-.23**</td>
<td>-.41**</td>
<td>.46**</td>
<td>-.42**</td>
<td>.53**</td>
<td>-</td>
</tr>
<tr>
<td>Males</td>
<td>-.12**</td>
<td>-.30**</td>
<td>.34**</td>
<td>-.43**</td>
<td>.45**</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* Dep: Depressive Symptoms, SE: Self-Esteem, BS: Body Satisfaction, Blmp: Body Importance.

** denotes significant at $p < .01$, * denotes significant at $p < .05$

Models of the dependent variable (DV) Body Satisfaction were undertaken using standard multiple regression, with stress, self-esteem, depressive symptoms, body importance, gender, age and BMI included as independent variables (IVs) to assess their relevance in the model hypothesised in the current research program. Consistent with research displaying a linear association between BMI and body satisfaction for females, but a parabolic function for males indicating dissatisfaction at both low and high BMIs (Ricciardelli et al., 2009), the relationship between BMI and Body Satisfaction (whether
linear or quadratic) was tested for each gender prior to performing regression analyses using curve estimation in which Body Satisfaction acted as the DV and BMI as the IV. Results indicated no relationship for males [Linear $R^2 = .008$, $F(1, 241) = 1.97$; Quadratic $R^2 = .013$, $F(2, 240) = 1.62$] but both the linear and quadratic functions were significant at $p < .01$ for females [Linear $R^2 = .038$, $F(1, 248) = 9.87$; Quadratic $R^2 = .040$, $F(2, 247) = 5.07$]. Based on these findings, a second BMI variable (‘BMISquared’), was constructed by centering and squaring the BMI variable to account for the significant curvilinear function in addition to the linear function in females in subsequent regression analyses. The model $R^2$ (and 95% confidence intervals), $F$ values, $\beta$ and $t$ values of these regression models are displayed in Table 3.4.
Table 3.4

Regression Analyses for Body Satisfaction

<table>
<thead>
<tr>
<th>IV</th>
<th>$R^2$</th>
<th>95% CI $R^2$</th>
<th>$F$ (df1, df2)</th>
<th>$\beta$</th>
<th>$t$</th>
</tr>
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<tr>
<td>Linear regressions</td>
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<tr>
<td>Stress</td>
<td>.235</td>
<td>.174</td>
<td>.296</td>
<td>152.03 (1, 494)***</td>
<td>-.49</td>
</tr>
<tr>
<td>Dep</td>
<td>.353</td>
<td>.289</td>
<td>.412</td>
<td>270.08 (1, 494)***</td>
<td>-.60</td>
</tr>
<tr>
<td>SE</td>
<td>.478</td>
<td>.419</td>
<td>.530</td>
<td>452.91 (1, 494)***</td>
<td>.69</td>
</tr>
<tr>
<td>BMI</td>
<td>.022</td>
<td>.004</td>
<td>.053</td>
<td>10.84 (1, 491)~</td>
<td>-.15</td>
</tr>
<tr>
<td>Blimp</td>
<td>.236</td>
<td>.174</td>
<td>.296</td>
<td>151.69 (1, 492)***</td>
<td>.49</td>
</tr>
<tr>
<td>BMI-Squared</td>
<td>.018</td>
<td>.002</td>
<td>.047</td>
<td>8.86 (1, 491)**</td>
<td>-.13</td>
</tr>
<tr>
<td>Gender</td>
<td>.080</td>
<td>.040</td>
<td>.129</td>
<td>43.02 (1, 494)***</td>
<td>.28</td>
</tr>
<tr>
<td>Age</td>
<td>0</td>
<td>0</td>
<td>.012</td>
<td>.23 (1, 486)</td>
<td>-.02</td>
</tr>
<tr>
<td>Main effect model</td>
<td>.598</td>
<td>.533</td>
<td>.633</td>
<td>44.13 (16, 474)***</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td>.11</td>
<td>3.53***</td>
</tr>
<tr>
<td>BMI</td>
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<td>-.66</td>
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<tr>
<td>BMI-Squared</td>
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<tr>
<td>SE</td>
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<td></td>
<td></td>
<td>.43</td>
<td>10.24***</td>
</tr>
<tr>
<td>Blimp</td>
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<td></td>
<td>.19</td>
<td>5.55***</td>
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<tr>
<td>HL</td>
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<td>-.44</td>
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<tr>
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<td>-.42</td>
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<td></td>
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<td>.04</td>
<td>1.13</td>
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<tr>
<td>PP</td>
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</tr>
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<td>1.90</td>
</tr>
<tr>
<td>FP</td>
<td></td>
<td></td>
<td></td>
<td>-.10</td>
<td>-2.17*</td>
</tr>
<tr>
<td>AR</td>
<td></td>
<td></td>
<td></td>
<td>.05</td>
<td>1.10</td>
</tr>
<tr>
<td>Final model</td>
<td>.582</td>
<td>.520</td>
<td>.618</td>
<td>61.02 (11, 482)***</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td>.11</td>
<td>3.61***</td>
</tr>
<tr>
<td>Dep</td>
<td></td>
<td></td>
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<td>-.08</td>
<td>-1.35</td>
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<tr>
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<td>7.42***</td>
</tr>
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<td>Blimp</td>
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<td>-.08</td>
<td>-1.66</td>
</tr>
<tr>
<td>G×Dep</td>
<td></td>
<td></td>
<td></td>
<td>-.05</td>
<td>-.90</td>
</tr>
<tr>
<td>G×SE</td>
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<td>.00</td>
<td>.05</td>
</tr>
<tr>
<td>G×Blimp</td>
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<td>-.71</td>
</tr>
<tr>
<td>G×PP</td>
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<td>G×FP</td>
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<td>.05</td>
<td>1.15</td>
</tr>
</tbody>
</table>

Table 3.4 reveals significant linear relationships at $p < .001$ for Stress (explaining 23.5% of variance in Body Satisfaction), Depressive Symptoms (35.3% of the variance), Self-Esteem (47.8%), Body Importance (23.6%), BMI (2.2%), BMI-Squared (1.8%), and Gender (8%). Age did not display a significant linear relationship with Body Satisfaction. Investigation of the combination of significant main effects revealed a significant model at $p < .001$, explaining 59.8% of the variance in Body Satisfaction. However, only Peer Pressure Stress, Self-Esteem, Body Importance, Gender ($p < .001$), Depressive Symptoms ($p = .001$), and Financial Pressure Stress ($p < .05$) contributed significantly. A final model including all significant main effects from the preceding model was then tested, including two-way interactions to test the moderating effect of gender. Interaction terms were constructed by centering variables and then multiplying the dummy coded gender variable by each main effect to reduce multicollinearity (Tabachnick & Fidell, 2007).

The final model was significant at $p < .001$, explaining 58.2% of the variance in Body Satisfaction, but only the Self-Esteem, Body Importance, Gender ($p < .001$), and Peer Pressure Stress ($p < .05$) main effects contributed significantly. This model was deemed the most appropriate for the sample because it tested significant main effects and the moderating effect of gender on other psychological variables in the model. This final model indicates that body dissatisfaction is associated with significantly greater reported stressors in the peer environment, lower self-esteem, higher body importance, and female gender. The gender main effect was interpreted by performing a one-way
between subjects ANOVA in which Gender was entered as a fixed factor and Body Satisfaction as the DV. Results revealed that females reported significantly greater body dissatisfaction compared to males, explaining 80% of the variance, \( F(1,494) = 43.02, p < .001, 95\% \text{ CI} [47.61,50.06], [53.42, 55.90] \). No gender differences in the relevance of individual psychological predictors were apparent given the non-significant interaction effects in the model.

**Discussion**

The present study investigated the relationship between stress and body satisfaction in male and female adolescents, and examined the role of self-esteem, depressive symptoms, body importance, BMI, gender, and age in these models. Results revealed support for hypotheses one and three, and partial support for two and four. Specifically, a strong relationship between stress and body dissatisfaction was supported, and this was pinpointed to the interpersonal domain of the peer group. While gender demonstrated a significant main effect in the model, it did not moderate the relevance of additional constructs in the model. Furthermore, self-esteem and body importance contributed to the final model for the sample, but depressive symptoms did not.

**Models Predicting Body Satisfaction**

The final model of body satisfaction was significant, with 95% confidence intervals suggesting it explained 52% to 61.8% of the variance in the construct. Significant main effects in the model revealed that body dissatisfaction is associated with significantly greater reported stressors in the peer environment, lower self-esteem, a higher importance placed on the body, and female gender. While financial pressure
stress contributed to the main effects model, it did not reach significance in the final model. Furthermore, while the gender main effect in the final model was significant, two-way interactions testing for gender moderation effects were not significant. This suggests that while females report greater body dissatisfaction compared to males, the remaining psychological constructs in the model relate similarly to body satisfaction for both females and males in the sample. The role of self-esteem (Ricciardelli & McCabe, 2001; Allgood-Merten, Lewinsohn, & Hops, 1990; Paxton, Eisenberg, et al., 2006) and female gender (Levine & Smolak, 2002; Muth & Cash, 1997) in body dissatisfaction is consistent with past studies, but the current study contributes uniquely to previous research by specifying the peer domain of stress and role of body importance as well, which are discussed below.

The current findings are unique in specifying the stress domain most relevant in the prediction of body dissatisfaction in adolescents, namely, peer pressure stress (i.e., pressure to fit in with peers, feeling judged by peers, being hassled by peers for not fitting in or about appearance, and peer conflict). In contrast, family-related stressors and romantic relationship stressors did not demonstrate significant links with body dissatisfaction. The importance of peer stress for body dissatisfaction is in accordance with findings in adolescent females testing the tripartite influence model which indicated parents were a less important influence during this time (Shroff & Thompson, 2006). These results are consistent with the salience of peers in body image concerns through, for example, weight and appearance teasing (D. C. Jones & Crawford, 2006; Levine & Smolak, 2002; Menzel et al., 2010; Paxton, Eisenberg, et al., 2006; Ricciardelli & McCabe, 2001a); peer pressures concerning the body (Hutchinson & Rapee, 2007; Paxton et al., 1999), appearance-contingent acceptance (Gerner & Wilson, 2005), 'fat talk' (Ata et al., 2007; Levine & Smolak, 2002), and social comparison (Ata et al., 2007; D. C. Jones, 2004; D. C. Jones & Crawford, 2006; Lemon et al., 2009;
Myers & Crowther, 2009; Stormer & Thompson, 1996). However, the lack of gender moderating effects in the final model indicates that peer stress was significantly related to body dissatisfaction in this study for both females and males. This is consistent with research highlighting the importance of peers for all adolescents (Bakker et al., 2010; Rose & Rudolph, 2006; Wagner & Compas, 1990), but does not align completely with previous findings in stress research displaying differences in the relevance of interpersonal and non-interpersonal domains to females and males respectively (Rudolph & Hammen, 1999).

It is interesting to note that the function and structure of peer networks differ substantially for females and males during adolescence (Rose & Rudolph, 2006). Specifically, female friendships reflect close and intimate ties of significant psychological value in self-worth and adjustment, while for males friendships tend to be less intimate and more concerned with expressions of social standing and dominance. While the current findings support the importance of peer relationships for body satisfaction in both females and males during adolescence (Paxton, Eisenberg, et al., 2006; Presnell et al., 2004), it is possible that the underlying processes for each gender differ. Difficulties in peer relationships have been associated with friendship issues in females, but verbal/physical victimisation or competition in males (Rose & Rudolph, 2006). This suggests the possibility that the meaning of peer stress could differ between the genders, for example, an inability to maintain harmonious relationships in females or a lack of social standing in males. While the results suggest that interpersonal processes, specifically through the peer network, are salient in body satisfaction, future research should consider whether this reflects convergent or divergent underlying mechanisms by gender.

The current findings also highlight the need to consider body importance in research examining body dissatisfaction. Research regarding this important construct
has been limited (Banfield & McCabe, 2002). However, close associations between the constructs of body dissatisfaction and body importance have been reported, indicating that an individual’s attitudes towards their body are closely associated with the centrality of physical appearance to their self-worth (Giovannelli et al., 2008; Rieder & Ruderman, 2001; Tiggemann, 2006). Therefore, additional research is needed to further understand this association and its implications for treatment. The current findings are consistent with the mediating mechanism highlighted in the tripartite influence model (Thompson et al., 1999), and also the core psychopathology outlined in the transdiagnostic model of eating disorders (Fairburn et al., 2003), and suggest that an individual’s investment in the body is important for eating disorder psychopathology and body dissatisfaction. The results also raise the possibility that the concurrence of body importance and body dissatisfaction plays a role in increasing an individual’s vulnerability for the onset of eating disorder pathology, and reinforces the need to also reduce the salience of the body for self-evaluation in interventions targeting body dissatisfaction in order to further reduce the risk of eating disorder pathology (Banfield & McCabe, 2002; Lawrence et al., 2006; McVey et al., 2002). An additional finding of interest is the relevance of body importance for body satisfaction in both females and males. This furthers understandings of male-specific body image and could elucidate shared pathways of risk despite diverse outcomes in females and males, that is, efforts to lose weight versus increase muscularity respectively (McCabe & Ricciardelli, 2004; Smolak, 2004).

**Theoretical and Clinical Implications**

The current findings hold implications for theoretical models of eating disorders and prevention research. First, they suggest that stress could be considered in the tripartite influence model (Thompson et al., 1999). Prospective and experimental
studies are needed to further elucidate the role of stress in this model (Stice, 2002), for example, it may act as a precipitating variable in addition to sociocultural factors, or it may represent an additional outcome of psychological dysfunction alongside self-esteem and depression. The results are also consistent with the impact of life stress in interpersonal relationships on eating disorder symptomatology (such as body dissatisfaction) in the transdiagnostic theory of eating disorders (Fairburn et al., 2003). Therefore, the potential for peer stress to play a role in the development of eating disorders through its association with body dissatisfaction should be considered in future studies.

Second, the findings inform prevention research by supporting the inclusion of stress management training in universal programs alongside modules focusing on self-esteem and reducing the importance placed on the body (Levine & Smolak, 2006; McVey et al., 2002, 2007; O’Dea & Abraham, 2000). However, the current findings suggest that its implementation could be targeted to managing difficulties in the peer domain. Future studies need to examine (i) the direction of the stress-body dissatisfaction relationship to determine whether inclusion of stress management could be expected to attenuate body dissatisfaction, (ii) the mechanisms underlying the stress-body dissatisfaction link through path models (e.g., the potential mediating roles of self-esteem and body importance), (iii) the inclusion of additional factors (such as perfectionism and sociocultural factors) to more comprehensively predict body dissatisfaction, and (iv) the specific nature of interactions with peers which produce stress and relate to body dissatisfaction to understand how stress training could be targeted to the peer domain (e.g., should it relate to general difficulties in peer relationships or specific comments about appearance).

A number of non-significant findings are also of note in this study. The non-significance of depressive symptoms in the final model replicated the results obtained
by Murray et al. (2011). This is surprising given previous research highlighting an association between depression and body image (Allgood-Merten et al., 1990; Bearman et al., 2006; Paxton, Neumark-Sztainer, et al., 2006; Rierdan & Koff, 1997; Sinton & Birch, 2006; Stice et al., 2000; Taylor & Cooper, 1992). These findings suggest that stress relates to the way in which individuals evaluate their body, but that dysphoric mood does not, at least in comparison to peer pressure stress, self-esteem, body importance, and gender. It is possible that stress and depressive symptoms interact to account for body satisfaction over time, which is a possibility that this cross-sectional study was unable to detect given their close association (Deardorff et al., 2003; Ge et al., 2001; Grant et al., 2004; Hankin & Abramson, 2001; Lewinsohn et al., 1999; Lewinsohn et al., 1994). Additional research is required to investigate this possibility.

BMI was also not identified as a significant predictor of body satisfaction in the final model despite its identification as a risk factor for body dissatisfaction in previous studies (McCabe & Ricciardelli, 2003b; McCabe et al., 2005; Paxton, Eisenberg, et al., 2006) and the fact that the present study took account of both linear and curvilinear associations between BMI and body satisfaction (Ricciardelli et al., 2009). It is possible that the significant negative skew on BMI in this study limits the potential to explore this association fully, but it should be noted too that other studies have not supported an association between BMI and body satisfaction (Bearman et al., 2006; Kenardy et al., 2001; Presnell et al., 2004), in accordance with the notion that body dissatisfaction constitutes a normative discontent that pervades BMI categories.

The final body satisfaction model revealed no significant interaction effects between any of the predictor variables and body satisfaction. This is consistent with Bearman et al. (2006) who reported that while females are more dissatisfied with their bodies, the same explanatory constructs are present in body image for females and males. Finally, age was also found to be a non-significant predictor, which could reflect
the limited range included in the current sample. Furthermore, findings relating to age effects in body dissatisfaction have previously been described as inconsistent (Levine & Smolak, 2002).

Limitations and Future Directions

The current study has several limitations, the most notable being its cross-sectional design which precludes definitive interpretations regarding the direction of the relationship between stress and body satisfaction. Furthermore, while the study sought to expand the constructs used in the prediction of adolescent body satisfaction, measures directly assessing sociocultural influences on body image (such as teasing or perceived pressures) were not included which could further enhance the predictive power of the model. It would also be useful to investigate the role of stress in predicting actual eating and body change behaviours, as well as further dimensions of body image (such as perceptual disturbances in body image including body size overestimation) to elucidate shared or unique risk factors for body image constructs (Thompson, 2004).

Despite these limitations, the study possesses a number of strengths, specifically the large sample size, comparison of stressor subdomains alongside a broad range of other psychological variables, and an objective assessment of BMI.

Summary

The current study aimed to extend previous research examining the relationship between adolescent stress and body satisfaction. It provides insight into body image in adolescence, highlighting the role of a previously unexplored variable - stress (specifically peer stress) - as a risk factor in body dissatisfaction, and the role of self-esteem, gender, and body importance as additional predictors of body dissatisfaction. This new perspective can inform programs of intervention designed to improve body
satisfaction and prevent the later development of outcomes such as eating disorder pathology by tailoring stress management training to the peer environment.
Chapter 4

Study 1b: Stress and Body Change Strategies in Adolescence

Stress in adolescence is an important factor in mental health and adjustment (Grant et al., 2004). However, it has only recently been considered in relation to body satisfaction (K. M. Murray et al., 2011), despite the shared link of stress and body dissatisfaction with eating disorder pathology (Stice, 2002). The present study aims to elaborate on the findings of a relationship between stress and body dissatisfaction reported in Chapter 3, by considering the role of adolescent stress in the related but distinct construct of body change strategies, therefore offering insight into its role as a risk factor for a broader conceptualisation of body image disturbance.

Psychological stress has consistently been associated with poor physical and mental health outcomes (Thoits, 2010). In adolescence, it is linked to the cascade of changes that take place across all life domains, and the impact of novel and simultaneous changes on coping abilities (Simmons, 1987). To date, studies have highlighted a role for adolescent stress in depression and anxiety (Grant et al., 2003; McLaughlin & Hatzenbuehler, 2009; Turner & Lloyd, 2004), poor self-esteem (Youngs Jr et al., 1990), smoking (Byrne & Mazanov, 1999, 2001, 2003; Croghan et al., 2006), and poor general physical health (Torsheim & Wold, 2001).

Research has also demonstrated an association between adolescent stress and body satisfaction (Johnson & Wardle, 2005; Marcotte et al., 2002; K. M. Murray et al., 2011; Smolak et al., 1993), particularly in the peer domain for both females and males as identified in Chapter 3. The salience of peer stress is consistent with sociocultural research emphasising the influence of peers in attitudes towards the body (Levine & Smolak, 2002). Given the frequency of body discontent during adolescence (Dohnt & Tiggemann, 2006; Levine & Smolak, 2002; Neumark-Sztainer, 2005; Smolak, 2004),
these findings provide insight for programs designed to improve body satisfaction and prevent eating disorders, supporting the inclusion of stress management training (McVey & Davis, 2002; McVey et al., 2004; McVey et al., 2007; O'Dea & Abraham, 2000) but suggesting it could be tailored to address difficulties in the peer domain. Despite these possibilities, the body image construct itself is complex and multidimensional (Smolak, 2004). Many definitions exist (Pruzinsky & Cash, 2002), involving cognitive, affective, perceptual, and behavioural dimensions (Muth & Cash, 1997; Pruzinsky & Cash, 2002; Wertheim et al., 2009). However, research has typically focused on one evaluative dimension, body satisfaction. As a result, there is a limited understanding of the associations between different dimensions of body image and psychological variables such as stress, with recommendations to address this in research and gain a more comprehensive understanding of the body image construct, and how it relates to mental health, in females and males (Thompson, 2004).

Body change strategies have been defined as the frequency of thoughts, feelings, and behaviours aimed at altering the size and/or shape of an individual’s body (Ricciardelli & McCabe, 2002; Smolak, 2004). This construct is useful because it captures a unique dimension of body image applicable to both females and males as it assesses preferences to lose weight and/or increase body size and muscularity respectively (Cohane & Pope Jr., 2001; Kostanski & Gullone, 1998; Levine & Smolak, 2002; McCabe & Ricciardelli, 2004; Muth & Cash, 1997; Ricciardelli et al., 2009). The measurement of both ideals is especially important in males who utilise body change strategies to achieve ‘lean muscularity’ (Ricciardelli & McCabe, 2011).

Understanding the aetiology of body change strategies is important because they predict the adoption of extreme strategies over time (McCabe & Ricciardelli, 2003a). Furthermore, research highlights that engagement in these strategies is highly prevalent, and occurs in children as young as 12 years of age (McCabe & Ricciardelli, 2001b).
Approximately one half and one third of adolescent females and males respectively report using unhealthy weight control behaviours such as skipping meals, dietary restriction, fasting or smoking; and 12% and 5% respectively report extreme strategies such as vomiting or the use of laxatives and diet pills (Neumark-Sztainer, 2005). In addition, one week prevalence rates of disordered eating and steroid use have been reported in 7.4% and 0.5% of adolescent females respectively, and 3.1% and 2.3% of adolescent males respectively (Neumark-Sztainer et al., 1999). It is important to note that absent from these statistics is the potential risk of excessive exercise in those attempting to change their body. This is particularly relevant for males as exercise is the most commonly reported body modification strategy in this gender compared to females who more frequently alter their eating behaviours through dieting (McCabe & Ricciardelli, 2001a). Body change strategies have been associated with significant physical and psychological morbidity in adolescents (D. C. Jones, 2004; Neumark-Sztainer, 2005; Ricciardelli & McCabe, 2001a), while the long-term consequences of some strategies, particularly steroids and food supplements which have not yet been investigated in detail, are largely unknown (Smolak, 2004).

Research has typically focused on the role of sociocultural influences, such as peers and parents (McCabe & Ricciardelli, 2001b; Morrison, Kalin, & Morrison, 2004; Ricciardelli & McCabe, 2001a, 2001b), in body change strategies during adolescence. For example, body comparison and sociocultural pressures to lose weight and increase musculaity have been associated with body change strategies in females and males (Muris et al., 2005), and shown to persist over time for weight loss (McCabe & Ricciardelli, 2003a). Pressures from parents, the media, and friends pertaining to musculaity have also been reported for adolescent and adult males (Cafri et al., 2005; Stanford & McCabe, 2005; Tylka, 2011), with self-esteem and negative affect also implicated in these pathways (Cafri et al., 2005; McCabe & Ricciardelli, 2003b).
Preliminary research suggests that psychological stress could provide additional insight into the development of body change strategies in that stressful events have been found to be associated with unhealthy weight control behaviours. Specifically, the coincidence of menstruation and dating in the same year has been shown to predict body dissatisfaction and eating disturbance in adolescent females (Smolak et al., 1993). Furthermore, stress has been associated with extreme weight control behaviours and binge eating in young adult females and males (Loth et al., 2008), dieting in females (Rosen et al., 1990), and high interpersonal stressors with dieting proximally (Cain et al., 2008) and longitudinally (Cain et al., 2010) in young adult females.

Thus the current study aims to more thoroughly investigate the role of stress in body image by assessing its relationship with body change strategies to decrease body size and increase muscularity, assessing thoughts, feelings, and actions to change the body in these ways. While there are numerous forms of body modification (McCabe, Ricciardelli, & James, 2007), these two strategies were selected to capture gender differences in body ideals (McCabe & Ricciardelli, 2001b, 2003a, 2003b; Ricciardelli & McCabe, 2002; Ricciardelli et al., 2009). The study also seeks to investigate the association between both general stress and specific subdomains of stress, with the peer domain expected to display a differential association with body change strategies given results reported in Chapter 3 and past studies highlighting sociocultural influences in the peer group in body change. Three additional psychological variables - self-esteem, depressive symptoms, and body importance, defined as the salience of the body compared to other aspects of an individual’s life (Muth & Cash, 1997; Smolak, 2004) - will also be assessed for inclusion in models testing the association between adolescent stress and body change strategies. These variables were selected based on their established links with strategies to lose weight and increase muscularity in adolescent females and males in past research (Banfield & McCabe, 2002; Cafri et al., 2005;
McCabe & Ricciardelli, 2001b, 2003b; McCabe et al., 2005; Muris et al., 2005; Ricciardelli & McCabe, 2001b; Smolak & Stein, 2006; Stice et al., 2000), and given their hypothesised roles in body image models including the tripartite influence model (Thompson et al., 1999) and transdiagnostic theory of eating disorders (Fairburn et al., 2003). These variables are expected to correlate with body change strategies and therefore provide an indication of the role of stress in these aspects of body image compared to other established psychological constructs. Demographic variables, specifically gender and age, have also been included as potential moderating variables, while body mass index was tested as a potential main and moderating effect due to its link with body change strategies, particularly weight loss efforts in those who are overweight (McCabe & Ricciardelli, 2001b, 2003a, 2003b; McCabe et al., 2005; McCabe et al., 2009; Paxton, Neumark-Sztainer, et al., 2006; Presnell et al., 2004).

In summary, the current study replicates and extends previous research investigating the relationship between adolescent stress and body dissatisfaction by investigating the relationship between general and specific subdomains of adolescent stress and another dimension of body image, namely, body change strategies designed to decrease body size or increase muscularity. Given the association between stress and dieting in past studies, it is hypothesised that stress will display an association with body change strategies to decrease body size, but its possible link with muscularity is not clear. Furthermore, based on the salience of interpersonal influences on body dissatisfaction and body change, and the link between peer stress and body dissatisfaction reported in Chapter 3, interpersonal stressors are expected to be especially relevant for body change. The role of self-esteem, depressive symptoms, body importance, body mass index, gender, and age will also be considered in the models.
Method

Study 1b utilised the same sample and questionnaire tested in Study 1a (see Appendix B). For detailed information on participants, self-report measures (i.e. adolescent stress, depressive symptoms, body importance, BMI, gender, age), study procedure and statistical analyses including screening and cleaning, see Chapter 3. Only additional information relevant to the two dependent variables (DV s) not discussed in Chapter 3, that is body change strategies to decrease body size and body change strategies to increase muscularity, are provided below.

Measures

**Body change strategies.** Body change strategies formed the primary dependent variable for the current study, and were measured using two scales from the Body Image and Body Change Inventory developed by Ricciardelli and McCabe (2002). These each comprised six items assessing thoughts, feelings, and behaviours relating to body change strategies to decrease weight (such as ‘how often do you change your levels of exercise to decrease your body size’) and to increase muscularity (such as ‘how often do you worry about changing your eating to increase the size of your muscles’). Respondents indicate the frequency of each item using a 5-point Likert scale ranging from 1 (always) to 5 (never), with higher scores indicating fewer body change strategies. The scales demonstrate good internal consistency (α = .95 for females and α = .94 for boys on decreasing weight; α = .92 and α = .95 for females and males respectively on increasing muscularity). Construct, content, and concurrent validity have been demonstrated for adolescent females and males with appropriate measures (Ricciardelli & McCabe, 2002). The present study found that decrease body size
displayed Cronbach’s alphas of .94, .94, and .93 for the total, female, and male samples, while increase muscularity displayed Cronbach’s alphas of .92, .90 and .91 respectively.

**Results**

Prior to statistical analysis, data were examined in accordance with recommendations to ensure their suitability (Tabachnick & Fidell, 2007). See Chapter 3 for details for the sample. With regards to the two body change strategies, both were identified with negative skew, suggesting that the majority of the sample were not reporting high levels of body change strategies. However, transformations of these variables were not undertaken due to development of significant kurtosis in tests to consider this possibility. Furthermore, it is not expected that these outcome variables would demonstrate a normal distribution in the sample, and therefore the raw data was considered most appropriate for inclusion in analyses. For information on the final sample, see Table 3.2 (Chapter 3).

Bivariate correlations were examined to determine suitability for regression analyses (see Table 4.1). Results display significant relationships supporting the inclusion of all variables in regression analyses. Importantly, significant correlations are apparent between stress and the two dependent variables at $p < .01$ for the total, female, and male samples. One variable, BMI, failed to relate significantly to Increase Muscles.
Table 4.1

**Correlation Matrix for Continuous Variables**

<table>
<thead>
<tr>
<th></th>
<th>Sample</th>
<th>BMI</th>
<th>Dep</th>
<th>SE</th>
<th>Stress</th>
<th>DecBS</th>
<th>IncM</th>
<th>Blmp</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>Total</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dep</td>
<td>Total</td>
<td>.08</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>.12</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>.03</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>Total</td>
<td>-.10*</td>
<td>-.67**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>-.10</td>
<td>-.74**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>-.11</td>
<td>-.52**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress</td>
<td>Total</td>
<td>.10*</td>
<td>.61**</td>
<td>-.49**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>.10</td>
<td>.66**</td>
<td>-.56**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>.10</td>
<td>.49**</td>
<td>-.34**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DecBS</td>
<td>Total</td>
<td>-.42**</td>
<td>-.46**</td>
<td>.49**</td>
<td>-.43**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>-.47**</td>
<td>-.51**</td>
<td>.50**</td>
<td>-.46**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>-.38**</td>
<td>-.29**</td>
<td>.37**</td>
<td>-.30**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IncM</td>
<td>Total</td>
<td>-.05</td>
<td>-.12**</td>
<td>.11*</td>
<td>-.19**</td>
<td>.21**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>-.04</td>
<td>-.22**</td>
<td>.21**</td>
<td>-.21**</td>
<td>.28**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>-.08</td>
<td>-.28**</td>
<td>.29**</td>
<td>-.38**</td>
<td>.48**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>BlImp</td>
<td>Total</td>
<td>-.20**</td>
<td>-.36**</td>
<td>.40**</td>
<td>-.41**</td>
<td>.54**</td>
<td>.48**</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>-.23**</td>
<td>-.41**</td>
<td>.46**</td>
<td>-.42**</td>
<td>.59**</td>
<td>.44**</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>-.12**</td>
<td>-.30**</td>
<td>.34**</td>
<td>-.43**</td>
<td>.50**</td>
<td>.64**</td>
<td>-</td>
</tr>
</tbody>
</table>


** denotes significant at $p < .01$, * denotes significant at $p < .05$

Models of the dependent variable (DV) Decrease Body Size were undertaken using regression, with all categorical and continuous variables as independent variables (IVs). Results from the regression analyses including model $R^2$ (and 95% confidence intervals), $F$ values, $\beta$, and $t$ values are displayed in Table 5.2.
Table 4.2

Regression Analyses for Decrease Body Size

<table>
<thead>
<tr>
<th>Model</th>
<th>IV</th>
<th>R²</th>
<th>95% CI R²</th>
<th>F (df1, df2)</th>
<th>β</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear Regression</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Stress</td>
<td>.184</td>
<td>.127</td>
<td>.243</td>
<td>111.13 (1, 493)***</td>
<td>-.43</td>
<td>-10.54***</td>
</tr>
<tr>
<td>Dep</td>
<td>.215</td>
<td>.155</td>
<td>.275</td>
<td>134.75 (1, 493)***</td>
<td>-.46</td>
<td>-11.61***</td>
</tr>
<tr>
<td>SE</td>
<td>.240</td>
<td>.179</td>
<td>.302</td>
<td>156.30 (1, 493)***</td>
<td>.49</td>
<td>12.46***</td>
</tr>
<tr>
<td>BMI</td>
<td>.173</td>
<td>.117</td>
<td>.232</td>
<td>102.85 (1, 490)***</td>
<td>-.42</td>
<td>-10.14***</td>
</tr>
<tr>
<td>Blmp</td>
<td>.290</td>
<td>.226</td>
<td>.350</td>
<td>200.39 (1, 491)***</td>
<td>.54</td>
<td>14.16***</td>
</tr>
<tr>
<td>Gender</td>
<td>.081</td>
<td>.041</td>
<td>.13</td>
<td>43.47 (1, 493)***</td>
<td>.29</td>
<td>6.59***</td>
</tr>
<tr>
<td>Age</td>
<td>0</td>
<td>0</td>
<td>.006</td>
<td>.07 (1, 485)</td>
<td>-.01</td>
<td>-.26</td>
</tr>
<tr>
<td>Main effect model</td>
<td>.533</td>
<td>.461</td>
<td>.569</td>
<td>36.07 (15, 474)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>.18</td>
<td></td>
<td>5.37***</td>
<td></td>
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<tr>
<td>SEx</td>
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<td>2.42*</td>
<td></td>
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<tr>
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</table>
The linear regression models in Table 4.2 reveal a significant linear relationship (at $p < .001$) for Stress (explaining 18.4% of the variance in Decrease Body Size), Depressive Symptoms (21.5%), Self-esteem (24%), BMI (17.3%), Body Importance (29%), and Gender (8.1%) on Decrease Body Size. Age did not relate to Decrease Body Size. The combined main effects of the significant linear predictors were tested in the second model, shown to be significant at $p < .001$, and explaining 53.3% of the variance in Decrease Body Size. Only BMI, Self-esteem, Body Importance, Gender (all at $p < .001$), and Depressive Symptoms ($p = .001$) contributed significantly. The gender main effect was examined using a one-way between subjects ANOVA, in which Gender was entered as a fixed factor and Decrease Body Size as the DV. Females were shown to report significantly more strategies to lose weight compared to males, explaining 8.1% of the variance $F (1,493) = 43.47, p < .001$, 95% CI [21.69, 23.13], [25.13, 25.60] respectively.

A final model including significant main effects and testing for two-way interaction effects was then performed. Specifically, the moderating effect of gender on main effects in the model was included, as well as an interaction between Self-esteem and BMI to explore whether this psychological construct moderates the relation between an objective measure of the body and efforts to decrease body size. This final model was significant at $p < .001$, explaining 54.2% of the variance in Decrease Body
Size with significant unique contributions by Gender, Depressive Symptoms, Body
Importance, BMI (at $p < .001$), Self-esteem, and its interaction with BMI ($p < .05$).
These findings indicate that greater body change strategies to decrease body size were
significantly associated with being female, and having greater depressive symptoms,
placing a higher importance on the body, a higher BMI and lower self-esteem. In
addition, self-esteem moderated the effect of BMI, with participants possessing a higher
BMI reporting significantly more strategies to decrease body size if they had lower self­
esteeem compared to those with higher self-esteem. This interaction was interpreted by
plotting the regression model against the DV (Decrease Body Size) using the model
intercept and B coefficients multiplied by the self-esteem and BMI main effects and
their interaction term. This was performed at high and low levels of self-esteem and
BMI (calculated at one standard deviation above and below the mean) (Equation;
$\text{Decrease Body Size} = 25.886 + (0.156)\text{Self Esteem} + (-0.593)\text{BMI} + (0.029)\text{Self}
\text{Esteem} \times \text{BMI}$; yielding terms for low Self Esteem = 27.58, 22.54 and high Self Esteem
= 28.19, 25.23 for below and above the mean of BMI respectively, see Appendix D for
details on calculations). Trends are depicted in Figure 4.1 (note that higher scores on
the y axis reflect fewer change strategies).
Models of Increase Muscles were performed with the exclusion of BMI given its non-significant correlations in Table 4.1. Results of regression analyses including model $R^2$ (and 95% confidence intervals), $F$ values, $\beta$, and $t$ values are displayed in Table 4.3.
### Table 4.3

**Regression Analyses for Increase Muscles**

<table>
<thead>
<tr>
<th>Model</th>
<th>IV</th>
<th>$R^2$</th>
<th>95% CI $R^2$</th>
<th>$F$ (df1, df2)</th>
<th>$\beta$</th>
<th>$t$</th>
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<tr>
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<tr>
<td>Stress</td>
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<td>.071</td>
<td>17.59 (1, 493)***</td>
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<td>4.19***</td>
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<tr>
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<td>.001</td>
<td>.042</td>
<td>7.19 (1, 493)***</td>
<td>-.12</td>
<td>2.68**</td>
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<tr>
<td>SE</td>
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<td>.001</td>
<td>.039</td>
<td>6.25 (1, 493)*</td>
<td>.11</td>
<td>2.50*</td>
</tr>
<tr>
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<td>.29</td>
<td>146.32 (1, 491)***</td>
<td>.48</td>
<td>12.10***</td>
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<tr>
<td>Gender</td>
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<td>.106</td>
<td>.219</td>
<td>94.81 (1, 493)***</td>
<td>-.40</td>
<td>9.74***</td>
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<tr>
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<td>.029</td>
<td>3.46 (1, 485)</td>
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<td><strong>Main effect model</strong></td>
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<td>.475</td>
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<td>- .01</td>
<td>- .13</td>
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<tr>
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<td>+ .46</td>
<td>11.52***</td>
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<tr>
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<td>1.81</td>
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<td></td>
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<td>- .69</td>
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<td>-1.23</td>
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<td>.496</td>
<td>78.51 (5, 487)***</td>
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<tr>
<td>Gender</td>
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<td>-12.81***</td>
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<td>4.54***</td>
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<tr>
<td>GxTI</td>
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<td>- .03</td>
<td>- .51</td>
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</table>


*** denotes significant at $p < .001$, ** denotes significant at $p < .01$, * denotes significant at $p < .05$

Table 4.3 reveals a significant linear relationship for Stress (explaining 3.4% of the variance in Increase Muscles), Body Importance (22%), Gender (16.1%) (each at $p < .001$), Depressive Symptoms (1.4%) ($p < .01$), and Self-esteem (1.3%) ($p < .05$) with Increase Muscles. The combined model of these main effects was investigated, revealing a significant model at $p < .001$ which explained 43.4% of the variance in the Increase Muscles. However, significant individual contributions were observed for Gender, Body Importance (at $p < .001$), and the Teacher Interaction subdomain of stress ($p < .05$). The gender main effect was examined in the same way as before, with males shown to report more strategies to increase muscularity compared to females, explaining 16.1% of the variance $F (1,493) = 94.808, p < .001, 95\% \text{ CI} [22.63, 23.75], [26.53, 27.64]$ respectively.

A final model comprising the significant main effects and two-way gender interactions was performed. This was significant at $p < .001$, explaining 44.6% of the variance in Increase Muscles, but only Gender, Body Importance, and an interaction between the two contributed significantly (at $p < .001$). This suggests that fewer body change strategies to increase muscles are engaged in by females and those who place a low importance on the body, but that gender also moderates the influence of body importance with males reporting greater investment in increasing muscularity in general, but even more when the body is also important to them. The same method as for Decrease Body Size was used to investigate this interaction except that separate calculations were made for females and males at high and low levels of body importance (Equation: $\text{Increase Muscles} = 22.653 + (-4.186)\text{Gender} + (.533)\text{Body}$
Stress and Body Image

Importance + (.554)Gender×Body Importance; yielding terms for Females = 21.15, 24.16 and Males = 15.39, 21.54 for below and above the mean of body importance respectively, see Appendix D for details on calculations). Note that lower scores on the body importance measure equate to a higher importance placed on the body, thus scores below the mean of body importance actually indicate high levels of body importance, and those above the mean reflect a lower importance placed on the body. Trends are depicted in Figure 4.2 (note that high scores on the y axis reflect fewer strategies to change the body).

Figure 4.2: Gender × Body Importance interaction on Increase Muscles

Discussion

The present study investigated the relationship between both general and specific domains of adolescent stress and two dimensions of body change strategies (i.e., decreasing body size and increasing muscularity). It also examined the role of self-esteem, depressive symptoms, body importance, BMI, gender, and age in these models. In contrast with the hypotheses about these links, stress was not found to relate
to body change strategies. However, exploration of additional variables provided insight into shared and diverging factors in body change strategies to decrease body size and increase muscul arity in adolescents.

Bivariate correlations provided support for an investigation into the relationship between stress and body change behaviours in the present study. Specifically, a moderate negative correlation between stress and decrease body size was apparent for the total ($r = -.43$), female ($r = -.46$), and male ($r = -.30$) samples, and a small to moderate negative correlation as well for these groups on increase muscles ($r = -.19, -.21, -.38$ respectively). This suggests that greater reports of stress are associated with more frequent body change strategies to reduce body size and increase muscul arity. However, as indicated above, stress did not contribute to multiple models of the two DVs, with these models discussed in turn below.

**Models of Body Change Strategies to Decrease Body Size**

Concerning thoughts, feelings, and behaviours related to decreasing one’s body size, the final model 95% confidence intervals indicated that it explained 47.6% to 58.1% of the variance in reported efforts to Decrease Body Size. Unique contributions revealed that a greater investment in strategies to decrease weight was associated with female gender, greater depressive symptoms and body importance, a higher BMI, poorer self-esteem, and an interaction between self-esteem and BMI. These findings reflect previous research highlighting the association between a desire to lose weight and female gender (Ricciardelli et al., 2009), a higher BMI (McCabe & Ricciardelli, 2001b, 2003a, 2003b; McCabe et al., 2005; McCabe et al., 2009; Muris et al., 2005; Paxton, Eisenberg et al., 2006; Presnell et al., 2004), greater body importance (McCabe & Ricciardelli, 2001b, 2003b; McCabe et al., 2005), lower self-esteem, and greater depressive symptoms (Cafri et al., 2005; Ricciardelli & McCabe, 2001b).
No gender interactions were significant for the model, suggesting that while the gender main effect reveals that females report more body change strategies to decrease weight compared to males, the remaining variables in the model relate to decreasing body size for both females and males. Interestingly, self-esteem was found to significantly moderate the relationship between BMI and decrease body size. This suggests that individuals with a higher than average BMI report more strategies to decrease body size, but that high self-esteem attenuates this relationship compared to individuals who report lower self-esteem. No such difference was apparent for those reporting lower than average BMI in the sample. While this relationship has not previously been identified to our knowledge, it suggests that self-esteem may buffer against extreme attempts to lose weight among overweight adolescents, similar to the finding that self-esteem moderates the impact of sociocultural pressures on efforts to decrease body size for males (Ricciardelli & McCabe, 2001b).

Models of Body Change Strategies to Increase Muscularity

Concerning body change strategies to increase muscularity, the final model 95% confidence intervals suggested that between 38% and 49.6% of the variance in Increase Muscles was explained. Significant contributions within this model indicated that more frequent reported engagement in body change strategies to increase muscularity was associated with male gender, greater body importance, and an interaction between the two. These findings are consistent with previous research, particularly the preference of males to enhance their muscularity, and the role of body importance in this intent (McCabe & Ricciardelli, 2003b; Muris et al., 2005). The interaction effect confirms that the preference to increase muscularity is unique to males, especially if they value the body, with females engaging in more of these strategies if the body represents an important component of their life. It is surprising that the psychological constructs of
self-esteem and depressive symptoms did not relate to efforts to increase muscularity, suggesting a less complex psychological profile in the prediction of efforts to increase muscularity compared to those directed at decreasing body size. This is consistent with suggestions that body dissatisfaction in males is specifically characterised by internalisation and commitment to ideals around muscularity (D. C. Jones, 2004).

The Role of Stress in Body Change Strategies

While the primary aim of the study was to investigate the association between stress and the two dimensions of body change strategies, both final models revealed that adolescent stress, either general or specific subdomains, did not contribute to the prediction of reported attempts to decrease body size or increase muscularity after controlling for other psychological constructs. While stress displayed linear relationships with each dependent variable, the final models suggest that its contribution is accounted for, or outweighed, by other psychological constructs. These results are somewhat surprising, particularly given the previously identified role of stress in body dissatisfaction in Murray et al. (2011) and in Chapter 3. They suggest that while stress may be a consideration in theoretical accounts of body dissatisfaction, such as the first component of the tripartite influence model (Thompson et al., 1999), it is not a supported inclusion in models of body change strategies.

The lack of a significant relationship between general or specific stress and body change strategies is an interesting distinction, particularly given that body dissatisfaction and body change strategies are dimensions of the body image construct. A substantial amount of research has focused on the translation of attitudes into action (Ajzen & Madden, 1986). An important factor which has been highlighted in this process is an individual’s confidence in change behaviours. Specifically, individuals reporting low self-efficacy, that is those who do not believe they have the resources or
opportunity to undertake a behavior, are less likely to develop a strong intention to act even if they possess attitudes in favour of doing so (Ajzen & Madden, 1986). This process may explain why stress, which is associated with attitudes towards the body (i.e. body dissatisfaction), does not relate to body change strategies in this study, as these individuals may possess low levels of self-efficacy and fail to consider or act to improve their body dissatisfaction. Future research should consider examining the role of self-efficacy in models of various body image dimensions, and their link with additional psychological constructs such as stress, to elucidate this possibility further.

A finding worth noting is the presence of teacher interaction stress in the main effects model of body change strategies to increase muscularity. While not contributing to the final model, this raises the possibility of an association between stressors in relationships with an authority figure and the pursuit of muscularity. It is possible that body change strategies to increase muscularity represent a method of regaining masculinity or dominance in response to these stressors. This possibility warrants further investigation in future studies, including additional information on teacher gender, personality characteristics, subject taught, or whether they were a role model, particularly given findings highlighting parental influences on efforts to increase muscularity (McCreary, 2011; McCreary & Sasse, 2000). It is also possible that since teachers fall within the context of the school, this finding reflects non-interpersonal processes which tend to be stressors indicated in males compared with interpersonal influences (Rudolph, 2002; Rudolph & Hammen, 1999).

The Prediction of Body Change Strategies

The two models also revealed key differences in the relation of psychological constructs to each of the body change variables. In both models, the influences of body importance and gender were significant, consistent with previous findings (McCabe &
Ricciardelli, 2001b, 2003b; Muth & Cash, 1997; Smolak, 2004). Gender was not shown to moderate the psychological variables in the decrease body size model, but did moderate body importance in the increase muscularity model. This is consistent with previous research highlighting the relevance of weight loss to both genders, yet the preference to increase body size is more uniquely associated with male gender (Cohane & Pope Jr., 2001; Kostanski & Gullone, 1998; Levine & Smolak, 2002; McCabe & Ricciardelli, 2004; Muth & Cash, 1997; Ricciardelli et al., 2009).

Body importance is a noteworthy addition in both models given that it is hypothesised to constitute the core psychopathology of clinical eating disorders according to the transdiagnostic model (Fairburn et al., 2003) and act as a mediating mechanism in the tripartite influence model (Thompson et al., 1999), yet research in this domain has been limited (Banfield & McCabe, 2002). The role of body importance in body change strategies to decrease body size is not surprising given its relevance for symptoms characteristic of eating disorders such as anorexia nervosa or bulimia nervosa (Paxton & McLean, 2010). That body importance - a characteristic typically associated with eating disorders - is also relevant in predicting body change strategies to increase muscularity may provide further evidence of using comparable aetiological models for both eating disorders and muscle dysmorphia (S. Murray et al., in press). This is also supported by tests of the tripartite model in young adult males which yielded support for internalisation of body ideals as a mediator variable but not appearance comparison processes (Tylka, 2011).

Of the non-significant findings, BMI contributed only to body change strategies to decrease body size. This is consistent with research displaying a preference to lose weight if one is overweight (Muth & Cash, 1997; Ricciardelli et al., 2009; Smolak, 2004), but that males of any size display a preference to bulk up (Smolak & Stein, 2006). Age did not contribute to any model which is consistent with some previous
studies (McCabe & Ricciardelli, 2001a) but not others (McCabe & Ricciardelli, 2001b). However, it should be noted that endorsement of body change strategies in the sample was uncommon. Given the negative skew on the two body change measures, the absence of age differences could reflect restricted range in these variables.

Limitations and Future Directions

The current study possesses several limitations, including its cross-sectional analysis which prevents definitive statements as to the direction of the relationship between the constructs found to be significantly associated. Furthermore, the study relied on self-report; it is possible that alternative measures of stress, such as physiological indices, may have yielded significant associations with body change strategies. Despite these limitations, the study possesses a number of strengths, specifically the large sample size, consideration of gender-specific trends in body image by assessing two dimensions of body change strategies, and objective assessment of BMI.

Summary

The present findings highlight the importance of considering multiple dimensions of body image in research (Thompson, 2004), with different dimensions of body image differentially related to stress. Thus, while previous research in this program has demonstrated a significant association between stress and body dissatisfaction, this relationship was not evident in the body change strategies investigated in the present study, at least after controlling for other variables. This finding has potential implications for prevention programs, suggesting that those focusing on improving body satisfaction could benefit from the inclusion of stress.
management training, but those focusing on body change strategies should focus on other constructs such as body importance.
Chapter 5

Study 2: A Longitudinal Investigation of the Relationship Between Stress and Body Dissatisfaction in Adolescent Male and Females: The Mediating Role of Self-Esteem and Body Importance

Body dissatisfaction is associated with significant psychological morbidity across the lifespan (Paxton & McLean, 2010). In particular, it is recognised as the most consistent risk and maintenance factor in eating disorder pathology (Stice, 2002). Body dissatisfaction peaks during adolescence (Gowers & Shore, 2001; Littleton & Ollendick, 2003), while eating disorders similarly display their peak period of onset in the mid- to late teenage years (Hudson et al., 2007; Stice et al., 2009). This makes adolescence a particularly important period for preventing or attenuating the onset of eating disorders by further understanding its risk factors, including the aetiology of body dissatisfaction.

Despite a significant empirical effort to understand the onset and maintenance of disordered eating behaviours, Stice (2002) reports that established risk factors such as body dissatisfaction display only modest effect sizes. In a review of the research literature in this domain, it was recommended that new variables be examined in eating disorder research, and that the relationship between these and existing risk and maintenance factors be explored. Specifically, Stice (2002) highlighted the need to: (1) conduct research examining correlations between risk or maintenance factors in eating pathology; (2) demonstrate prospective links; and (3) examine the underlying mechanisms explaining these relationships.

Given the importance of body dissatisfaction in eating disorder pathology, research examining the relationship between this and other risk factors is worthwhile. One candidate for such an examination is psychological stress, defined as a transaction
between an individual and their environment in which events are appraised as exceeding available coping resources and posing a threat to well-being (Lazarus & Folkman, 1984). Stress is a construct consistently implicated in the onset of internalising and externalising symptoms in adolescence (Grant et al., 2004). Despite its prominence in research examining risk factors for psychological disorders in adolescence (Grant et al., 2003), the link between adolescent stress and body dissatisfaction has received very limited empirical attention. Yet suggestive of such a link are studies in adolescent and young adult females that have revealed associations between body dissatisfaction and stress, including significant correlations between low self-esteem, general stress, depression, and body dissatisfaction (Johnson & Wardle, 2005; Marcotte et al., 2002; K. M. Murray et al., 2011). The findings reported in Chapter 3 also support these previous studies, and suggest that the peer group is a particular stress domain relevant to body dissatisfaction in females and males. A moderating role for stress in the relationship between fat talk and body dissatisfaction has also been reported in young adult females, specifically those reporting low to moderate levels of general stress. The authors argued that this reflected ceiling effects in that those experiencing high levels of stress also reported high levels of body dissatisfaction and drive for thinness independent of fat talk frequency (Warren et al., 2012) – therefore lending support to a link between high levels of stress and body dissatisfaction.

While receiving limited attention in terms of its association with body dissatisfaction, stress has been examined more frequently in the related domain of eating disorder pathology. For example, cumulative stress has been shown to predict weight management efforts (Levine et al., 1994) and body dissatisfaction (Smolak et al., 1993) in early adolescent females over time; stressful life events have been positively associated with extreme weight control behaviours and binge eating in older adolescent and young adult males and females (Loth et al., 2008); stress, emotion-focused coping,
and low self-esteem have been associated with eating disordered attitudes in adolescent females (Fryer et al., 1997); and high interpersonal stressors have been implicated in dieting proximally (Cain et al., 2008) and over time (Cain et al., 2010). However, findings regarding the potential causal role of stress have been inconsistent. For example, one study over four months supported a correlation between stress and dieting in adolescent females but found that dieting predicted increases in stress over time (Rosen et al., 1990). In contrast, others argue that eating disorder pathology reflects attempts to cope with stress (Ball & Lee, 2002; Loth et al., 2008).

While these studies support an association between stress and body dissatisfaction, they highlight the lack of clarity regarding the direction of this relationship. Yet clarifying the direction of this relationship is important to understand the prevention, aetiology, and treatment of body dissatisfaction and eating disorders. Prospective studies provide further clarification in this regard given that they allow for inferences to be made regarding the temporal relationship between these two variables (Lazarus, 2000). Thus the current study aims to extend recent cross-sectional research revealing an association between adolescent stress and body dissatisfaction in females and males by testing this relationship prospectively over a one-year period.

In addition to prospective studies, research utilising multivariate models is needed to further our understanding of the mechanisms by which stress is related to body dissatisfaction. As such, the current study will test a multiple mediator model to understand the degree to which additional psychological variables explain or account for the stress-body dissatisfaction association (Grant et al., 2003; Grant et al., 2006). In Chapter 3, results supported a multiple regression model of body dissatisfaction that included main effects for stress (specifically in the peer domain), gender, self-esteem, and body importance. Furthermore, gender failed to show a significant moderating effect on the psychological variables in the model, indicating comparable predictors for
female and male body dissatisfaction. These results are suggestive of potential mediating variables in the stress-body dissatisfaction link, namely, self-esteem and body image importance.

The first possible mediating variable, self-esteem, is a central psychological construct implicated in the development and maintenance of body dissatisfaction in adolescence (Allgood-Merten et al., 1990; Biro et al., 2006). Self-esteem is also associated with stress in adolescence (Moksnes et al., 2010; Youngs Jr et al., 1990), and it has been theorised that the inability to cope with external events outside an individual’s control leads to feelings of inadequacy and poor self-worth (Youngs Jr et al., 1990). Poor self-esteem has in turn been found to be associated with body image disturbance. For instance, research suggests that low self-esteem increases a young female’s vulnerability to pressures around the body and predicts body dissatisfaction over time (Paxton, Eisenberg, et al., 2006). Similarly, only males with low self-esteem have been shown to display a link between media pressures regarding the body and strategies to increase muscularity (Ricciardelli & McCabe, 2001b). In combination, these studies provide support for a stress-body dissatisfaction association mediated by low self-esteem.

The second possible mediating variable, body image importance, provides an indication of the centrality of the body in assessments of self-worth (Rieder & Ruderman, 2001) and is particularly salient during adolescence. If offers an indirect assessment of internalisation of appearance ideals (Tiggemann, 2004) and as such is aligned with the central mediator of sociocultural influences (parents, peers, and the media) on body dissatisfaction and subsequent eating disordered behaviours as proposed in the tripartite influence model (Thompson et al., 1999), as well as the core psychopathology maintaining eating disorder symptoms proposed in the transdiagnostic theory of eating disorders, i.e. the overvaluation of weight and shape (Fairburn et al.,
Studies reveal a close (but distinct) association between body importance and body dissatisfaction (Banfield & McCabe, 2002; Giovannelli et al., 2008; McCabe & Ricciardelli, 2003b; Rieder & Ruderman, 2001; Tiggemann, 2004). Adolescents invested in their weight have been shown to report lower appearance and weight satisfaction (Mendelson et al., 2000), and greater engagement in body change behaviours (Banfield & McCabe, 2002; McCabe & Ricciardelli, 2001b, 2003b; Muris et al., 2005; Smolak & Stein, 2006). These findings suggest that body importance may render individuals vulnerable to the experience of body dissatisfaction. While yet to be investigated, stress may result in a greater body importance if individuals focus on body control as a means of compensating for a sense of having minimal control over life stressors (Fairburn et al., 2003; Rutledge & Linden, 1998; Wallis & Hetherington, 2004). Hence, body importance may comprise an additional mediating variable between stress and body dissatisfaction.

In summary, the current study investigates the prospective relationship between stress and body dissatisfaction in adolescent females and males, and the mediating role of self-esteem and body image importance. While findings in Chapter 3 suggested peer stressors are a particular subdomain relevant to body dissatisfaction, analyses in the current study assessed general stress given past examinations in stress, body dissatisfaction and eating disorder pathology. The model hypothesised and tested for the current study is displayed in Figure 5.1.
Method

Participants

The present study followed up participants sampled in Chapter 3 and 4 approximately one year after initial testing (follow-up ranged between 11 and 14 months). Of those with valid data at Time 1 (N = 496), 298 adolescents were surveyed, with the Time 2 sample including 161 females and 137 males with a mean age of 15.36 years (SD = 1.10) for females and 15.54 years (SD = 1.15) for males. The grade level breakdown was n = 101 (Grade 8), 58 (Grade 9), 87 (Grade 10), 52 (Grade 11), with a mean age in years for Grade 8 of 14.22 (SD = 0.37), for Grade 9 of 15.20 (SD = 0.44), for Grade 10 of 16.04 (SD = 0.32), and for Grade 11 of 17.12 (SD = 0.37). Permission to conduct the study was obtained from the Australian National University Human Research Ethics Committee (protocol 2009/390) and the Catholic Education Office (see Appendix A).

Measures

Participants completed the same self-report survey at Time 2 as at Time 1. For details on measures tested, and alpha coefficients for Time 1, refer to Chapters 3 and 4.
All measures displayed acceptable internal consistency at Time 2 and are reported below. Coefficients for the subsample who were followed up were also tested for Time 1 and were found to be appropriate.

**Adolescent stress.** Cronbach alphas for the 56-item version of the Adolescent Stress Questionnaire (ASQ) (Byrne et al., 2007) at Time 2 was .96 for the total, female and male samples. Correlations between the original 58-item and modified 56-item scales at both Time 1 and Time 2 were found to be $r = .999 \ (p<.01)$, supporting its validity in the longitudinal sample. Only total stress scores were used for this study.

**Body satisfaction.** Cronbach alphas for the Body Image subscale from the Self-Image Questionnaire for Young Adolescents (SIQYA) at Time 2 were .83, .84, and .81 for the total, female, and male samples respectively.

**Body importance.** Cronbach alphas for the Body Importance subscale of the Body Image and Body Change Inventory (Ricciardelli & McCabe, 2000, 2002) at Time 2 were .75, .73, and .88 for the total, female, and male samples respectively.

**Self-esteem.** Cronbach alphas for the Rosenberg Self-Esteem Scale (Rosenberg, 1965) at Time 2 were .90, .92 and .84 for the total, female and male samples.

**Procedure**

The present research formed the second part of a one-year longitudinal study (see Chapter 3 for details on the procedure for Time 1, only unique aspects of the Time 2 procedure are discussed below). Students whose data at Time 1 were deemed valid were invited to take part after one year by contacting each school and providing a list of the names of students eligible to participate. Letters providing information about the study were sent to the parent/guardian of each potential participant by post or email at least three days prior to data collection. Sessions were scheduled so as not to compete with other school activities. Students were assigned to each session by their school and
informed of the date and period in which they were to take part by their school. They were instructed to attend data collection instead of their scheduled class. Reminders for students were placed in the morning notices at each school.

A passive consent procedure was approved and employed in all three schools at Time 1. However, active consent procedures were employed for all students aged 12 or 13 years of age during Time 2 data collection. This procedural amendment was made at the request of the Human Research Ethics Committee following a broader institutional change to procedures relating to research in adolescent populations. In total, 27 students were identified who required active parental consent at Time 2, one of whom had since left their original school. One student was not permitted to take part by their parent/guardian, while six students did not return the consent form so were not eligible to participate.

Students who attended data collection and who had not been actively withdrawn by their parents were provided with a brief verbal introduction reminding them of the areas of enquiry and the voluntary and anonymous nature of the study. Students who did not want to take part were able to return to their scheduled class. Those that did want to take part were given an envelope marked with their name which contained the questionnaire booklet and consent form. At completion of data collection, this envelope was destroyed and the survey and consent form stored separately. This procedure ensured that responses remained anonymous and were only identifiable by a three-digit code assigned at Time 1 to match responses at follow-up.

The survey took one class period (approximately 50 minutes) with up to 50 students taking part at one time. At the conclusion of data collection, students were verbally debriefed, and a debrief sheet describing the aims of the study and contacts for students encountering difficulties was distributed. Data collection was supervised by a staff member from each school. The names of students who did not attend their
scheduled session were provided to each school who then invited the student to attend another session (see Appendix E for student and parent consent forms, information and debrief sheet; see Appendix F for example form sent to parents of students who required active consent).

**Statistical Analysis**

All statistical analyses were conducted using SPSS 20.00. Exploration of the direction of the relationship between stress and body dissatisfaction utilised hierarchical regression, in which autocorrelation from Time 1 predictors was controlled. Mediation analyses utilised multiple mediation procedures (Preacher & Hayes, 2008), a product of coefficients technique in which the total indirect effect of the IV on the DV through mediating variables is estimated while adjusting for the effects of the IV and other variables on the DV. It utilises 95% bias corrected confidence intervals 95% for each individual mediator and the collective effect of multiple mediators as a group based on bootstrap sampling procedures. This technique is argued to possess advantages over traditional causal chain models of mediation (e.g., Baron & Kenny, 1986) because it specifically tests the indirect effect between two variables (Preacher & Hayes, 2008) and does not require the sampling distribution of the indirect effect to be normal (Preacher & Hayes, 2004). Interpretation focuses only on the size, direction, and significance of the indirect effects in the model. The use of a multiple mediation model also possesses advantages over single mediator models as it assesses the total effect of multiple mediators, accounts for shared variance between multiple mediators, and compares the strength of multiple mediators in a model (Hayes, 2011; Preacher & Hayes, 2008). Macros provided at http://www.afhayes.com/ were utilised to conduct these analyses (i.e., INDIRECT). An α-level of .05 was set to determine statistical significance.
Results

Completion Rates

Data was first examined to determine the generalisability of the follow-up sample of N = 298 from the original Time 1 sample of N = 496 with valid data. Information detailing reasons for attrition was collected where possible, with the majority of students not available for testing (possibly absent from school, deciding not to take part, or forgetting to attend testing sessions). Appendix G presents detailed information on follow-up and attrition rates. The attrition rate of 40% for the original sample was deemed appropriate to conduct longitudinal data analysis. However, to reduce the potential impact on external validity, analyses were undertaken to examine whether there were systematic differences between students who completed both periods of data collection compared to those who did not in order to remove risks relating to over/underestimated relationships between variables and random sampling (Goodman & Blum, 1996). As such, a one-way between-subjects ANOVA was performed to determine whether or not there were significant differences at Time 1 between those who completed Time 2 data collection and those that did not. This analysis is important to ensure any conclusions made from the data take into account any selection biases in the follow-up sample. Table 5.1 displays the results for each variable.
Table 5.1

Comparison of Time 1 Data For Time 2 Completers and Non-Completers

<table>
<thead>
<tr>
<th>DV</th>
<th>$F$ (df1, df2)</th>
<th>$\eta^2$</th>
<th>EMM</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Age</td>
<td>4.12 (1, 486)</td>
<td>.008</td>
<td>14.41</td>
<td>14.27 14.55</td>
</tr>
<tr>
<td>Completers</td>
<td></td>
<td></td>
<td>14.64</td>
<td>14.47 14.80</td>
</tr>
<tr>
<td>Non-completers</td>
<td></td>
<td></td>
<td>14.64</td>
<td>14.47 14.80</td>
</tr>
<tr>
<td>Self Esteem</td>
<td>.77 (1, 494)</td>
<td>.002</td>
<td>29.99</td>
<td>29.39 30.60</td>
</tr>
<tr>
<td>Completers</td>
<td></td>
<td></td>
<td>29.57</td>
<td>28.83 30.31</td>
</tr>
<tr>
<td>Non-completers</td>
<td></td>
<td></td>
<td>29.57</td>
<td>28.83 30.31</td>
</tr>
<tr>
<td>Stress</td>
<td>.55 (1, 494)</td>
<td>.001</td>
<td>133.27</td>
<td>128.56 137.98</td>
</tr>
<tr>
<td>Completers</td>
<td></td>
<td></td>
<td>136.07</td>
<td>130.34 141.80</td>
</tr>
<tr>
<td>Non-completers</td>
<td></td>
<td></td>
<td>136.07</td>
<td>130.34 141.80</td>
</tr>
<tr>
<td>Body Satisfactions</td>
<td>2.70 (1, 494)</td>
<td>.005</td>
<td>51.09</td>
<td>49.92 52.26</td>
</tr>
<tr>
<td>Completers</td>
<td></td>
<td></td>
<td>52.64</td>
<td>51.21 54.08</td>
</tr>
<tr>
<td>Non-completers</td>
<td></td>
<td></td>
<td>52.64</td>
<td>51.21 54.08</td>
</tr>
<tr>
<td>BodyImport</td>
<td>1.30 (1, 492)</td>
<td>.003</td>
<td>10.06</td>
<td>9.73 10.38</td>
</tr>
<tr>
<td>Completers</td>
<td></td>
<td></td>
<td>10.35</td>
<td>9.96 10.75</td>
</tr>
<tr>
<td>Non-completers</td>
<td></td>
<td></td>
<td>10.35</td>
<td>9.96 10.75</td>
</tr>
</tbody>
</table>

* denotes significant at $p < .05$

Table 5.1 reveals significant differences at Time 1 between those who did and did not complete Time 2 data collection on the variable of age. This difference reflects attrition data highlighting the higher drop-out rate of older adolescents in the sample despite attempts to recruit these students, possibly indicating that these students had left or changed schools, or opted not to complete follow-up due to the academic demands of senior school. While this difference is significant at $p < .05$, the 95% confidence
intervals overlapped, suggesting the size of this difference is small. Importantly, there were no significant differences at Time 1 between those who completed both data collection timepoints and those who did not on the key variables under consideration (i.e., stress, body dissatisfaction, self-esteem or body importance).

Data Screening

Prior to statistical analysis, data for the N = 298 follow-up sample were examined to determine their suitability for analysis (Tabachnick & Fidell, 2007). Inspection of data led to the deletion of two cases possessing greater than 5% missing responses. Mean substitution for missing data was used for each continuous variable, with the exception of the ASQ, which was imputed with 1 (indicating none or irrelevant stress to the individual). Missing values on age (which is not part of the current analysis due to findings reported in Chapter 3) were calculated based on the length of months between data collection sessions, however, one case contained missing data for both time periods and could not be calculated. Two cases contained missing data on all three body importance items and were thus excluded from analyses including this variable. Four cases with multivariate outliers were inspected, leading to the removal of two males and one female; one male was retained following examination of his responses which revealed an extreme value on BMI which did not form part of the current analyses. The final sample comprised N = 293, with the number of female and male participants in each grade shown in Table 5.2.
The Time 1 data corresponding to the N=293 longitudinal sample was also assessed to ensure this subgroup met assumptions regarding suitability for data analysis. These analyses were consistent with those deemed appropriate in the larger Time 1 sample and the follow-up Time 2 sample. Therefore, longitudinal data analysis was pursued for the final sample using a dataset merging Time 1 and Time 2 responses for each participant. The relationships between variables used in the longitudinal analyses were examined using bivariate correlations for Time 1 and Time 2. The matrix for the total, female, and male samples are presented in Table 5.3 for variables included in the present analysis.
Table 5.3

Correlation Matrix for Continuous Variables at Time 1 and Time 2

<table>
<thead>
<tr>
<th>Sample</th>
<th>T2 SE</th>
<th>T2 Stress</th>
<th>T2 BS</th>
<th>T2 BImp</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1SE</td>
<td>Total</td>
<td>.66**</td>
<td>-.36**</td>
<td>.63**</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>.63**</td>
<td>-.38**</td>
<td>.57**</td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>.63**</td>
<td>-.32**</td>
<td>.66**</td>
</tr>
<tr>
<td>T1Stress</td>
<td>Total</td>
<td>-.43**</td>
<td>.64**</td>
<td>-.46**</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>-.46**</td>
<td>.63**</td>
<td>-.52**</td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>-.27**</td>
<td>.60**</td>
<td>-.26**</td>
</tr>
<tr>
<td>T1BS</td>
<td>Total</td>
<td>.58**</td>
<td>-.39**</td>
<td>.70**</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>.55**</td>
<td>-.41**</td>
<td>.66**</td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>.54**</td>
<td>-.33**</td>
<td>.71**</td>
</tr>
<tr>
<td>T1BImp</td>
<td>Total</td>
<td>.42**</td>
<td>-.37**</td>
<td>.51**</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>.50**</td>
<td>-.38**</td>
<td>.57**</td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>.30**</td>
<td>-.34**</td>
<td>.43**</td>
</tr>
</tbody>
</table>


** significant at \( p < .01 \), * denotes significant at \( p < .05 \)

Table 5.3 reveals that the relationship between variables at Time 1 and Time 2 are significant over time. Importantly, all variables displayed stability over time, and stress, self-esteem, and body importance all showed significant associations with body satisfaction over the one-year period for the total, female, and male samples. This indicates that body dissatisfaction over one year is associated with greater stress, lower self-esteem, and greater body importance at Time 1. This supports their inclusion in
models testing the nature and direction of the relationship between stress and body dissatisfaction in adolescents over time.

**Testing the Predictive Relationship Between Stress and Body Dissatisfaction**

A hierarchical regression analysis was performed to examine the direction of the relationship between stress and body dissatisfaction during adolescence. Gender was controlled in all prospective tests due to its significant main effect in Chapter 3. In both analyses, gender was entered in the first block of predictors to control for its effect, and the Time 1 measurement of the dependent variable (DV) was then entered in the second block of predictors to control for autocorrelation, and the independent variable (IV) of interest entered in the third block. Specifically, for models of Time 2 Body Satisfaction, Gender was entered in Block 1, Time 1 Body Satisfaction was controlled by entering it in Block 2, and then Time 1 Stress was entered in Block 3. The reverse relationship (i.e., the prediction of Stress by Body Satisfaction over one year) was also tested. The model $R^2$, $F$ values, $\beta$, and $t$ values for each model are shown in Table 5.4.
Table 5.4

Longitudinal Analysis of Stress-Body Satisfaction Link

<table>
<thead>
<tr>
<th>DV</th>
<th>Block</th>
<th>$R^2$</th>
<th>$F$ change</th>
<th>IVs</th>
<th>β</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2 Body</td>
<td>1</td>
<td>.125</td>
<td>41.40 (1, 291)***</td>
<td>Gender</td>
<td>.35</td>
<td>6.43***</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>2</td>
<td>.525</td>
<td>244.22 (1, 290)***</td>
<td>Gender</td>
<td>.18</td>
<td>4.26***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T1 Body Sat</td>
<td>.66</td>
<td>15.63***</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>.535</td>
<td>6.12 (1, 289)*</td>
<td>Gender</td>
<td>.17</td>
<td>4.06***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T1 Body Sat</td>
<td>.60</td>
<td>12.60***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T1 Stress</td>
<td>-.12</td>
<td>-2.47*</td>
</tr>
<tr>
<td>T2 Stress</td>
<td>1</td>
<td>.044</td>
<td>13.35 (1, 291)***</td>
<td>Gender</td>
<td>-.21</td>
<td>-3.65***</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>.409</td>
<td>178.96 (1, 290)***</td>
<td>Gender</td>
<td>-.08</td>
<td>-1.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T1 Stress</td>
<td>.62</td>
<td>13.38***</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>.414</td>
<td>2.52 (1, 289)</td>
<td>Gender</td>
<td>-.07</td>
<td>-1.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T1 Stress</td>
<td>.58</td>
<td>10.97***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T1 Body Sat</td>
<td>-.09</td>
<td>-1.59</td>
</tr>
</tbody>
</table>

Note. T1: Time 1, T2: Time 2, Body Sat: Body Satisfaction, Stress: Total ASQ Score

*** denotes significant at $p < .001$, * denotes significant at $p < .05$.

Table 5.4 reveals that both Stress and Body Satisfaction at Time 1 contribute significant predictive variance to their counterpart at Time 2 (at $p < .001$). The hierarchical regression Block 3 predictors revealed that only Time 1 Stress predicted additional significant variance in Time 2 Body Satisfaction once Gender and autocorrelation were controlled, with an $R^2$ change of .01 (at $p < .05$), but that the reverse model predicting stress was non-significant, with an $R^2$ change of .005. Therefore, the results suggest that reporting a greater amount of stress at Time 1
predicts greater reports of body dissatisfaction one year later in adolescents when
gender is controlled. Furthermore, body dissatisfaction does not display a predictive
relationship with stress over one year when gender is controlled. To investigate
whether or not these two hierarchical models differed significantly, the unstandardised
residuals for each hierarchical model were saved and correlated. The resulting
Pearson’s $r$ was significant (-.28, $p < .01$), suggesting the two models remained
significantly correlated after the predictive model variance was removed. However, it is
notable that this correlation is smaller than the Time 1 correlation of -.51 ($p < .01$) for
the N=293 subsample. The path model tested is displayed in Figure 5.2.

![Figure 5.2. Path model testing directionality in stress-body satisfaction link](image)

Despite no significant cross-sectional relationship between stress and the two
measures of body change strategies investigated in Chapter 5, this same prospective
model was tested to determine whether or not stress exerted a predictive effect over time
on these variables. No significant prospective effects were identified and therefore the
results are not detailed (see Appendix H for information on these results).
Testing the Mediation Roles of Self-Esteem and Body Importance in the Association Between Stress and Body Dissatisfaction

In order to understand how stress relates to body satisfaction over time, a multiple mediation model examining the intervening effects of self-esteem and body importance was tested. This model has advantages over single mediation models by testing several potential mediators at once. Preacher and Hayes (2008) developed a macro script to test the combined effect of multiple mediating variables in a model, as well as their comparative individual contributions. Therefore, it takes into account the unique contribution of variables within the model and tests the strength of the differences between these variables. This procedure also allows covariates to be controlled, with gender effects partialled out in the current analysis using this function given the gender main effects identified in Chapter 3.

Two versions of the multiple mediator model in Figure 5.1 were tested, utilising cross-sectional and longitudinal data respectively, and with autocorrelation controlled in the prospective test. A bootstrapping sample of 1000 was selected for the current analysis. Model 1 utilised Time 1 data to test a cross-sectional multiple mediation model. Model 2 utilised Time 2 data with Time 1 autocorrelation removed in order to examine the stability of Model 1 over time. The results of the analyses are displayed in Table 5.5.
Table 5.5

Multiple mediation model indirect effects output

<table>
<thead>
<tr>
<th>DV Model</th>
<th>Mediator</th>
<th>Point Estimate</th>
<th>SE</th>
<th>BCa 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
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<td>TOTAL</td>
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<td>.0121</td>
<td>-.1115</td>
</tr>
<tr>
<td></td>
<td>SE</td>
<td>-.0618*</td>
<td>.0095</td>
<td>-.0794</td>
</tr>
<tr>
<td></td>
<td>BodyImp</td>
<td>-.0261*</td>
<td>.0001</td>
<td>-.0411</td>
</tr>
<tr>
<td></td>
<td>Contrast</td>
<td>-.0358*</td>
<td>.0006</td>
<td>-.0562</td>
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<td>(SE-BodyImp)</td>
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<tr>
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<td>.0090</td>
<td>-.0582</td>
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<td></td>
<td>SE</td>
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<tr>
<td></td>
<td>(SE-BodyImp)</td>
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Note. SE = standard error, BCa = bias corrected confidence interval, L: Lower limit of 95% confidence interval, U: Upper limit of 95% confidence interval, SE: Self-Esteem, BodyImp: Body Importance, Contrast: Comparison of first mediator to second, involves subtraction of effects and tests of significance of this difference. Statistics are reported to more than two decimal places given the nature of the analysis and output values.

* denotes significant at $p < .05$ due to confidence interval not including zero

According to Preacher and Hayes (2008), Table 5.5 reveals that Model 1, the cross-sectional Time 1 multiple mediator model, explained 61.08%, 95%CI [.54, .659] of the variance in body satisfaction, $F(4, 288) = 113.02, p < .001$. Taken as a set, self-esteem and body importance mediate the effect of stress on body satisfaction. The total (effect of the IV on the DV) and direct (effect of IV on DV once mediators accounted for) effects of stress on body satisfaction are -.1205, $p < .001$, and -.0326, $p < .05$. 
respectively, with the difference between the total and direct effects (i.e., the indirect effect through the two mediators) displaying a point estimate of -0.0879 and a 95% bootstrap CI of -0.1115 to -0.0634. This means that the indirect effect through the two mediators is significant since zero is not included in the confidence interval. The directions of the a and b paths reveal that greater stress leads to lower self-esteem and higher body importance, and that this in turn leads to greater body dissatisfaction. Examining the specific indirect effects in Table 5.5 reveals that both self-esteem and body importance are significant mediators since their BCa 95% CI does not include zero, and examination of pairwise contrasts of the indirect effects shows that the specific indirect effect through self-esteem is significantly larger than the indirect effect through body importance, with a BCa 95% CI of -0.0562 to -0.0128. The gender covariate effect was significant at $p < .05$.

Model 2 revealed a significant model explaining 28.7% of the variance, 95% CI [.195, .358] in body satisfaction at Time 2, $F(4, 286) = 28.75, p < .001$. Taken as a set, this suggests that over time the self-esteem and body importance mediation remains significant. The total and direct effects of stress on body satisfaction at Time 2 controlling for Time 1 autocorrelation are -0.0606, $p < .001$, and -0.0235, $p = .07$, with a significant indirect effect indicated by a point estimate of -0.0371 with a 95% CI of -0.0582 to -0.0228. Examination of indirect effects is also consistent with Model 1, with a BCa 95% CI of -0.0481 to -0.0147 for the contrast between the two mediators. The gender covariate effect was significant at $p < .05$. Therefore, the Model 2 results are consistent with those identified in Model 1, with the exception that the direct effect of stress over time was no longer significant once accounting for the indirect effect.
Discussion

The present study investigated the direction of the relationship between stress and body satisfaction in male and female adolescents using a prospective study design. Furthermore, it examined the underlying mechanisms involved in this relationship, specifically the role of self-esteem and body image importance in mediating this link. Results revealed support for the hypothesised model tested in the current study.

The Direction of the Relationship Between Stress and Body Dissatisfaction

The first aim of this study related to the direction of the relationship between stress and body dissatisfaction in adolescence. Statistical analyses were undertaken through examination of bivariate correlations and hierarchical regression. Bivariate correlations were examined for the total, female, and male samples at Time 1 and Time 2 on all psychological variables tested in the model. Results revealed stability in each variable over time, evidenced by significant correlations between each measure at Time 1 and its counterpart one year later, highlighting the need to account for autocorrelation in subsequent analyses. Significant correlations between all variables across the three samples were apparent. Importantly, stress at Time 1 displayed significant negative correlations with body satisfaction at Time 2 (r = -.46, -.52, -.26 for the total, female, and male samples respectively), indicating that greater reports of stress at time 1 were associated with greater body dissatisfaction one year later. The reverse relationship also revealed significant correlations (r = -.39, -.41, and -.33), indicating that greater body dissatisfaction at Time 1 was associated with greater stress one year later.

These findings supported further prospective analyses of the relationship between stress and body satisfaction. Hence hierarchical regression models were performed to examine the direction of the relationship between stress and body
satisfaction in adolescent females and males, controlling for gender and Time 1 autocorrelation. Results revealed that stress at Time 1 significantly predicted body satisfaction at Time 2 (controlling for Time 1 body satisfaction), explaining 1% of the variance over time. However, the reverse relationship was not significant, with body satisfaction at Time 1 failing to predict stress at Time 2 (controlling for stress at Time 1). These findings suggest a unidirectional relationship between the two variables, with greater reports of stress predicting greater body dissatisfaction over a one-year period when gender and baseline levels of body dissatisfaction are controlled.

These findings extend previous studies focusing on the role of stress in mental health during adolescence. While previously identified in a number of internalising and externalising symptoms such as depression and anxiety (Grant et al., 2004; McLaughlin & Hatzenbuehler, 2009; Turner & Lloyd, 2004), self-esteem (Marcotte et al., 2002; Youngs Jr et al., 1990), and smoking (Byrne & Mazanov, 1999, 2001, 2003; Croghan et al., 2006), the current findings suggest that stress is also implicated in the prediction of body dissatisfaction. Moreover, the present study examined the relationship for both females and males, across stress in 10 life domains, and in a broader age range than previous research. Therefore, it expands upon the limited and often cross-sectional examination of the stress-body dissatisfaction link conducted to date, such as the focus on female adolescents and young adults (Johnson & Wardle, 2005; Marcotte et al., 2002; Smolak et al., 1993; Warren et al., 2012), and confirms the relevance of stress for body dissatisfaction in both genders over time.

While supporting the predictive role of stress in body dissatisfaction, the models examining directionality suggest the involvement of additional variables in predicting body dissatisfaction. That is, while contributing significant variance to body dissatisfaction over time, the addition of stress to the model explained only a small proportion of variance (1%), highlighting the importance of other variables. In addition,
the two models remained significantly correlated, of small to medium magnitude \((-0.28, \ p < 0.01)\), after hierarchical models were tested. This suggests that a significant association remains between the two variables and that the predictive model does not provide a complete account of the relationship over time. It is possible that variables such as self-esteem (Marcotte et al., 2002; Youngs Jr et al., 1990) and body importance (McCabe & Ricciardelli, 2001b; Muris et al., 2005; Muth & Cash, 1997) play a role here given their mutual links, a hypothesis tested through the multiple mediation model.

The Mediational Role of Self-Esteem and Body Importance in the Association Between Stress and Body Dissatisfaction

The second aim of the study was to understand how stress and body satisfaction are related over time by examining the role of self-esteem and body importance as potential mediating variables. The inclusion of these additional psychological constructs in the model was based on their theoretical and empirical links to both stress and body dissatisfaction in adolescence.

Two path models were tested to assess multiple mediation in the cross-sectional and longitudinal data respectively. Results revealed that self-esteem and body importance mediate the proximal and longitudinal effect of stress on body satisfaction, controlling for gender. Both mediating variables were shown to contribute significantly to this model, but self-esteem was shown in both the cross-sectional and prospective data to exert a stronger indirect effect than body importance. Results relating to lower and upper values of 95% bias corrected accelerated confidence intervals (i.e., those that utilised bootstrapping to test the indirect effects) revealed that the cross-sectional model explained between 54 to 65.9% of the variance in body dissatisfaction, while tests of the model over time revealed a reduced but significant amount of variance explained according to 95% accelerated confidence intervals, at 19.5 to 35.8%. These models
highlight the salience of stress, self-esteem, and body importance in body dissatisfaction both in the short-term and over a one year period.

The findings are suggestive of the mechanisms by which stress might result in body dissatisfaction in adolescent females and males, namely, by reducing self-esteem and increasing the importance placed on the body in a young person's life. Poor self-esteem has consistently been associated with body dissatisfaction in adolescent females and males (Allgood-Merten et al., 1990; Biro et al., 2006; Paxton, Eisenberg, et al., 2006; Ricciardelli & McCabe, 2001b), and is also closely linked to adolescent stress through the inability to cope with uncontrollable events in the environment (Youngs Jr et al., 1990). Body importance also demonstrates links with body dissatisfaction (Giovannelli et al., 2008; McCabe & Ricciardelli, 2003a; Mendelson et al., 2000; Rieder & Ruderman, 2001; Tiggemann, 2004) and is relevant in the development of body change behaviours (Banfield & McCabe, 2002; McCabe & Ricciardelli, 2001b, 2003a; Muris et al., 2005; Smolak & Stein, 2006), but has not yet been investigated in relation to stress.

In combination, the results are consistent with the notion that stress leads an individual to feel worse about themselves and to increase their focus on the body as a controllable aspect of self. The reduction in self-esteem and increase in body importance in turn result in the development of more critical evaluations of the body. Over time, body dissatisfaction may trigger the adoption of unhealthy and extreme body change behaviours to improve self-worth (given the importance of the body to the individual's sense of self). While the present study found no evidence of the models to predict body change strategies, it is possible that such relationships may emerge over a longer timeframe. Hence future studies could test this hypothesis by including behavioural outcomes which have previously been linked to stress, such as dieting (Cain et al., 2008, 2010) and extreme weight control behaviours and binge eating (Loth et al.,
The finding that self-esteem demonstrated a stronger indirect effect in the multiple mediation model compared to body importance underscores the importance of positive evaluations of the self in general for positive evaluations of the body specifically.

Limitations of the Present Study and Suggestions for Future Research

The present study possesses several strengths, particularly the longitudinal design, the large sample size, and the focus on theory-driven research examining the underlying mechanisms of the relationship between stress and body dissatisfaction (Stice, 2002). Yet, the present study has several limitations that must be considered in interpreting the findings. First, the study had an attrition rate of approximately 40%. Examination of those who did and did not complete the longitudinal data collection on psychological measures at Time 1 was undertaken to determine the suitability of the sample for prospective examination. No significant differences were identified on the primary psychological variables, suggesting that there were no differences between individuals who did and did not complete Time 2 data collection. However, significant differences were identified on the demographic variable of age, reflecting the greater attrition rate in students who were in Grade 10 at Time 1. Therefore, interpretation of the results must be undertaken taking this difference into account because of the limited sampling of older adolescents whose stress profile is likely different from younger adolescents in the sample. For instance, it may have led to reduced detection of stress effects in body dissatisfaction, and even body change strategies which increase with age (McCabe & Ricciardelli, 2001b).

Second, the present study relied solely on self-report. This is important to consider when interpreting the findings because it can lead to inaccurate or biased assessments of the psychological constructs tested. The use of additional measures,
such as physiological assessments of stress (Feldman et al., 1999), could offer more objective accounts of the variables assessed in the study. Furthermore, the use of experimental designs to provide further support for the causal roles of stress, self-esteem, and body importance, as well as measurement of actual behavioural outcomes (e.g., dieting), could provide further insight into the outcomes of the models tested in this study. The possibility of including parent, sibling or peer reports could also be considered, or using naturalistic settings, such as exam periods, as tests of the effects of stress.

Third, the analyses in the present study focused on general rather than specific subdomains of stress. While providing a comprehensive assessment of stressors during adolescence, an analysis of the differential role of specific stressor domains with body dissatisfaction over time was not undertaken in the current study. Rather, the effect of general stress was assessed so that the analyses more closely replicated previous studies examining the cross-sectional link which focused on perceived stress in general (Johnson & Wardle, 2005; Marcotte et al., 2002; Warren et al., 2012). Examining the associations between specific stressors and body dissatisfaction could be helpful in designing more targeted prevention programs. For example, the preponderance of sociocultural influences on body dissatisfaction during adolescence, specifically in family and peer relationships (Levine & Smolak, 2002) highlights the potential of interpersonal stress as a specific domain worth considering in relation to body dissatisfaction over time. This is consistent with findings by Murray et al. (2011) and Chapter 3 emphasising the role of peer stress in body dissatisfaction.

**Theoretical and Practical Implications of the Findings**

The present findings possess implications for theories of body dissatisfaction, eating disorders, and other psychological disorders (such as depression), as well as
informing the design of prevention programs. They suggest the possibility that the relationship between stress and body dissatisfaction is an early interaction enhancing the vulnerability of young people to the later development of eating disorders, which frequently show their onset in late adolescence (Hudson et al., 2007; Stice, 2002). In doing so, the current findings suggest extending the tripartite influence model (Thompson et al., 1999) and transdiagnostic theory of eating disorders (Fairburn et al., 2003) by including stress in the prediction of body dissatisfaction alongside self-esteem and body importance which already feature in these models. The relevance of the current model to both females and males also supports recent work examining shared underlying features of muscle dysmorphia and anorexia nervosa, despite their strong bias towards males and females respectively (S. Murray et al., in press). Any consideration of the outcomes of the current multiple mediator model should explicate the role of gender further, especially the tendency of females and males to focus on weight loss and increasing muscularity respectively (Cohane & Pope Jr., 2001; Levine & Smolak, 2002; McCabe & Ricciardelli, 2004; Muth & Cash, 1997).

An additional consideration for the current findings is how they relate to other aetiological research in body dissatisfaction. A substantial body of research consistent with the tripartite influence model has been conducted focusing on the role of interpersonal relationships and sociocultural influences on body dissatisfaction in adolescence and the adoption of body change behaviours. In particular, perceived pressures from parents or peers around the body have been highlighted for both males and females during this time (D. C. Jones & Crawford, 2006; Levine & Smolak, 2002; McCabe & Ricciardelli, 2003b; Paxton et al., 1999; Ricciardelli & McCabe, 2001b). It is plausible that these pressures elicit stress for a young person, and thus the current model could be expanded to assess how stress relates to these sociocultural risk factors in predicting body dissatisfaction and its outcomes.
Investigation of the possibility that the current model informs the aetiology of other mental disorders in adolescence, such as major depression, is warranted. Body dissatisfaction has been shown to predict depression over time (Paxton, Neumark-Sztainer, et al., 2006; Rierdan & Koff, 1997; Stice et al., 2000), while stress has also been consistently implicated in the onset of this disorder during adolescence (Burton et al., 2004; Hankin, 2006; Lewinsohn et al., 1999). Therefore, it is possible that depression, as well as eating disorders, could be among the clinical outcomes of the stress-body dissatisfaction pathway identified in the present study.

The current findings yield support for the inclusion of stress management training in programs to prevent eating disorder pathology by expanding current etiological accounts of body dissatisfaction. On the basis of the present results, programs targeting stress, self-esteem, and body importance in adolescence could be expected to exert a preventive effect on the later development of body dissatisfaction and its associated outcomes, including eating disorder pathology. To date, a number of programs for females and males have included modules focusing on stress management as part of life skills training, along with self-esteem enhancement and reducing the importance of physical appearance (Levine & Smolak, 2006), with some reporting maintenance of improvements in body satisfaction and eating disorder symptoms over time (McVey et al., 2007; O'Dea & Abraham, 2000). These findings highlight the role of all three variables in preventing body dissatisfaction in both females and males.

Summary

The current study examined the direction of the relationship between stress and body dissatisfaction in adolescent females and males, and the mediating role of self-esteem and body importance. Results revealed a unidirectional relationship between stress and body dissatisfaction, supporting a link in which stress predicted greater body
dissatisfaction one year later. Furthermore, self-esteem and body importance were shown to explain this relationship in proximal and prospective models, revealing that stress predicts reductions in self-esteem and an increase in the importance placed on the body, which in turn predict body dissatisfaction. Self-esteem was shown to exert a significantly stronger effect in the model compared to body importance. These findings highlight the relevance of targeting stress, self-esteem, and body importance in prevention programs for body dissatisfaction and eating disorders in adolescent females and males.
Chapter 6

Study 3: The Effect of Interpersonal Stress on Body Dissatisfaction in Female and Male Young Adults

Body dissatisfaction peaks during adolescence (Littleton & Ollendick, 2003). Despite the substantial attention paid to adolescent body dissatisfaction, research confirms these difficulties persist into young adulthood with a number of comparable trends, specifically higher rates of dissatisfaction in young adults (i.e. 18-25 year olds) compared to older age groups (Grogan, 2011), and greater reports in adult females compared to males too (Grogan, 2011; Lewinsohn et al., 2002). Prevalence rates of appearance concerns in this population have been reported as 69% of young adult females compared to 56% of males (Harris & Carr, 2001). Furthermore, links between body dissatisfaction and depression and anxiety in both genders have been demonstrated (Lewinsohn et al., 2002). Given the strong association between mental health symptoms in adolescence and young adulthood (Achenbach et al., 1995), research examining how risk factors in adolescent body dissatisfaction translate into adulthood holds important implications for prevention in both adolescence and into young adulthood, a time when eating disorders often have their onset (Hudson et al., 2007).

Recent research has identified subjective stress as a risk factor for body dissatisfaction. For example, it was shown to predict body dissatisfaction over one year in females and males (see Chapter 5), with the peer domain especially correlated with body dissatisfaction (see Chapter 3; Murray et al., 2011). The role of stress in body dissatisfaction has also been shown to be relevant to young adults, with a study in females confirming this link (Warren et al., 2012). The current study aims to further investigate the role of stress in body dissatisfaction in young adult females and males. In doing so, it extends past studies by including both subjective and objective measures
of stress in an experimental design (Stice, 2002). Such a study provides the opportunity to examine the potential causal effect of stress on body dissatisfaction, and how stress relates to body dissatisfaction in a young adult population.

Psychological stress results from transactions between an individual and their environment (Lazarus, 1990, 1999). Specifically, it stems from appraisals that the threat imposed by events is beyond the individual’s available coping resources (Lazarus & Folkman, 1984). Like adolescence, young adulthood is a period involving transitions across all life domains (e.g., academic, financial, independent living, social relationships), and these changes have been associated with stress (Maggs & Schullenberg, 2004; Schullenberg & Maggs, 2002). The experience of stress in this age group has been examined in the context of a number of mental health concerns, with links comparable to those identified in adolescence, specifically between stress and eating pathology (Bennett & Cooper, 1999; Warren et al., 2012), alcohol use (Maggs & Schullenberg, 2004; Schullenberg & Maggs, 2002) and depression in adulthood generally (Hankin & Abramson, 2001; Lewinsohn et al., 2002).

While stress is typically assessed using subjective self-report measures (Pearlin et al., 1981), stress encapsulates a broader construct including physiological changes in the body (Feldman et al., 1999; Torres & Nowson, 2007). In order to conduct a comprehensive assessment of the stress experience, it is important to measure autonomic arousal in addition to subjective cognitive/emotional reports due to the complexity of the stress experience. For example, subjective, physiological, and behavioural responses have been shown to diverge based on whether an individual appraises an opportunity to adopt active or passive coping responses (Tomaka et al., 1993). Additional studies have reported a discordance between subjective and physiological measures of stress (Connelly & Denney, 2007; Nandrino et al., 2012), such as increases in autonomic arousal due to task characteristics in the absence of
subjective reports of stress (Feldman et al., 1999). The use of multiple stress measures also minimises the demand characteristics that may be present in self-report (Rutledge & Linden, 1998). Physiological arousal is amenable to objective assessment, such as increased heart rate and blood pressure, sweating, increased respiration, and hormonal changes (Torres & Nowson, 2007) which have negative effects on physical health (Semmer et al., 2003).

Experimental designs have been utilised successfully to examine causative factors in body image disturbance, specifically in young adult females (Furman & Thompson, 2002; Haedt-Matt, Zalta, Forbush, & Keel, 2012; Smith & Rieger, 2010). For example, reading scenarios in which a gender-matched individual receives negative feedback focusing on appearance or ability has been shown to elicit more negative state body image and dysphoria compared to those receiving positive feedback (Furman & Thompson, 2002). Furthermore, negative mood induction has been associated with increased body dissatisfaction (Haedt-Matt et al., 2012) and increased attention to weight- and shape-related information (Smith & Rieger, 2010). While not specifically assessing stress, these studies suggest a potential causal role for stress on body image given the close association between stress and dysphoric mood.

Further support is apparent in research assessing subjective and objective stress in the related area of eating behaviours. Experimentally-induced stress has been shown to predict changes in eating behaviours, such that acute stress leads to reduced food intake and chronic stress in increased consumption of energy dense foods (Torres & Nowson, 2007; Wallis & Hetherington, 2009). Research in young adult females has shown that cognitive stressors containing ego-threat information, and incongruent colour-naming Stroop tasks, lead to increased food intake in individuals who typically restrain eating (Wallis & Hetherington, 2004). Furthermore, these findings have been supported through measurement of objective (heart rate, blood pressure) and subjective
Stress and Body Image

(positive and negative affect) stress, with individuals who typically restrain tending to eat more, and those who do not restrain eating less. In both groups, these changes coincided with high levels of negative affect (Rutledge & Linden, 1998). Eating in response to emotional states has also been linked to increased consumption of energy dense foods under stress (Oliver et al., 2000), particularly following ego-threat (Wallis & Hetherington, 2004). Interpretation of the link between stress and eating behaviours has focused on food acting as an emotion regulation strategy (Rutledge & Linden, 1998) by escaping or shifting attention away from aversive stimuli (Wallis & Hetherington, 2004). This attentional shift to the immediate environment is believed to account for disinhibition in restrained eaters and overeating in emotional eaters (Wallis & Hetherington, 2004). Such research is important in the context of examining the link between stress and body dissatisfaction by highlighting the cognitive and behavioural influences of stress on eating behaviours. Since body dissatisfaction is a key predictor of eating disorder pathology (Stice, 2002), it is possible that stress and body dissatisfaction constitute a part of this process. For example, stress may lead to changes in self-evaluation and more specifically state body dissatisfaction, which then leads to the use of eating to avoid this state of aversive self-awareness.

In order to examine the link between stress and state body dissatisfaction using an experimental design, careful consideration must be given to the nature of the stress manipulation and the role of potential moderating variables in the relationship. Theoretical accounts of body dissatisfaction, namely the tripartite influence model (Thompson et al., 1999), emphasise interpersonal interactions and internalisation of appearance ideals in body dissatisfaction (Keery et al., 2004; Shroff & Thompson, 2006; van den Berg et al., 2002). This model has been supported in tests of adolescent and young adult female samples, as well adapted to account for muscularity investment and dissatisfaction in males (Keery et al., 2004; Shroff & Thompson, 2006; Tylka,
Three key aspects of this model were utilised to inform the current design, specifically interpersonal relationships, appearance importance, and gender.

Interpersonal networks, specifically the peer group, are valued by both young adult females and males (Wagner & Compas, 1990). Belonging in interpersonal networks is vitally important for adjustment (Baumeister & Leary, 1995; Leary et al., 1998), particularly for self-esteem (Gailliot & Baumeister, 2007; Smart Richman & Leary, 2009). Sociometer theory proposes that self-esteem functions to monitor an individual's success at belonging, and that an individual will assess their success based on attributes to which the sociometer is calibrated. Failure in these domains is believed to trigger low self-esteem (Gailliot & Baumeister, 2007). Interpersonal relationships are especially salient for females who value these networks to gain a sense of self-worth and belonging, and spend significant quantities of time fostering and maintaining these links (Rose & Rudolph, 2006; Stroud et al., 2002). In contrast, while these domains are important to males, they tend to focus more on social standing and their relationships are less intimate than those between females (Rose & Rudolph, 2006), with achievement domains of greater importance (Stroud et al., 2002).

Research has confirmed a key role for interpersonal relationships in the aetiology of both body dissatisfaction and stress in adolescence and young adulthood. Most pertinent to the current study are findings that interpersonal stress shows links with dieting proximally and prospectively in young adult females (Cain et al., 2008, 2010). In addition, rejection from peers has been associated with significant objective physiological stress such as cortisol changes and increased blood pressure in both genders (Ford & Collins, 2010; Stroud et al., 2000), subjective reports of anger, sadness, and hurt (Buckley et al., 2004), tension, and increased food consumption in young adult females (Stroud et al., 2000). Based on these empirical findings, peer relationships
were identified as a specific interpersonal domain in which stress, elicited through peer rejection processes, could lead to body image concerns in young adults.

It remains unknown as to the precise nature of the peer-related stress that could trigger body dissatisfaction. Research on body dissatisfaction in adolescence has highlighted sociocultural influences as relating to appearance, such as teasing and perceived pressures to change appearance (Levine & Smolak, 2002). In addition, acceptance from peers in adolescence is increasingly based on physical attractiveness (Harter, 1999). Along with Furman and Thompson (2002) who reported negative comments about appearance and ability from peers predicted body dissatisfaction, these findings suggest that the interpersonal stressor influences on body dissatisfaction may need to be specifically linked to appearance. However, previous studies assessing interpersonal rejection in young adults have manipulated mild and ambiguous rejection (Ford & Collins, 2010), exclusion based on general negative feedback from others (Buckley et al., 2004; Stroud et al., 2000, 2002), and exposure to words associated with rejection (Wallis & Hetherington, 2004). Therefore, it is also possible that, rather than peer stress pertaining only to the body (e.g., negative comments regarding appearance) triggering body dissatisfaction, it may pertain to negative feedback relating to the self more generally. To inform the current study, comparison of the five items on the modified peer stress subscale assessed in Study 1a (Chapter 3) in relation to body dissatisfaction was undertaken through multiple regression. Results revealed a significant total model, $F(5,490) = 36.47, p < .001, R^2 = .27$, with significant individual items pertaining to pressure to fit in with peers ($p < .001$), peers hassling you about the way you look ($p = .001$), and being judged by your friends ($p = .01$). The current study aims to investigate whether stress in the peer domain related to appearance and/or personality triggers body dissatisfaction, with slightly more evidence supporting the former.
In considering moderating variables relevant to the interpersonal stress-body dissatisfaction link, the current study focused on appearance importance and gender. Appearance importance, defined in this study as the degree to which self-worth is staked in the appearance domain (Crocker, Luhtanen, Cooper, & Bouvrette, 2003), is a particularly important variable in research focusing on body dissatisfaction and eating disorders. It has been aligned closely with internalisation of cultural appearance ideals (Tiggemann, 2004), a central mediating variable in the tripartite model of body image and eating disturbance (Thompson et al., 1999), and is also aligned with the overvaluation of weight and shape which forms the core psychopathology of eating disorders according to the transdiagnostic theory (Fairburn et al., 2003). Appearance importance has been shown to explain the variability of daily body image states in young adult females (Rudiger, Cash, Roehrig, & Thompson, 2007). In the current study, it is hypothesised that, in accordance with sociometer theory (Gailliot & Baumeister, 2007), interpersonal stress through rejection leads to deficits in self-esteem, which could then translate into body dissatisfaction, particularly if an individual places a high degree of importance on the body in assessments of self-worth.

Gender is also tested as a moderating variable in the present study given the preponderance of females reporting body dissatisfaction compared to males in young adulthood (Grogan, 2011; Lewinsohn et al., 2002). The inclusion of gender in the study is central to understand the effect of interpersonal stress on body image, and whether this is relevant for both females and males. In the current study, it is hypothesised that interpersonal rejection could trigger body dissatisfaction in both young adult females and males given their importance to both (Wagner & Compas, 1990), but given past studies identifying interpersonal stress through rejection as particularly salient for young adult females (Stroud et al., 2000), it is possible that these effects may be stronger compared to males.
In summary, the current study builds on previous research examining the nature and direction of the relationship between stress and body dissatisfaction in adolescents and young adults. It utilises an experimental design to examine causality in the relationship, and assesses the effect of subjective and physiological interpersonal stress through peer rejection on state body dissatisfaction, as well as the moderating effect of appearance importance and gender in a young adult sample. It is hypothesised that peer rejection (appearance- and personality-based) will result in greater body dissatisfaction than a neutral, no-rejection condition for both genders, particularly for individuals reporting high appearance importance. The effect of peer rejection on body dissatisfaction is hypothesised to be greater for appearance-based versus personality-based peer rejection. The model tested in the current study is depicted in Figure 6.1.

**Figure 6.1.** Experimental model tested in Study 3
Method

Participants

Participants were 111 students aged 18 to 25 years at the Australian National University (M = 20.58, SD = 1.86), with n=66 females (M = 20.42, SD = 1.82) and n=45 males (M = 20.82, SD = 1.93). Allocation to experimental conditions was undertaken using block randomisation for females and males, that is n=22 females and n=15 males per condition. Recruitment was undertaken through advertisement of the study on the first year undergraduate psychology website and through posters displayed on campus and emailed to residential halls and faculties for distribution (see Appendix I). Participants were offered one-hour course credit for undergraduate first-year psychology courses, or $10 remuneration for their participation. Permission to undertake the study was provided by the Australian National University Human Research Ethics Committee (protocol number 2011/668) (see Appendix J).

Design

The study comprised a $3 \times 2 \times 2$ design, pertaining to three interpersonal stress experimental conditions (appearance-based peer rejection, personality-based peer rejection, no rejection control) $\times$ gender (female, male) $\times$ appearance importance (high, low).

Measures

All participants completed the following self-report questionnaires (see Appendix K), including demographic information relating to gender, age, university degree and year of commencement, and whether or not they had abstained from caffeine for four hours prior to testing. Seven participants indicated they had not abstained but
were not identified as outliers in data screening on the physiology measures and were therefore retained in the analyses.

**State body dissatisfaction.** The Body Image States Scale (BISS; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002) was administered to provide one index of state body dissatisfaction. The scale assesses six items focusing on evaluations of the body in a specific situation and point in time, with participants indicating the degree to which they agree with nine response statements (with scores ranging from 1 to 9) based on how they feel right now with regards to their physical appearance, body size and shape, weight, attractiveness, their looks, and how they compare with an average person on attractiveness. The total score represents an average of the six items, with higher scores indicating more positive views of the body. The scale is a reliable assessment of state body satisfaction, with Cronbach’s alpha coefficients ranging from .77 to .90 and .62 to .84 for different positive, negative and neutral situations respectively among female and male young adult samples. Temporal stability has been shown to be .69 and .68 for females and males over 2 to 3 weeks respectively, and convergent validity shown with trait measures of body image evaluation and investment, as well as body dissatisfaction, shame, overweight preoccupation and dysfunctional investment in appearance (Cash et al., 2002). Alpha coefficients in the current study were .79, .81 and .73 for the total, female, and male samples respectively.

State body satisfaction was also assessed by the Physical Appearance State and Trait Anxiety Scale (PASTAS; Reed, Thompson, Brannick, & Sacco, 1991) to provide a more specific index of weight-related distress compared to the focus on general dissatisfaction in the BISS. It includes 16 items assessing the amount of anxiety, tension or nerves associated with body parts and areas at the present moment using a Likert scale ranging from 0 (not at all) to 4 (exceptionally so), such that higher scores correspond to greater body-related anxiety. The PASTAS includes two subscales,
weight based and non-weight based appearance anxiety. Only the weight-based subscale was used in the present study to provide a pure measure of weight-related dissatisfaction. The weight-based scale (PASTAS-W) contains eight items and focuses on ratings of anxiety associated with aspects of the body associated with weight, such as hips, thighs, shape, and weight (scores range from 0 to 32). This subscale correlates with measures of body dissatisfaction, appearance evaluation, and eating disturbance. Alpha coefficients for the PASTAS-W indicate a high level of internal consistency of .88 for the trait version, and ranging between .90 to .92 for low, medium and high state assessments relating to situations inducing various levels of body image anxiety. In addition, test-retest correlation was reported as .89. In the current study, alpha coefficients were .89, .89 and .85 for the total, female and male samples respectively on the PASTAS-W.

**Appearance importance.** Appearance Importance was measured by the Appearance subscale of the Contingencies of Self-Worth Scale (CSWS; Crocker et al., 2003). The complete scale includes 35 items referencing the degree to which self-worth is based on seven sources of self-esteem in young adults including academic performance, appearance, approval from others, competition, family support, God’s love, and virtue. Respondents indicate the importance of statements, such as “My sense of self-worth suffers whenever I think I don’t look good” on a 7-point likert scale from “Strongly Disagree” to “Strongly Agree”, with higher scores reflecting greater investment in that domain for self-worth assessments. The appearance importance scale contains five items, with scores ranging from 5 to 35. All subscales have demonstrated high internal consistency and test-retest reliability (displaying a stability of .75 over three months, .66 for five months, and .66 for eight months for the appearance importance scale), and have been shown to be distinct from other personality measures. The measure is appropriate for females and males and has been identified as a predictor
of the way in which an individual spends their time, and is distinct from global personal self-esteem, narcissism, social disability, and parent income. In the current study, alpha coefficients were .85, .83, and .86 for the total, female, and male samples respectively.

Prior to statistical analyses, but before the screening and cleaning procedures outlined in the Results section, the appearance importance variable was split into two groups representing high and low values for inclusion as a categorical variable. To ensure a split at a meaningful value given gender differences on the measure favouring greater importance in females (One-way ANOVA: \( F(1, 109) = 6.94, \eta^2 = .06, p = .01 \)), a mean score of 5 across each item (corresponding to a score of 25 or above in total) was chosen as it corresponded to “agree somewhat” and thus endorsement of appearance importance. Note that this variable was transformed using a reflected square root due to deviations from normality, thus the split was performed at the transformed equivalent score of 3.32. Cell frequencies for this separation of the sample are presented in Table 6.1.

Table 6.1

<table>
<thead>
<tr>
<th>Appearance Importance Group</th>
<th>Total n</th>
<th>Condition n</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Appearance</td>
<td>Personality</td>
</tr>
<tr>
<td></td>
<td>Rejection</td>
<td>Rejection</td>
</tr>
<tr>
<td>High</td>
<td>60</td>
<td>22</td>
</tr>
<tr>
<td>Females</td>
<td>40</td>
<td>14</td>
</tr>
<tr>
<td>Males</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>Low</td>
<td>51</td>
<td>15</td>
</tr>
<tr>
<td>Females</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td>Males</td>
<td>25</td>
<td>7</td>
</tr>
</tbody>
</table>
Body mass index. The researcher measured the height and weight of each participant one at a time in order to calculate Body Mass Index (BMI = kg/m²). A two-metre height rod on the wall was used to measure height to the half-centimetre at the crown of the head, and scales were used to measured weight to the kilogram. Weight and height were measured without shoes, with pockets emptied, and with bulky clothing items removed. In order to alleviate any weight-related distress, participants were not informed of their height or weight and were asked to focus on an optical illusion picture placed on the wall to distract them during the weighing process. A randomly allocated three-digit code was assigned to each participant on their questionnaire and recorded to match height and weight with survey responses.

Manipulation checks. Manipulation checks for the peer stress induction comprised measurements of subjective and objective stress. Participants were asked to rate, following the stressor stimulus, how tense, irritable, agitated, positive in mood, and how calm they were feeling on a scale from 1 to 7 (corresponding to none to a lot). Objective assessments were also undertaken to evaluate changes in arousal of the body throughout the study. Objective assessment included analysis of tonic EDA (sweat responses) and heart rate changes due to the influence of psychological states on arousal (Lazarus, 1990). Tonic EDA provides an indirect measure of the sympathetic nervous system which assesses average skin conductance changes in microsiemens (µS) over time, generally in the order of one to three values as the sweat duct fills and conductance increases in response to psychological states (Dawson, Schell, & Filion, 2000; Figner & Murphy, in press). A second variable, heart rate, was assessed using an electrocardiogram (ECG) and then mean beats per minute were calculated using the Acqknowledge software program. This assesses electrical potential across the heart, thus both sympathetic and parasympathetic activity, in response to emotional experiences (Porges & Byrne, 1992). ECG measurement is particularly impacted by
movement and needs to be analysed using computer programs to evaluate the full cycle of activity minimising error (Porges & Byrne, 1992). These two physiological assessments of stress were selected to provide an indication of objective stress, but can also be effected by food intake, movement, substances (e.g. caffeine), and health status (Semmer et al., 2003). Therefore, strategies to minimise error were employed by instructing participants to abstain from nicotine or caffeine four hours prior to the study, and allowing sufficient habituation periods. Each was calculated for the baseline period of the study and for the stress vignette sections in which rejection occurs (sections four and five). The latter was calculated by subtracting baseline measures so that individual differences in physiological responses were accounted for and a change score during the stress section analysed as the manipulation check.

The content of the vignettes used to induce stress was also assessed by asking participants how rejected, humiliated, and ashamed they felt using the same 1 to 7 Likert scale. Written responses were also reviewed to ensure participants engaged appropriately in the writing task association with the stress induction (described below).

Materials

Vignettes describing peer-based interactions in which the protagonist was gender-matched with the participant were used to induce stress in the current study. Due to the potential adverse effects of direct exposure, vicarious exposure was considered appropriate based on its efficacy in previous state body image research (Furman & Thompson, 2002). In order to increase the stress response and ensure each participant had participated appropriately in the study, participants were asked to write about how they would think and feel if in the same situation after reading the vignette.

Three vignettes were developed to correspond to the appearance rejection, personality rejection, and no rejection conditions. Each vignette describes the
experience of ‘Alex’ who has an interaction with peers from high school. In two scenarios, Alex is rejected by a group of peers based on his/her appearance or personality, while a third scenario acts as a control containing no rejection. Rejection is communicated in the two scenarios through both verbal and non-verbal cues, with a negative comment made by the group either relating to appearance (i.e., “If I looked like that in a swimsuit I wouldn’t go out in public!”) or personality (i.e., “I thought she would never leave. She’s as lame as ever!”), and the group laughing together loudly. In the control condition, Alex runs into a peer from high school and speaks to them briefly, with no clear positive or negative feedback provided. Vignettes were matched for word-length across the three conditions. The vignettes were the same for females and males, with only the gender of the protagonist differing. The female versions of the three vignettes are provided in Appendix L.

Procedure

Testing session. Participants were invited to contact the researcher by email if interested in taking part in a study focusing on “Self-view and group-based interactions”. Testing was group-based, with up to three participants taking part in one session. Random assignment to stress conditions was undertaken upon arrival for testing, with two separate randomised lists of condition allocations developed for females and males respectively (using randomiser.org) in which sets of three containing one of each condition were generated. A maximum of 20 sets corresponding to 60 participants for each gender was developed, with a minimum sample size of 15 per condition per gender required for adequate power. A second group comprising five sets of three was generated to accommodate an additional six females in the study. Once each participant arrived for testing and their condition was assigned it was crossed off.
Three desks were prepared for each session with the questionnaire (including a three digit code to match to physiology output and measures of height and weight), information and consent forms, and equipment required for the physiology assessment. Electrocardiogram (ECG) and electrodermal activity (EDA) were used to assess heart rate and skin conductance, with sampling rates of 200Hz and 50Hz used respectively with participants attached to equipment using a Lead 2 configuration. ECG measurement used EL503 electrodes which were attached to the inside of each wrist (V+ inside left wrist, V- inside right wrist) and on the right ankle (grounding electrode was attached to the right clavicle if the ankle was not possible). To measure EDA, EL507 electrodes were attached to the index (V+) and middle finger (V-) on the non-dominant hand.

Fifteen minutes prior to testing, the temperature of the room was set to 22°C using a wall-mounted reverse cycle air conditioner set to slow fan speed and a temperature gauge placed in the room to monitor temperature. When participants arrived, they were asked to sit at one of three desks which were placed at 45° from one another to ensure they were not in each other’s line of sight. The experimenter was positioned in front of a monitor adjacent to participants (but out of their line of sight) to view physiology readings and observe participants. The experimenter remained silent throughout the study except when giving instructions.

Once participants had read the information sheet and consent form, they were attached to the physiology equipment, with the experimenter wearing a different set of gloves for each participant. Areas of electrode placement were wiped with a sterile lint-free swab using water, and once dry electrodes were attached and leads connected. In order to reduce movement, wires were fastened to each table with velcro and medical tape was used to hold electrodes in place. Following attachment to the equipment, participants completed the CSWS questionnaire to allow sufficient time for electrodes
to bond to the skin. When complete, a 10-minute baseline data collection period commenced, with participants instructed to relax and remain silent and still.

Participants then undertook the stressor task. They were provided with booklets containing the experimental vignette (appearance rejection, personality rejection or control) and asked to read the instructions on the first two pages. When all participants were ready, they were asked to begin reading the vignette and vividly imagine each of the five sections of the scenario, turning the page to the next section only when instructed by the experimenter after 30 seconds (e.g., "You may now turn to section 1"). A four-minute writing period followed, with participants asked to write about what they would think and feel if they were the protagonist in the situation described in the vignette.

Participants then completed the subjective stress measure and dependent variable measures of the PASTAS-W and BISS, as well as a question asking them to write what they believed the study was about. Once all participants completed the questionnaires, they were asked to remove the electrodes, leads, and tape which were placed in a bin, to remove their shoes, and to then have their height and weight measured. Participants were not informed of their height or weight, or shown the physiology data. At the end of the study, a debrief sheet describing the true nature of the study and a verbal debrief was provided, with participants invited to ask questions. The experimenter then signed course credit forms or provided $10 remuneration.

Sections of the study were timed using a stopwatch by the experimenter, and the physiology output was marked accordingly throughout the study to identify the baseline measurement period, stress stimulus administration (including each 30 second interval), writing period, and the final survey completion period. No readings were collected during the CSWS administration (see Appendix M for participant consent form, information statement and debrief sheet).
Pilot work. Prior to the study, the stress manipulation procedure and subjective stress reports, writing period duration and dependent variables were piloted in a sample of 20 adult females and males (n=16 and n=4 respectively). The mean age of pilot participants was 31.16 years (SD = 7.28). Participants were randomly assigned to the three conditions (n=7, 8 and 5 respectively for appearance rejection, personality rejection, and control). To assess an appropriate writing period, 10 participants wrote for two minutes following reading the experimental vignette, and 10 for five minutes. Six of the pilot participants were tested in the laboratory utilising the full procedure including physiology measurement. The remaining participants only completed the stress task, pre-post subjective stress measures and dependent variables. Trends in subjective stress reports after stress exposure and in the BISS and PASTAS-W were examined using one-way ANOVA examining condition effects (see Appendix N for descriptive statistics). While not significant given the number of participants tested in piloting, trends supported higher distress ratings in the two rejection conditions compared to controls. The manipulation check assessing rejection was significant, \( F(2, 19) = 3.67, p = .047 \), with results supporting a significant difference between experimental groups and the control, thus supporting the efficacy of the rejection manipulations. Detailed feedback was elicited from participants, with consensus leading to a four minute writing period due to feedback that two minutes was too short and five minutes too long (e.g., potentially leading to a reduction in stress).

Statistical Analysis

Statistical analyses in the current study utilised analysis of variance, a technique assessing differences in mean values across a continuous dependent variable (DV) at levels of one or a number of categorical independent variables (IV) and their combination. This technique was deemed appropriate in the current study based on the
experimental design and use of three categorical independent variables, that is, condition (three levels: appearance-based peer rejection, personality-based peer rejection, no rejection control), gender (two levels: female, male), and appearance importance (two levels: high, low). Two state-based dependent variables were measured, pertaining to body satisfaction (i.e., the BISS and PASTAS-W). Full factorial three-way models were hypothesised. To analyse physiology output, a software program Acqknowledge was utilised.

Results

Prior to statistical analysis, data were examined in accordance with recommendations by Tabachnick and Fidell (2007) to ensure their suitability. No cases or variables possessed greater than 5% missing data, with a total of four values missing (three contingencies of self-worth items – none pertaining to the appearance importance scale - and one subjective manipulation check) for the sample, with mean substitution used. Univariate outliers were examined using boxplots for variables at the sample level for ungrouped variables in the analysis (i.e., age, BMI, and appearance importance) and at the condition level (i.e., body image dependent variables and subjective manipulation checks). The criterion for extreme values was determined as a z-score exceeding 3.29 (Tabachnick & Fidell, 2007), with analyses revealing one on appearance importance \( z = -3.48 \). Examination of normality revealed significant deviations from normality at \( p < .05 \) on the Kolmogorov-Smirnov statistic for the PASTAS-W in both rejection conditions. A square root transformation was undertaken and retained due to successful correction for deviations in normality (PASTAS-Wt) (Tabachnick & Fidell, 2007) at the condition level and the whole sample. For the (continuous) appearance importance variable, a reflected square root transformation was
undertaken to correct for negative skew and bring the extreme value closer to the centre of the distribution; both of which were appropriately corrected. Note that this led to the reversal of the appearance importance variable, such that low values equate to high importance, and high values to low importance. Mean values (and standard deviation) for the (transformed) appearance importance variable at the level of the total, female and male sample were 3.23 (0.83), 3.07 (0.80) and 3.48 (0.83) respectively. No multivariate outliers were evident, $\chi^2 (4, .999) = 18.47$, and assumptions of linearity, homoscedasticity, multicollinearity and singularity were all met. Objective manipulation checks were also investigated and deemed appropriate.

**Manipulation Checks**

Investigation of the efficacy of the stress manipulation in the current study was tested using one-way between-subjects ANOVA for both the subjective (assessed following stressor exposure) and objective (assessed across study sections) manipulation check measures. In addition, assessment of the content validity of the vignettes was examined. Table 6.2 displays the $F$ values, effect size ($\eta^2$), power, estimated marginal means (EMM) and significance of multiple comparisons relating to these analyses. Results supported the efficacy of the stress manipulation based on subjective reports, specifically identifying significantly greater tension, agitation, negative mood, and irritability in the appearance rejection condition compared to controls, and on irritability, negative mood, and marginal significance on tension, agitation and not calm for the personality rejection condition compared to controls. No significant differences were apparent between the two stressor conditions on any of the measures, or between the appearance rejection and controls on calmness. In contrast, no significant differences by condition were apparent for objective manipulation checks (i.e. skin conductance (EDA) or heart rate) at baseline, supporting random allocation to
conditions, or for the change scores associated with the stress component of the study. Examination of the rejection, humiliation, and shame rating scales revealed significant differences by condition, thus supporting the validity of the stress manipulation in the study. Specifically, both rejection conditions led to significantly greater reports of rejection, humiliation, and shame compared to the control group, and significantly greater rejection in the appearance compared to the personality condition. The Levene's test was violated in the rejection analysis, suggesting the difference between the two rejection conditions may not be significant as it exceeds a more conservative criterion of $p < .01$ (Pallant, 2011).

Table 6.2

**Manipulation checks analysis**

<table>
<thead>
<tr>
<th>DV</th>
<th>$F$ (df1, df2)</th>
<th>$\eta^2$</th>
<th>Observed Power</th>
<th>EMM</th>
<th>Multiple Comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subjective Manipulation Checks</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tension</td>
<td>4.89 (2, 108)**</td>
<td>.083</td>
<td>0.795</td>
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</tr>
<tr>
<td>Appearance</td>
<td>4.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personality</td>
<td>3.77</td>
<td></td>
<td></td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3.00</td>
<td></td>
<td></td>
<td>^</td>
<td></td>
</tr>
<tr>
<td>Irritation</td>
<td>10.65 (2, 108)***</td>
<td>.165</td>
<td>0.988</td>
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<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>3.38</td>
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<tr>
<td>Personality</td>
<td>3.80</td>
<td></td>
<td></td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>2.22</td>
<td></td>
<td></td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Negative mood</td>
<td>8.54 (2, 108)****</td>
<td>.137</td>
<td>0.963</td>
<td></td>
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<tr>
<td>Appearance</td>
<td>3.92</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personality</td>
<td>4.30</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3.08</td>
<td></td>
<td></td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Agitation</td>
<td>3.69 (2, 108)*</td>
<td>.064</td>
<td>0.667</td>
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</tr>
<tr>
<td>Appearance</td>
<td>3.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personality</td>
<td>3.54</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>2.76</td>
<td></td>
<td></td>
<td>^</td>
<td></td>
</tr>
<tr>
<td>Not calm</td>
<td>2.48 (2, 108)^</td>
<td>.049</td>
<td>0.488</td>
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<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>3.62</td>
<td></td>
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</tr>
<tr>
<td>Personality</td>
<td>3.78</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Control</td>
<td>3.05</td>
<td></td>
<td></td>
<td>^</td>
<td></td>
</tr>
</tbody>
</table>
### Table 6.3: Estimated Marginal Means for Objective Manipulation Checks

<table>
<thead>
<tr>
<th>DV</th>
<th>F (df1, df2)</th>
<th>η²</th>
<th>Observed Power</th>
<th>EMM</th>
<th>Multiple Comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline EDA</strong></td>
<td>.73 (2, 108)</td>
<td>.013</td>
<td>.172</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td></td>
<td></td>
<td></td>
<td>10.81</td>
<td>1 vs 2</td>
</tr>
<tr>
<td>Personality</td>
<td></td>
<td></td>
<td></td>
<td>10.59</td>
<td>1 vs 3</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td>12.19</td>
<td>2 vs 3</td>
</tr>
<tr>
<td><strong>Stress EDA</strong></td>
<td>1.56 (2, 108)</td>
<td>.028</td>
<td>.324</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td></td>
<td></td>
<td></td>
<td>1.97</td>
<td>1 vs 2</td>
</tr>
<tr>
<td>Personality</td>
<td></td>
<td></td>
<td></td>
<td>1.51</td>
<td>1 vs 3</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td>2.18</td>
<td>2 vs 3</td>
</tr>
<tr>
<td><strong>Baseline HR</strong></td>
<td>.57 (2, 108)</td>
<td>.01</td>
<td>.143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td></td>
<td></td>
<td></td>
<td>91.92</td>
<td>1 vs 2</td>
</tr>
<tr>
<td>Personality</td>
<td></td>
<td></td>
<td></td>
<td>86.87</td>
<td>1 vs 3</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td>89.27</td>
<td>2 vs 3</td>
</tr>
<tr>
<td><strong>Stress HR</strong></td>
<td>.51 (2, 108)</td>
<td>.009</td>
<td>.132</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td></td>
<td></td>
<td></td>
<td>5.234</td>
<td>1 vs 2</td>
</tr>
<tr>
<td>Personality</td>
<td></td>
<td></td>
<td></td>
<td>3.258</td>
<td>1 vs 3</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td>2.409</td>
<td>2 vs 3</td>
</tr>
</tbody>
</table>

### Manipulation check for stressor stimulus content

<table>
<thead>
<tr>
<th>Rejection</th>
<th>17.87 (2, 108)***</th>
<th>.249</th>
<th>1.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>3.24</td>
<td>1 vs 2</td>
<td>**</td>
</tr>
<tr>
<td>Personality</td>
<td>4.08</td>
<td>1 vs 3</td>
<td>**</td>
</tr>
<tr>
<td>Control</td>
<td>2.03</td>
<td>2 vs 3</td>
<td>***</td>
</tr>
<tr>
<td>Humiliation</td>
<td>15.93 (2, 108)***</td>
<td>.228</td>
<td>.999</td>
</tr>
<tr>
<td>Appearance</td>
<td>3.11</td>
<td>1 vs 2</td>
<td></td>
</tr>
<tr>
<td>Personality</td>
<td>3.73</td>
<td>1 vs 3</td>
<td>+</td>
</tr>
<tr>
<td>Control</td>
<td>1.81</td>
<td>2 vs 3</td>
<td>***</td>
</tr>
<tr>
<td>Shame</td>
<td>6.96 (2, 108)+</td>
<td>.114</td>
<td>.919</td>
</tr>
<tr>
<td>Appearance</td>
<td>3.03</td>
<td>1 vs 2</td>
<td></td>
</tr>
<tr>
<td>Personality</td>
<td>3.16</td>
<td>1 vs 3</td>
<td>**</td>
</tr>
<tr>
<td>Control</td>
<td>1.89</td>
<td>2 vs 3</td>
<td>**</td>
</tr>
</tbody>
</table>

**Note.** Appearance: Appearance rejection condition, Personality: Personality rejection condition, Control: No rejection control condition, EDA: Electrodermal activity (skin conductance), HR: Heart rate, EMM = Estimated Marginal Means.

*** denotes significant at p < .001, + denotes significant at p = .001, ** denotes significant at p < .01,

* denotes significant at p < .05, ^ denotes significant at p < .10

Bivariate correlations were also examined for the total sample and by gender to determine the suitability of the hypothesised statistical models. Table 6.3 reveals significant relationships between the body dissatisfaction DVs, with a moderate to strong negative correlation suggesting greater general satisfaction is associated with less
weight-specific dissatisfaction ($p < .01$ for all samples). BMI displayed a significant positive relationship with weight dissatisfaction for females through a weak to moderate correlation, significant at $p < .01$. Appearance importance (transformed) displayed significant links for the total and female samples at $p < .01$ with state satisfaction and weight dissatisfaction of a weak to moderate size, but only on weight dissatisfaction for males. These findings support the inclusion of appearance importance and gender alongside stressor conditions in analyses of the DVs testing state satisfaction and weight dissatisfaction (three-way between subjects ANOVA).

Table 6.3

*Correlation Matrix for Continuous Variables*

<table>
<thead>
<tr>
<th></th>
<th>Sample</th>
<th>BMI</th>
<th>BISS</th>
<th>PASTAS-Wt</th>
<th>App Impt</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>BISS</td>
<td>Total</td>
<td>-.09</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>-.24</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>-.09</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>PASTAS-Wt</td>
<td>Total</td>
<td>.12</td>
<td>-.62**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>.34**</td>
<td>-.66**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>.16</td>
<td>-.46**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>App Impt</td>
<td>Total</td>
<td>.18</td>
<td>.26**</td>
<td>-.39**</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>.15</td>
<td>.34**</td>
<td>-.35**</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>.05</td>
<td>.01</td>
<td>-.31*</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* BISS: Body Image States Scale (state satisfaction), PASTAS-Wt: Transformed Weight Related Appearance Anxiety variable, App Impt: Transformed Appearance Importance variable.

** denotes significant at $p < .01$, * denotes significant at $p < .05$
The Effect of Interpersonal Stress, Gender, and Appearance Importance on General Body Dissatisfaction (BISS)

A three-way between subjects ANOVA was performed testing the main effects of stressor conditions, gender, and appearance importance, and their interaction, on general state body satisfaction as measured by the BISS. Results revealed a significant model, $F(11, 99) = 2.82, \eta^2 = .238, p = .003$. Examination of the three main effects, two-way interactions, and three-way interaction revealed two significant interactions; stress condition x gender, $F(2, 99) = 3.93, \eta^2 = .074, p = .023$, and gender x appearance importance, $F(1, 99) = 6.67, \eta^2 = .063, p = .011$; and one significant main effect; gender, $F(1, 99) = 4.88, \eta^2 = .05, p = .029$. The main effects for stress condition, $F(2, 99) = .50, p = .607$, and for appearance importance, $F(1, 99) = 1.54, p = .218$, were non-significant. In addition, the stress condition x appearance importance interaction, $F(2, 99) = .72, p = .487$ and the three-way interaction, $F(2, 99) = 1.06, p = .349$ were non-significant. Mean values (and standard deviations) for each cell of the design are presented in Table 6.4.

Table 6.4

Mean (SD) Scores on the BISS Across Each Cell

<table>
<thead>
<tr>
<th>Condition</th>
<th>Gender</th>
<th>Appearance Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Appearance</td>
<td>Female</td>
<td>4.58 (1.16)</td>
</tr>
<tr>
<td>Rejection</td>
<td>Male</td>
<td>5.88 (.86)</td>
</tr>
<tr>
<td>Personality</td>
<td>Female</td>
<td>4.51 (1.23)</td>
</tr>
<tr>
<td>Rejection</td>
<td>Male</td>
<td>5.13 (.60)</td>
</tr>
<tr>
<td>No Rejection</td>
<td>Female</td>
<td>4.56 (1.31)</td>
</tr>
<tr>
<td>Control</td>
<td>Male</td>
<td>5.85 (.75)</td>
</tr>
</tbody>
</table>
Mean scores for the significant gender main effect on the BISS (and standard error: SE) were 4.98 (.14) and 5.47 (.17) for females and males respectively (however, 95% confidence intervals overlapped). In order to interpret the interaction effects, and by extension the main effect of gender, simple effects analyses were undertaken. To do so, one-way between subjects ANOVA was performed with one of the interaction variables acting as the IV (i.e., stress condition) with the sample split at levels of the second interaction variable (i.e., gender). As such, the effect of stress condition on the BISS was examined separately for females and males. The reverse analysis was then performed, that is, splitting the sample at the level of the first variable (i.e., stress condition) and examining the effect of the second on the DV (i.e., gender). Thus the difference between females and males on the BISS was also examined within each stress condition. This allows for differences between the two variables, and among levels of each variable to be assessed, with trends for each two-way interaction depicted in Figures 6.2 and 6.3.

The stress condition x gender interaction was first assessed by examining stress condition effects within each gender level. Mean values (and standard deviation) for the stress condition x gender interaction (and SE) were 4.65 (.25), 5.30 (.24) and 4.99 (.24) for females in the appearance rejection, personality rejection and no rejection control conditions respectively, and 5.74 (.29), 4.91 (.32) and 5.76 (.29) respectively for males. No significant differences for females across stress conditions was identified, but significant difference was evident for males, $F (2, 42) = 4.53, p = .017$, with multiple comparisons identifying significantly lower state body satisfaction (as indexed by the BISS) for males in the personality rejection condition compared to the appearance rejection ($p = .036$) and no rejection control conditions ($p = .031$). The second set of simple effects examining the difference between females and males within each stress condition revealed a significant gender effect in the appearance-based peer rejection...
condition, $F(1, 35) = 10.58, p = .003$, and the control condition, $F(1, 35) = 5.24, p = .028$, such that females reported lower satisfaction scores than males in these conditions. These interaction effects are depicted in Figure 6.2.

![Figure 6.2. Gender x Stress Condition interaction effect for BISS scores](image)

Examination of the gender x appearance importance interaction was undertaken in the same manner. Mean (SE) scores for the gender x appearance importance interaction were 4.55 (.18) and 5.40 (.22) for females reporting high and low appearance importance respectively, and 5.62 (.26) and 5.32 (.23) for males reporting high and low appearance importance respectively. Testing each gender separately, a significant difference between high and low levels of appearance importance was apparent for females, $F(1, 64) = 8.67, p = .005$, but not for males, $F(1, 43) = 2.48, p = .123$. However, analyses comparing gender effects within each level of appearance importance revealed that among those reporting high levels of appearance importance, females displayed significantly worse body satisfaction (as indexed by BISS scores) than males, $F(1, 58) = 15.25, p < .001$, but no difference was evident between males.
and females reporting low appearance importance, $F(1, 49) = .40, p = .529$. This interaction effect is depicted in Figure 6.3 using mean values.

![Figure 6.3. Gender x Appearance Importance interaction effect for BISS scores](image)

**Figure 6.3.** Gender $\times$ Appearance Importance interaction effect for BISS scores

**The Effect of Interpersonal Stress, Gender, and Appearance Importance on Weight-Specific Body Dissatisfaction (PASTAS-W)**

The same three-way between subjects ANOVA was performed for the assessment of weight-specific state body dissatisfaction using the PASTAS-Wt scores. Controlling for BMI was considered given its relation for females in bivariate correlations, but since it was not significant in males, this was not performed as it violates the vital assumption of homogeneity of regression in ANCOVA (Pallant, 2011). The model was significant, $F(11, 99) = 4.86, \eta^2 = .351, p < .001$. Within the model, significant contributions were made by a stress condition $\times$ appearance importance interaction, $F(2, 99) = 5.23, \eta^2 = .096, p = .007$; and main effects for gender, $F(1, 99) = 14.97, \eta^2 = .131, p = .000$ and appearance importance, $F(1, 99) = 10.42, \eta^2 = .095, p = .002$. Non-significant effects were apparent for the stress condition main effect, $F(2,$
Stress and Body Image

99) = 1.36, \( p = .261 \); the gender \( \times \) appearance importance, \( F (1, 99) = .652, p = .421 \), stress condition \( \times \) gender, \( F (2, 99) = 2.15, p = .122 \) two-way interactions, and the three-way interaction, \( F (2, 99) = 2.756, p = .068 \). Mean values (and standard deviations) for each cell of the design are presented in Table 6.5.

Table 6.5

*Mean (SD) Scores on the PASTAS-Wt Across Each Cell*

<table>
<thead>
<tr>
<th>Condition</th>
<th>Gender</th>
<th>Appearance Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Appearance Rejection</td>
<td>Female</td>
<td>3.57 (.107)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>1.89 (.95)</td>
</tr>
<tr>
<td>Personality Rejection</td>
<td>Female</td>
<td>3.61 (1.02)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>2.53 (.69)</td>
</tr>
<tr>
<td>No Rejection Control</td>
<td>Female</td>
<td>3.43 (1.32)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>2.91 (.89)</td>
</tr>
</tbody>
</table>

Mean values (and standard error: SE) for the two main effects on the dependent variable were 3.07 (0.15) and 2.16 (0.18) for females and males respectively, and 2.99 (0.17) and 2.23 (0.16) for high and low appearance importance respectively.

Investigation of the two-way interaction effect between stress condition and appearance importance was again undertaken using simple effects. First, it used a split file to compare stress conditions across high and low levels of appearance importance, and then a split file to compare high and low levels of appearance importance within each stress condition. Mean values for the stress condition \( \times \) appearance importance interaction (and SE) were 2.73 (.26), 3.07 (.33), and 3.17 (.26) for individuals reporting high appearance importance in the appearance rejection, personality rejection and no rejection control conditions respectively, and 2.94 (.30), 2.18 (.26), and 1.58 (.29)
respectively for those reporting low appearance importance. No significant stress condition effect was identified in the high appearance importance group, $F(2, 57) = .58$, $p = .561$, but a significant stress condition effect was apparent in the low appearance importance group, $F(2, 48) = 3.54$, $p = .037$, such that for those reporting low appearance importance, the appearance rejection condition differed significantly from the control group ($p = .029$) but not the personality rejection condition (which did not differ from the control). The Levene’s test was violated in this analysis, $F(2, 48) = 5.09$, $p = .01$, but since the significance value was close to a more conservative criterion that $p < .05$ the result was retained (Pallant, 2011).

Examination of the effect of the appearance importance variable on PASTAS-Wt within each stress condition revealed no significant difference between high and low appearance importance groups on the DV for the appearance rejection condition, $F(1, 35) = .002$, $p = .962$, but significant differences were apparent for the personality rejection and no rejection control conditions, $F(1, 35) = 10.65$, $p = .002$; and $F(1,35) = 10.69$, $p = .002$ respectively, such that high appearance importance was associated with greater weight dissatisfaction. Trends based on mean values are depicted in Figure 6.4.

![Figure 6.4: Condition x Appearance Importance interaction on PASTAS-Wt scores](image-url)
Discussion

The current study investigated the effect of interpersonal stress on state body dissatisfaction (both general and weight-specific) in young adult females and males. It assessed both subjective and objective stress associated with peer rejection scenarios based on appearance, personality, or no rejection, and resulting state body dissatisfaction. The moderating roles of gender and appearance importance were also tested in these models.

Manipulation Checks

The first aim of the current study was to elicit interpersonal stress using a peer rejection vignette. The efficacy of the manipulation was assessed through subjective and objective assessments, with the results partially supporting the efficacy of the manipulation in the sample. Supporting the effectiveness of the manipulation were the results for the subjective stress measures, and the questions assessing the content of the vignettes, which both indicated significant differences between the control groups and the experimental rejection conditions. Overall, these findings are consistent with previous studies verifying the efficacy of vicarious stress exposure in an experimental design (Furman & Thompson, 2002).

However, assessment of objective stress through skin conductance and heart rate revealed no significant changes in average physiological arousal from baseline to stressor exposure across conditions. These findings are surprising and contrast with the subjective assessments of stress in this study. The examination of objective stress through physiological arousal is undertaken comparatively less frequently in psychological stress research (Pearlin et al., 1981), with these findings highlighting a discordance in subjective self-report versus objective assessments of the stress
construct. However, this difference has been identified in previous studies (Connelly & Denney, 2007; Feldman et al., 1999; Nandrino et al., 2012) and is understood to reflect the complexity of the stress experience for an individual. It is also important to consider possible methodological contributions to this finding, of which a number of potential explanations can be identified. First, it is possible that the manipulation in the current study elicited discomfort for participants in rejection conditions compared to controls, but was not sufficiently intense to produce observable physiological indicators of arousal. Second, given the interpersonal context of the stressor stimulus, participants in the control group may have experienced anticipatory anxiety associated with the expectation of a negative event in the scenario which did not dissipate during the stress exposure period. Third, movement artefact could have produced error in the readings taken in the study. While efforts to reduce confounds relating to movement and substances (e.g., nicotine and caffeine) were made in the study, including a 10-minute baseline and habituation period during set-up, these possible effects cannot be ruled out.

Future studies could utilise alternative materials to further control for these confounds, such as presentation of vignettes and questionnaires on a computer screen, and responding to the vignettes verbally. In addition, the possibility of alternative assessments such as cortisol or blood pressure could be considered (Epel, Lapidus, McEwen, & Brownell, 2001; Porges & Byrne, 1992; Stroud et al., 2000, 2002). For instance, it has also been suggested that cortisol changes more in response to stressors involving social evaluative threat and uncontrollability (Stroud et al., 2009). Despite the differences between the subjective and objective assessments in the current study, the subjective data provide some support for the efficacy of the stress manipulations.
The Effect of Interpersonal Stress, Appearance Importance, and Gender on State Body Dissatisfaction

The second aim of the study was to assess the effect of interpersonal stress on state body dissatisfaction (both general and weight-specific), and the role of gender and appearance importance in moderating this effect. The main hypothesis of the current study focused on the effect of interpersonal stress on body dissatisfaction, such that the stress elicited by peer rejection focused on appearance (in particular) and personality would be translated into negative subjective evaluations of the body. Furthermore, it was predicted that this effect would be apparent in both females and males, but would be particularly salient for females and those reporting high appearance importance. However, examination of the models of the two dependent variables revealed more complex findings which are discussed in turn.

The effect of interpersonal stress, gender, and appearance importance on general body satisfaction. Assessment of general state body satisfaction as assessed by the BISS revealed a significant model, explaining 23.8% of the variance. However, significant individual contributions within the model centred on the main effect for gender, and two interaction effects between stress condition and gender, and gender and appearance importance. Interpretation of the interaction effects revealed a significant difference between females and males on state body dissatisfaction in the appearance-based peer rejection condition and in the control group, but not in the personality-based peer rejection condition. This latter finding can be attributed to the worse body dissatisfaction of males in personality-based rejection condition. More specifically, examination at the level of gender revealed no significant differences between the effects of stressor conditions for females, but significant differences were evident for males, such that those in the personality-based peer rejection condition reported greater general body dissatisfaction compared to males in the other two stressor conditions.
The second interaction between gender and appearance importance revealed that females reporting high appearance importance reported significantly greater general body dissatisfaction compared to females reporting low appearance importance, and males in general.

These findings suggest that there is no significant interpersonal stress effect on general body dissatisfaction for females, but that there is for males in the context of peer rejection based on personality. Indeed, males in the personality-based peer rejection condition had levels of general body dissatisfaction equivalent to females generally. These findings are consistent with previous studies highlighting the propensity for females (Lewinsohn et al., 2002; Muth & Cash, 1997), and those with high appearance importance (Giovannelli et al., 2008; McCabe & Ricciardelli, 2003b; Rieder & Ruderman, 2001; Tiggemann, 2004) to report greater negative body image. However, the present study adds two additional findings, namely (i) that body dissatisfaction in females was unresponsive to additional stressors of an interpersonal nature, and (ii) the vulnerability of males to body dissatisfaction when interpersonal stress centres on personality characteristics.

The lack of salience of the interpersonal setting for females is an unexpected finding, with no difference in body dissatisfaction observed based on the nature of interactions with peers - that is, whether these were negative and rejecting (based on the person’s appearance or personality) or neutral. This constrasts with past findings highlighting a link between interpersonal stress and eating behaviours (Cain et al., 2008, 2010; Stroud et al., 2000; 2002; 2009). One possible interpretation of this finding is that the interpersonal stressors were not of sufficient intensity (as suggested by the lack of change on objective measures of stress) to further inflate the already elevated body dissatisfaction of the female participants. Alternatively, susceptibility of female body dissatisfaction to the interpersonal context may have emerged had a positive
interpersonal feedback condition been included. Since no positive peer interaction condition was tested in the study, it is unclear whether these findings apply to all interpersonal interactions for females or whether they apply only to negatively valenced and ambiguous (neutral) experiences. For example, it is possible that neutral or negative interactions in the interpersonal context lead to self-consciousness or increased awareness of the body, or elicit comparative processes with those participating in the interaction (Menzel et al., 2010), which lead to body dissatisfaction. Conversely, any interpersonal context may lead to increased focus on the body and critical body image assessments, such that the study would have benefitted from the inclusion of a non-interpersonal condition.

In contrast, interpersonal stress for males elicited greater general body dissatisfaction in the context of personality-based rejection, with males in this condition reporting levels of elevated body dissatisfaction equivalent to the female participants. This finding might reflect the fact that the body is associated with masculinity, instrumentality, and dominance in males (Galambos et al., 1990), so that any diminution of the male's personality may in turn be experienced as dissatisfaction with his body. It is possible that messages from others impact negatively upon self-worth and body satisfaction in males because social standing or the potential for dominance has been threatened. It is also possible that self-worth is more focused on personality characteristics than appearance for young adult males, as indicated by their focus on achievement domains in past studies (Stroud et al., 2002, 2009), and thus rejection on this trait elicits reductions in self-esteem (including body esteem as assessed in the present study).

The second interaction indicated that appearance importance is specifically relevant for body dissatisfaction in females, such that higher levels are associated with greater general body dissatisfaction compared to females rating lower on appearance
importance and males generally. This is not surprising, highlighting a core vulnerability in body dissatisfaction for females (Banfield & McCabe, 2002; Muth & Cash, 1997). Interestingly, while body importance was highlighted for both genders in previous studies in the current research program, the findings of the present study suggest it is more important for females in state body dissatisfaction. However, the age of the current sample is older than the adolescent samples utilised in previous studies in this research program, raising the possibility that appearance importance endures for females while becoming less meaningful to males into adulthood. It is also possible that the lack of an assessment of the importance of muscles in self-evaluation may explain the gender difference in appearance importance observed in the current study, given the importance of both muscle-related and body fat-related investment and satisfaction in young adult males (Tylka, 2011).

The effect of interpersonal stress, gender, and appearance importance on weight-specific body satisfaction. Investigation of weight-specific body dissatisfaction (as measured by the PASTAS-W) also yielded a significant model, with an effect size of 35.1%. Significant individual contributions were identified for gender and appearance importance, as well as an interaction between stress condition and appearance importance. These results highlighted a gender difference in weight-specific body dissatisfaction, such that females reported greater weight-dissatisfaction than males, which is consistent with past research on body dissatisfaction which has tended to focus on weight-related variables as more relevant for females (Muth & Cash, 1997; Ricciardelli et al., 2009; Smolak, 2004). Those who reported high appearance importance also reported greater weight-dissatisfaction. This finding is also consistent with past studies, emphasising a significant role for appearance importance in body dissatisfaction, including specific weight and shape dissatisfaction (Mendelson et al.,
and muscle-specific dissatisfaction in males which was not assessed in the current study (Smolak & Stein, 2006).

In terms of the significant interaction effect between stress condition and appearance importance, examination at the condition level revealed no differences in weight-related body dissatisfaction between those with high versus low appearance importance in the appearance rejection condition. Thus interpersonal stress based on appearance resulted in significantly greater distress regarding weight-related body areas than the control group, irrespective of appearance importance. These findings suggest a significant effect of interpersonal stress related to appearance on weight-related dissatisfaction, regardless of the importance of appearance for self-evaluation. However, differences in weight-dissatisfaction between those high and low in appearance importance were evident for the personality-based peer rejection and control groups.

The finding relating to interpersonal stress around appearance is not surprising since negative comments relating to appearance could readily be translated to negative body image assessments. However, rather than the hypothesised effect of increased reports for those with high appearance importance, these findings are suggestive of a ceiling effect, such that stress impacts upon weight-related body dissatisfaction only in those for whom there is room to increase distress, that is, individuals with low appearance importance. These ceiling effects are reflective of the results obtained by Warren et al. (2012), who showed that fat talk impacted upon body dissatisfaction in young adult females reporting low levels of stress, but not those with high levels of stress due to ceiling effects in body dissatisfaction in the latter group. A similar process could be apparent in the current findings, with interpersonal stress around appearance predicting weight-based dissatisfaction at equivalent levels for those reporting high and low appearance importance. The same trend was not evident for the personality-based stress and the control conditions, where appearance importance remains the strongest
determinant of weight-based dissatisfaction. It is possible that no effect of appearance rejection stress in the peer environment is the result of a ceiling effect in this group, but for those reporting low appearance importance there is room for an increase in weight-related dissatisfaction subsequent to appearance-based rejection. The appearance rejection vignette involves negative commentary relating to appearance rejection at the pool, which makes characteristics related to weight and shape especially salient. Therefore, for those individuals who do not focus on the body or appearance as a central component of self-evaluation, exposure to this feedback forces them to focus on these features, leading to distress in relation to them. These findings suggest stress is a proximal risk factor which acts secondary to pre-existing vulnerability factors, such as appearance importance, in weight-based dissatisfaction.

Summary of the Findings on Interpersonal Stress, Gender, and Appearance Importance Effects for Body Dissatisfaction

Taken together, the findings suggest that females generally report greater state body dissatisfaction (both general and weight-specific) compared to males (which may reflect the fact that the measures did not specifically index muscularity concerns except for one item on the PASTAS-W assessing muscle tone, and were thus potentially less sensitive to the concerns of males). Secondly, appearance importance is a central vulnerability factor, such that high appearance importance is linked with more negative state body dissatisfaction. In accordance with sociometer theory, these findings suggest that for females and those reporting high appearance importance, self-worth assessments are calibrated to the appearance domain and perceived failure in this area leads to low body esteem (Gailliot & Baumeister, 2007) regardless of actual interactions in the interpersonal context. The models revealed a greater proportion of explained variance in the weight-specific body dissatisfaction measure, suggesting that stress,
appearance importance, and gender are more influential in this specific dimension of body dissatisfaction. It is possible that this difference is accounted for by the fact that the appearance-based peer rejection vignette described a situation in which weight and shape was salient, but also that the weight-salience of the measure is more closely aligned with female body image concerns.

The different models of state body dissatisfaction (i.e., general and weight-specific) also demonstrated subtle differences in terms of significant main and interaction effects. While stress condition effects were evident in both dependent variables, the role of stress was moderated by gender in the general body dissatisfaction model, and by appearance importance in the weight-specific body dissatisfaction model. In terms of the former, given that the general measure of body dissatisfaction was not focused solely on weight, it may have been more sensitive to the body image concerns of males and hence been able to identify the negative impact of personality-based peer rejection on male body satisfaction. In terms of the latter, that even those with low appearance importance were vulnerable to weight-related distress following appearance-related peer rejection may have been due to the shape/weight-focused setting in which this rejection occurred.

The results offer insight into the role of interpersonal stress in body dissatisfaction, suggesting it is influential as a situational trigger for body dissatisfaction in individuals who do not already present with significant vulnerability. Models of body dissatisfaction have previously highlighted investment in appearance as a vulnerability factor, leading to body dissatisfaction and subsequent dysphoric body experiences (Muth & Cash, 1997). The current study assesses triggers to this model, suggesting interpersonal stress does not predict body dissatisfaction for females, except in comparison to males, and nor did it display a significant effect for those reporting high appearance importance in weight-specific body dissatisfaction. In contrast,
significant stress condition effects were apparent for males in the personality rejection condition on general body dissatisfaction, and for individuals reporting low appearance importance in the appearance rejection condition for weight-specific body dissatisfaction. Interestingly, while appearance rejection was most salient in weight-related body dissatisfaction for those reporting low appearance importance, personality rejection was strongest in general body satisfaction for males, identifying differences in the nature of interpersonal stress in these less vulnerable groups. Thus, while the lower vulnerability is shared, the actual triggers diverge. Personality appears to be more closely aligned with self-evaluation in young adult males, while direct comments about appearance in those who do not rate appearance as a central component of self-evaluation appears to increase vulnerability to weight-related dissatisfaction. While the meaning of these two interpersonal stress scenarios differ, in both it appears to threaten self-worth in an important way, which is then translated into body image concerns. In line with sociometer theory (Gailliot & Baumeister, 2007), it is possible that for individuals who do not already calibrate to the appearance domain, these rejecting interpersonal interactions force evaluation of the self based on these characteristics, leading to low self-esteem and poorer body or weight satisfaction as a result. For males, personality assessments appear to relate more closely to body image than appearance assessments. It should be noted that the duration of the effects in the current study are unclear, but could indicate increased vulnerability over time and the need to prevent this process and intervene early, particularly for adolescents.

Clinical and Theoretical Implications of the Findings

The current findings hold implications for programs aimed at preventing body dissatisfaction in adolescents and young adults, identifying the need to focus especially on females, reducing appearance importance for self-evaluation, and management of
stress as a proximal factor in initiating or enhancing an individual’s vulnerability. Furthermore, intervention for males could focus on personality-related rejection in peer relationships. The study findings support the tripartite model of body dissatisfaction which emphasises the role of peer processes and internalisation of ideals (Keery et al., 2004; Shroff & Thompson, 2006; Thompson et al., 1999; van den Berg et al., 2002), but also supports the role of body importance in the onset of eating disorders as proposed by the transdiagnostic theory of eating disorders (Fairburn et al., 2003). As a result, the findings highlight the potential relevance of stress as a component of peer influences on body dissatisfaction, which could subsequently enhance vulnerability to eating disorders. Therefore, it is worth considering its inclusion as a precipitating factor in both models.

Limitations and Future Directions

In addition to the limitations already mentioned, the current study possesses a number of methodological problems which must be considered when interpreting the findings. The most notable limitation is the restricted sample of males which, while sufficient for analyses, reduced the power of these analyses. In addition, the sample comprised university students, and therefore the generalisability of the findings young adults with different educational backgrounds is unclear. Second, the measurement of the dependent variables after the stressor stimulus precludes conclusions relating to changes in body dissatisfaction from pre- to post-stressor manipulation. A post-test design was used in order to conceal the true nature of the study and therefore minimise demand characteristics. It was also assumed that, through randomisation, the groups were equivalent on baseline levels of body dissatisfaction. Finally, the inclusion of a measure of body dissatisfaction specific to muscularity would have been more sensitive to the body image concerns of males.
Summary

The current study tested the effect of interpersonal stress (based on appearance or personality rejection) on state body dissatisfaction (both general and weight-specific). The results suggest that gender and appearance importance are central in creating vulnerabilities to body dissatisfaction in young adulthood, such that females and those reporting high appearance importance report greater concerns in relation to body satisfaction. Furthermore, males experiencing interpersonal stress related to personality rejection report significantly greater general body dissatisfaction, at an equivalent level to females, while stress does not appear to influence general body satisfaction in females. Interpersonal stress relating to appearance rejection was also shown to elicit greater weight-focused body dissatisfaction regardless of appearance importance in self-evaluation. These findings suggest ceiling effects in general and weight-specific body dissatisfaction respectively, such that stress enhances state body image concerns in those who are otherwise less vulnerable (i.e., in males and those reporting low appearance importance). The results pose implications for prevention work in young adults and adolescents, highlighting the need to address established risk factors such as gender and appearance importance, but also improve coping with proximal factors such as interpersonal stress (based on appearance or personality) which elicit state body dissatisfaction that could in turn enhance vulnerability to trait body dissatisfaction over time.
Chapter 7
General Discussion

The current research program investigated the relationship between stress and body image, specifically the evaluative dimension body dissatisfaction, and body change strategies, in adolescent and young adult females and males. This chapter discusses the complete findings from three empirical studies utilising diverse methodologies in order to more comprehensively understand the nature of the association between stress and body dissatisfaction in Australian youth. A number of research questions based on the stressor-psychopathology framework (McMahon et al., 2003), and informed by key theoretical models in body image and eating disorders (i.e., the tripartite model (Thompson et al., 1999) and transdiagnostic theory (Fairburn et al., 2003)), and existing literature within the stress and body image domains, were used to inform the following research questions:

1. What is the nature and direction of the relationship between stress and body dissatisfaction in adolescence and young adulthood? Is there a differential role for stressor subdomains, specifically interpersonal domains?

2. What moderating variables influence the relationship, specifically gender?

3. What psychological variables account for the relationship between stress and body dissatisfaction, in particular self-esteem, depressive symptoms, and body importance?

4. How does stress relate to another dimension of body image, specifically body change strategies?

The model tested is depicted in Figure 7.1, hypothesising that stress, specifically interpersonal stress, relates to body dissatisfaction and body change strategies in
adolescence and young adulthood, and that this is explained by psychological constructs including self-esteem, depressive symptoms, and body importance, while being moderated by gender.

![Figure 7.1. Current research program model](image)

Three studies were employed to test this model:

1. Study 1 assessed the nature of the relationship between adolescent stress and body dissatisfaction (Study 1a) and body change strategies (Study 1b), and the association of additional variables postulated as moderating (gender, BMI, and age) and mediating variables (self-esteem, depressive symptoms, and body importance). Three dependent variables were tested, assessing main effects and interaction effects in models of body dissatisfaction (see Chapter 3), and body change strategies to decrease body size or increase muscularity (see Chapter 4). Results revealed that stress, specifically in the peer domain, is significantly associated with body dissatisfaction for both females and males, with additional main effects identified for self-esteem, body importance, and gender on body dissatisfaction. Contrary to expectations, no significant relationship between stress, or its subdomains, and models of body change strategies was apparent.

2. Study 2 assessed a longitudinal model of body dissatisfaction over one year to assess the predictive ability of general stress, and the mechanisms underlying
this relationship (see Chapter 5). Results indicated that, after controlling for
gender, stress in general predicts body dissatisfaction both proximally and
prospectively, and this relationship is explained by a reduction in self-esteem
and increased importance placed on the body. Interestingly, no support was
found for the converse relationship in that body dissatisfaction did not
significantly predict increases in stress over time.

3. Study 3 examined the effect of interpersonal stress on state body satisfaction
(both general and weight-specific) in young adults (see Chapter 6). The
experimental design assessed both objective physiological and subjective stress,
as well as the moderating effects of gender and appearance importance. Results
indicated that stress acts as a situational trigger enhancing an individual’s
vulnerability to body dissatisfaction. Specifically, while stress was not found to
affect general body satisfaction in females, males experiencing personality
rejection reported greater dissatisfaction compared to males in the appearance­
based and no interpersonal stress conditions. Secondly, while no differences in
weight dissatisfaction were apparent for those reporting high appearance
importance, those reporting low appearance importance who experienced
appearance rejection reported greater weight dissatisfaction compared to those in
the personality-based and no interpersonal stress conditions. In other words,
interpersonal stress acted to trigger state body dissatisfaction in individuals
otherwise less vulnerable to body dissatisfaction (i.e., males and those with
lower levels of appearance importance).
Findings Pertaining to Research Questions in the Current Research Program

The implications of these findings will be discussed in relation to each research question, followed by a consideration of the overarching theoretical and clinical implications of the research program, and its strengths and limitations.

Research Question 1: The Nature and Direction of the Relationship Between Stress and Body Dissatisfaction

The nature of the relationship between stress and body dissatisfaction. In the current research program, all three studies investigated the nature of the relationship between stress and body dissatisfaction and found support for their link. Cross-sectional data supported a strong association between the constructs, while the prospective and experimental data yielded small but significant effects (discussed in more detail below). The linear regression models in Study 1a suggested that adolescent stress in general explains between 17.4% and 29.6% of the variance in body dissatisfaction, which is comparable to those identified by Murray et al. (2011) which reported 95% confidence intervals of 21.8% to 35.3%. Study 2, the prospective study, indicated that stress accounts for an additional 1% of variance in body dissatisfaction over time, after controlling for initial body dissatisfaction, and Study 3, the experimental study, displayed effect sizes of approximately 7.4% and 9.6% for the two-way interactions which included stress respectively (first with gender on general body dissatisfaction, and secondly with appearance importance on weight dissatisfaction). These findings are consistent with the few studies which have tested the association between stress and body dissatisfaction in cross-sectional studies (Johnson & Wardle, 2005; Marcotte et al., 2002), prospectively (Smolak et al., 1993), and experimentally (Warren et al., 2012). However, an important extension of these studies in the current
research program is the inclusion of both females and males in these investigations, confirming the relevance of stress for body dissatisfaction in both genders during adolescence and young adulthood. Differences in the variance associated with stress effects across the three studies are notable, with smaller effects in the prospective and experimental studies. This is not surprising given that longitudinal research contains a time period in which additional intervening variables can exert an effect, and limitations in ecological validity inherent in experimental designs. Furthermore, body dissatisfaction has been associated with a number of variables which could demonstrate stronger predictive effects than stress, such as initial body image, social and cultural influences, psychological symptoms, and physical development (Levine & Smolak, 2002; Paxton & McLean, 2010).

**Specific stressor domains and body dissatisfaction.** A second aspect of research question one relates to investigation of stressor subdomains in the context of body dissatisfaction. Studies 1a and 3 both assessed specific stressor subdomains in females and males, with the initial investigation utilising a dimensional assessment of adolescent stress due to the frequency and intensity of transitions that take place during adolescence across multiple domains (Hampel & Petermann, 2006; Simmons, 1987). Based on past research, it was hypothesised that specific aspects of stress may be more or less relevant in body dissatisfaction, with interpersonal stress highlighted as a possible domain of particular relevance. Family, peer, and romantic relationships are extremely important in adolescence, and are relevant in the onset of stress (Rudolph & Hammen, 1999; Schraml et al., 2011; Wagner & Compas, 1990) and body dissatisfaction (Levine & Smolak, 2002). However, comparison of stressor subdomains in Study 1a found support for only one of these three networks in body dissatisfaction, namely, peer stress, suggesting peer relationships are especially salient in body dissatisfaction for both genders. This finding is consistent with the results obtained by
Murray et al. (2011) who also reported a differential link between peer stress and body dissatisfaction, except that the current research program identified its significant contribution alongside other psychological constructs noted for their relevance to body dissatisfaction. Past studies in adolescent and young adult females have highlighted the salience of interpersonal stress (Cain et al., 2008, 2010), family stressors (Horesh et al., 1996) and school stress (McVey et al., 2002) in eating disorder pathology, with the current findings confirming the association between interpersonal (peer) stress and body dissatisfaction for both adolescent and young adult females and males.

The significance of peer stress in body dissatisfaction for adolescent females and males is not surprising, and is consistent with a substantial body of literature confirming the importance of peers for both adolescent stress and body image. Peer networks become increasingly salient during adolescent development (Rudolph & Hammen, 1999), function as the primary domain of socialisation (Paxton, Eisenberg, et al., 2006; Petersen, 1988; Rose & Rudolph, 2006; Rudolph, 2002) and are equally as important for young adult females and males (Wagner & Compas, 1990). For females, these networks facilitate psychological adjustment through intimacy and disclosure, while the larger and less intimate associations characteristic of male friendships also convey important feedback about the self (Rose & Rudolph, 2006; Rudolph & Hammen, 1999). For both genders, friendships play a central role in self-esteem, specifically through social approval (Harter, 2006), and during adolescence this acceptance is increasingly based on physical attractiveness (Harter, 1999). One interesting finding in Study 1a is that peer stress related to body dissatisfaction in both genders, while family and romantic relationships did not. While both of these domains are important influences on factors such as body image (Gerner & Wilson, 2005; Levine & Smolak, 2002; Tylka, 2011) during adolescence, the current findings indicate that disruptions in these networks do not confer the same level of disturbance in body image and self-evaluations
as peer stress during adolescence. With regards to the family, Rudolph and Hammen (1999) report that familial stressors are more common in preadolescence, while peer stress increases during the adolescent years. Evidence suggests that peer supports have the potential to overcome deficits in the family domain (Presnell et al., 2004), while investigations of the tripartite model of body dissatisfaction have yielded stronger support for peer and media influences in adolescent females compared to parental effects (Shroff & Thompson, 2006). Conversely, romantic relationships may become increasingly important across adolescence, and therefore may be more influential as either a risk or protective factor in older age groups not assessed in this study (Collins, Welsh, & Furman, 2009). One important future direction of the current finding is examination of actual peer networks to understand the processes within these relationships aligned with stress and how these relate to the body dissatisfaction of individuals in the network.

A considerable body of research has been dedicated to understanding how peer and other significant relationships influence body dissatisfaction. Analyses of the specific items on the peer pressure stress measure used in Study 1a suggested that subjective stress related to hassles around appearance from peers, not fitting in, and feeling judged by peers, were particularly salient for body dissatisfaction. Study 3 further examined the specific nature of peer stress in body dissatisfaction by comparing the effect of stress relating to appearance rejection, personality rejection, and no rejection in young adults. The results indicated that both interpersonal stress conditions elicited body dissatisfaction, but that the nature of these effects were complex. Rejection based on general negative feedback (i.e., personality) led to increases in general body dissatisfaction for males, while increases in weight-specific dissatisfaction was precipitated by rejection from peers around appearance for individuals reporting low appearance importance. Interestingly, no significant differences in the interpersonal
conditions were apparent for females in general body dissatisfaction, or for those reporting high appearance importance in weight-specific dissatisfaction. These findings are useful in understanding the specific aspects of peer stress interactions which lead to body dissatisfaction.

These findings are consistent with past research in body image. Research has highlighted a number of influences, particularly teasing or negative verbal commentary, on body dissatisfaction for both genders (D. C. Jones & Crawford, 2006; Kearney-Cooke, 2002; Menzel et al., 2010; Myers & Crowther, 2009; Paxton, Eisenberg, et al., 2006), as well as a plethora of more subtle influences for females, for example, appearance conversations (D. C. Jones & Crawford, 2006), appearance norms, and appearance-based acceptance (Gerner & Wilson, 2005; Hutchinson & Rapee, 2007; Kearney-Cooke, 2002; Paxton et al., 1999). The finding in the present research that the nature of interactions as negative or neutral is not important for females in body dissatisfaction is consistent with the general importance of these relationships (Rose & Rudolph, 2006), the susceptibility of females generally to body dissatisfaction compared to males (Muth & Cash, 1997), and findings that adolescent females, unlike males, fail to perceive positive messages regarding appearance, thereby rendering even positive encounters as indistinguishable from negative ones (Ricciardelli et al., 2000). Furthermore, they indicate the possible role of additional processes acting in these interactions, such as social comparison, so that even neutral interactions in which no negative body comments are made may nevertheless elicit body dissatisfaction (D. C. Jones, 2004; Myers & Crowther, 2009). While some previous research has displayed a positive effect for affirming feedback on body image in young adult females (Furman & Thompson, 2002), the current research program cannot confirm this because no positive feedback comparison was included. Yet, what was demonstrated was that neutral
appearance feedback did not have a salutary effect on the body dissatisfaction of females.

With regard to the findings for males, the greater impact of personality rejection on body dissatisfaction, as opposed to appearance rejection, was contrary to the hypotheses. One possible interpretation of this unexpected finding relates to the fact that males tend to focus on achieving a body which is low in body fat with high levels of muscularity (Ricciardelli et al., 2009) – a physique associated with dominance and instrumentality (Galambos et al., 1990). Thus, perhaps the meaning of the physical self for males is less concerned with appearance itself, but more with what the body represents, such that negative comments about personality pose a greater threat to general satisfaction with the body than comments about the body specifically. It is possible that achieving the idealised male physique is a method of communicating possession of valued personality traits to others. This means that when personality traits are questioned (e.g., being referred to as “lame” as in the current research), this is translated into low self-esteem and subsequent dissatisfaction with the body. It should also be kept in mind that given the age of the Study 3 sample, the meaning of the body may be different to adolescents and may more closely related to appearance comments at this time even in males.

Finally, more specific dissatisfaction with weight was elicited by direct comments around appearance. This finding is consistent with the salience of teasing in body dissatisfaction (D. C. Jones & Crawford, 2006), such that it brings a focus on the characteristics explicitly questioned by others, which tend to be those contrary to cultural ideals. Interestingly, this effect led to equivalent dissatisfaction for individuals who did and did not place a high value on the body in their self-evaluations. The current findings are consistent with the impact of comments around the body leading to an increased critical focus on features of the body questioned by others even if self-worth
is not dependent on these areas. For example, strong relationships with body
dissatisfaction are reported whether teasing is weight-specific or based on general
appearance (Menzel et al., 2010). This is an important finding, highlighting the
potential impact of peer relationships in increasing vulnerability to specific weight
dissatisfaction, and suggests this is important in young adults in addition to adolescents,
with prevalence rates indicating 62% of adolescents report being teased by peers
(Menzel et al., 2010) and teasing has been shown to predict dissatisfaction over time (D.
C. Jones, 2004).

The direction of the stress-body dissatisfaction relationship. Investigation of
the direction of the relationship between adolescent stress and body dissatisfaction
yielded support for the predictive effects of general stress in adolescents (Study 2), and
causative effects of interpersonal stress specifically in young adults (Study 3). Study 2
revealed that, controlling for gender, adolescent stress predicts body dissatisfaction over
one year. Interestingly, the reverse effect for body dissatisfaction on stress was not
significant. The unidirectional nature of this association is surprising given that body
image concerns have been identified as a source of stress in past studies (O'Dea &
Abraham, 1999). Furthermore, in the related area of eating disorder pathology, there
has been some support for dieting as a predictor of subjective stress in females (Rosen
et al., 1990). However, the current findings are more consistent with hypotheses that
stress predicts changes in eating over time as an emotion regulation control strategy
(Ball & Lee, 2002; Loth et al., 2008; Rutledge & Linden, 1998; Wallis & Hetherington,
2004), and that the accumulation of certain adolescent transitions (i.e., menstruation,
dating, and school transition) predict eating pathology and body dissatisfaction in
adolescent females (Levine et al., 1994; Smolak et al., 1993). The current findings
extend these past investigations, identifying a predictive role for stress in both genders.
However, it is important to recognise that the two longitudinal models (i.e., the model
of stress predicting body dissatisfaction over time and the model of body dissatisfaction predicting stress over time) remained correlated, suggesting additional variables are important in gaining a clearer picture of their relationship over time. Furthermore, the specific role of stressor domains over time was not assessed, with Study 3 explicitly assessing the causal effect of peer stress.

Findings from Study 3 further supported the predictive effect of subjective interpersonal (peer) stress in body dissatisfaction. In addition, the study examined a slightly older sample, confirming the continued impact of stress on body dissatisfaction in the early adult years. Specifically, rejection from peers based on personality characteristics led to increased body dissatisfaction in males, while appearance-based peer rejection led to increases in weight-specific dissatisfaction. These findings are supportive of previous examinations of negative feedback from peers in body dissatisfaction (Furman & Thompson, 2002), suggesting subjective stress is one mechanism through which this effect occurs. In addition, they are consistent with the results obtained by Cain et al. (2010) which indicated an interpersonal stress effect over one year in dieting for young adult females. The present research extended these findings by confirming interpersonal stress effects with regards to body dissatisfaction for both genders. Therefore, the importance of both general stress, and stress in the peer domain, have been highlighted in the current research as risk factors for body dissatisfaction.

However, it is important to note that only subjective stress measures demonstrated significant effects on body dissatisfaction, despite assessment of objective physiological arousal through skin conductance and heart rate in Study 3. While discordance in subjective and objective stress assessments has been highlighted previously (Connelly & Denney, 2007; Nandrino et al., 2012; Tomaka et al., 1993), the present findings failed to replicate past studies identifying a relation between objective
stress and changes in eating behaviours (Rutledge & Linden, 1998; Torres & Nowson, 2007; Wallis & Hetherington, 2004, 2009). In combination, these findings suggest that subjective stress may be more relevant for some aspects of eating disorder pathology (e.g., body dissatisfaction) while physiological components of stress are more influential on other eating disorder features (e.g., disordered eating). This is highly speculative, however, and requires investigation in further studies combining subjective and objective measures of stress, and assessing different aspects of eating disorder symptomatology.

Conclusions. Taken together, the findings of the three studies support an association between stress (particularly in the interpersonal domain of the peer group) and general and weight-based body dissatisfaction in adolescence and young adulthood. Furthermore, support for a predictive and causative relationship indicates that stress is a salient risk factor worth considering in the onset and maintenance of body dissatisfaction in both the short- and longer-term. Importantly, subjective stress appears to increase an individual’s vulnerability to body dissatisfaction in adolescence, while personality appears to be a particularly salient domain on which body satisfaction is evaluated in young adult males. In contrast, the nature of interpersonal interactions did not influence body dissatisfaction in females. For those who do not value appearance in their self-evaluations, exposure to negative appearance comments predicted weight dissatisfaction. The findings support consideration of stress as a factor initiating, enhancing or maintaining an individual’s vulnerability to body dissatisfaction, an association that is especially salient in the peer domain. Further discussion of the manner in which stress enhances individual vulnerability to body dissatisfaction is discussed in research questions two and three.
Research Question 2: Moderating Variables in the Relationship Between Stress and Body Dissatisfaction

Gender as a moderator of the stress-body dissatisfaction link. Investigation of moderating variables in the association between stress and body dissatisfaction focused primarily on gender as a central influence on the direction and/or strength of the relationship (Grant et al., 2006). During adolescent development, gender roles intensify, particularly through socialisation with same sex peers (Galambos et al., 1990), and these effects are evident in both body image and stress. Gender is one of the strongest influences on body image, and is believed to be a unique emergence in adolescence (Littleton & Ollendick, 2003; Smolak, 2004). For example, gender determines preferences relating to body ideals, such that females focus on weight loss and thinness while males aim to enhance muscularity and reduce body fat (L. R. Jones et al., 2007; Ricciardelli et al., 2000). Females also report greater dysphoric body experiences compared to males (Muth & Cash, 1997), while body evaluations in males tend to more closely align with objective physical characteristics (Ricciardelli et al., 2000, 2009). An important caveat in investigations of gender in body image is the comparative lack of research focusing on males, making investigations of their unique experience and risk factors especially important (Smolak, 2004). Key differences in adolescent stress can offer insight into these shared and divergent body experiences for females and males. Gender is a key moderator of stress in early adolescence (Grant et al., 2006; Wagner & Compas, 1990), with females reporting greater interpersonal stressors and internalising responses to stress, while males report greater non-interpersonal or self-relevant stressors and externalising response tendencies (Grant et al., 2006; Rudolph, 2002; Rudolph & Hammen, 1999). However, it is important to note that interpersonal domains are also of significance to males (Rose & Rudolph, 2006), at a level equivalent to females in young adulthood (Wagner & Compas, 1990).
The direct and moderating effect of gender was examined in all three studies. Findings supported the salience of gender as a main effect in body dissatisfaction, such that females report greater general body dissatisfaction and specific weight dissatisfaction compared to males in proximal and predictive data. This is consistent with previous findings reporting greater levels of body dissatisfaction in adolescent and young adult females compared to males (Lewinsohn et al., 2002; Muth & Cash, 1997; Neumark-Sztainer, 2005; Nowak, 1998). However, no support for gender as a moderating variable in relation to peer stress or general stress (or other psychological variables) in the adolescent samples from Study 1 and 2 was identified, which is consistent with the results of Murray et al. (2011). This finding suggests that in adolescence, psychological constructs important in body dissatisfaction such as peer stress, are equally relevant risk factors for both females and males. The importance of peer stress is consistent with previous research highlighting its salience particularly to females but also to males (Rose & Rudolph, 2006; Wagner & Compas, 1990), and informs understandings of stress as a shared risk factor for both genders in adolescence.

The lack of moderation effects in self-esteem and body importance in Study 1 is surprising because, unlike stress which has not been considered in this capacity previously, these constructs have been identified in past studies aligned with body image as more problematic for females compared to males (Banfield & McCabe, 2002; Grant et al., 2006; Kostanski & Gullone, 1998; Muth & Cash, 1997; Polce-Lynch et al., 2001). However, given the bias towards females in body image research generally (Smolak, 2004), the current findings supporting their importance in both genders is useful because the few studies focusing on stress and body dissatisfaction, and eating disorder pathology, have exclusively referred to female samples (Johnson & Wardle, 2005; Levine et al., 1994; Marcotte et al., 2002; Smolak et al., 1993; Warren et al., 2012). The non-significant gender moderation effects in the adolescent sample could be
interpreted in a number of ways. First, it is possible that since research is only now considering the unique body experience of males, that these variables were previously overlooked in males. Second, these variables may have become increasingly more problematic for males over time. Both of these possibilities are supported by research reporting a dualistic body image for males (Ricciardelli et al., 2009) which is now argued to equate to levels of dissatisfaction in females (McCabe & Ricciardelli, 2004). The relevance of stress, self-esteem, and body importance for body dissatisfaction in both genders suggests these variables as shared risk factors. It is possible that the greater prevalence of body dissatisfaction in females in general results from the more frequent reports of stress, low self-esteem, and high body importance compared to males in research.

Interestingly, a significant moderating effect for gender was apparent on state-based general body dissatisfaction in the young adult sample (Study 3), such that females reported significantly greater body dissatisfaction following appearance rejection and no rejection, but not on personality rejection, compared to males. Gender also moderated the effect of appearance importance on body dissatisfaction in females alone, where high appearance importance was associated with greater body dissatisfaction compared to low appearance importance. The presence of moderation effects in the older (young adult) sample is interesting, suggesting that while the variables are equally relevant during adolescence, differences become apparent in adulthood. In addition, it is possible that, since different aspects of peer stress (i.e., appearance or personality based) were tested in this older sample, these gender differences on the types of interpersonal stress related to body dissatisfaction may also be apparent in adolescence but were not assessed. The findings support hypotheses that the underlying processes in peer stress that contribute to evaluations of the body differ between females and males. Overall, females reported greater general and weight-
specific dissatisfaction compared to males, but the findings also showed that personality rejection in the peer group is specifically impactful in assessments of the body in males. Moreover, the nature of interactions in the interpersonal context exerted no effect in females, which contrasts with past experimental studies assessing interpersonal stress and eating behaviours (Stroud et al., 2000), but high appearance importance was particularly salient in body dissatisfaction for females. These findings indicate that the body represents something quite different to females compared to males. It is possible that, given the relevance of interpersonal and non-interpersonal stressors to females and males respectively (Rudolph, 2002; Rudolph & Hammen, 1999), that any negative or ambiguous peer interaction conveys negative information about the self and body for females, or that it conveys no information because females report greater body dissatisfaction regardless of these interactions, particularly if they endorse high appearance importance. For males, only comments relating to personality appear to threaten their self-view and by extension, their body satisfaction. Interestingly, levels of body dissatisfaction for males in the personality rejection condition were at the equivalent level of females. Thus, while psychological constructs such as stress, self-esteem, and body importance are equally important as risk factors for body dissatisfaction during adolescence, they diverge in young adulthood, with stress and appearance importance more relevant to males and females respectively.

**Age and body mass index as moderators of the stress-body dissatisfaction link.** Additional moderating variables were investigated in the current research program, specifically age and body mass index (BMI). Both factors received little to no support in the present studies, with neither altering the relationship between stress and body dissatisfaction in Study 1. As a result, examination of these variables in Study 2 and 3 was limited.
With regards to age, a large range was included in the current research program, including 12 to 17 years in the cross-sectional and prospective studies, and 18 to 25 year olds in the experimental study. It is surprising that no age differences were identified in the adolescent sample given that adolescence represents a changeable developmental period with the potential for different stressor subdomains to demonstrate relevance across the age range. However, no differences were identified across adolescence, with differences only evident between the findings relating to peer stressors in the adolescent and young adult samples. Previous studies have yet to clarify the role of age in both body dissatisfaction (Levine & Smolak, 2002) and adolescent stress (Grant et al., 2006; Hampel & Petermann, 2006), with the current research program unable to delineate these trends further. However, with regards to the young adult sample, the lack of importance of stress in female body dissatisfaction, but the salience of personality rejection for males, was a unique finding not apparent in adolescence. The findings suggest the potential for adolescent stress experiences to solidify vulnerabilities to body dissatisfaction (e.g., increasing appearance-based self-evaluations) which are then related to increased levels of body dissatisfaction in young adults. An additional finding in the current study is the significance of variables across the age groups, specifically in the role of body importance and gender in body dissatisfaction in both the adolescent and young adult samples, highlighting the importance of these features across both development periods.

Body mass index (BMI) was also assessed in the current research program to allow for investigation of the role of objective physical characteristics in models of body image. However, no main effects were identified in the adolescent or young adult samples, despite accommodating curvilinear trends (i.e., poorer body dissatisfaction at both higher and lower body weights) which have been identified in males (Ricciardelli et al., 2009). As a result, BMI was excluded from analyses examining its moderation...
effects. The findings suggest that stress appears to relate to body dissatisfaction independent of body size or shape, a finding consistent with some previous studies in this area (Bearman et al., 2006).

**Conclusions.** Taken together, findings in the current research program suggest that adolescent and young adult females report greater body dissatisfaction and weight-specific dissatisfaction compared to males. Psychological constructs including peer stress, self-esteem, and body importance were found to be equally important to females and males in body dissatisfaction during adolescence. However, during young adulthood, appearance importance, not stress, is increasingly salient in body dissatisfaction for females, while stress relating to personality rejection by peers is salient in body dissatisfaction in males. Thus, stress around personality appears to be important as a risk factor for body dissatisfaction specifically for males in young adulthood, while females tend to report dissatisfaction regardless of the nature of interpersonal interactions, and particularly if they place a high importance on the body in evaluations of their self-worth.

**Research Question 3: The Mediating and Moderating Role of Self-Esteem, Body Importance, and Depressive Symptoms in the Relationship Between Stress and Body Dissatisfaction**

Investigation of mediating variables in the relationship between adolescent stress and body dissatisfaction focused on self-esteem, body importance, and depressive symptoms. These variables were selected based on the fact that they are shared morbidities in the two research domains on body dissatisfaction and stress, as well as the theoretical relevance of body importance, self-esteem, and mood in models of body image and eating disorders. Studies 1, 2 and 3 examined the mediating (and moderating) roles of self-esteem and body importance, and will be discussed first.
Results in relation to depressive symptoms, which were examined in Study 1, will then be considered.

**Self-esteem and appearance importance as mediators and moderators of the relationship between stress and body dissatisfaction.** Global self-esteem refers to an individual's general feelings about their worth and value (Polce-Lynch et al., 2001; Rosenberg, 1965; Zimmerman et al., 1997). Body importance refers to the salience of the body in an individual's life and impact of these concerns (Banfield & McCabe, 2002), and features as a key explanatory factors in theories regarding body dissatisfaction and eating concerns (Fairburn et al., 2003; Thompson et al., 1999).

Firstly, results across all three studies supported an association between both of these constructs and body dissatisfaction in adolescents and young adults. This is consistent with previous studies highlighting bidirectional links between self-esteem and body dissatisfaction in adolescent females (Allgood-Merten et al., 1990; K. M. Murray et al., 2011; Paxton, Eisenberg, et al., 2006; Paxton, Neumark-Sztainer, et al., 2006), and self-esteem as a moderator of the effect of media pressures on efforts to increase muscularity in adolescent males (Ricciardelli & McCabe, 2001b).

Furthermore, body importance has frequently been linked to body dissatisfaction in adolescent females and males (Giovannelli et al., 2008; Muth & Cash, 1997; Rieder & Ruderman, 2001; Tiggemann, 2004). The findings are also consistent with the role of both self-esteem and body importance in body dissatisfaction and eating pathology in young adults, as tested by the tripartite model (Tylka, 2011; van den Berg et al., 2002).

Secondly, the results from Study 2 supported hypotheses that both self-esteem and body importance mediate the relationship between general stress and body dissatisfaction in adolescents over one year. This result suggests that the pathway from general stress to body dissatisfaction, both proximally and over time, is explained by a reduction in self-esteem and an increase in the importance placed on the body, which in
turn leads to body dissatisfaction. Interestingly, self-esteem was identified as the stronger mediating variable when compared with body importance.

Thirdly, investigation of a variable combining self-esteem and body importance through assessment of the relative importance of appearance in self-evaluation in Study 3 yielded further support for these variables in understanding the circumstances under which peer-related stress elicits body dissatisfaction in young adults. Given the nature of the Study 3 design, this variable was tested as a moderating variable, with the study identifying appearance importance as an explanatory variable in weight dissatisfaction generally, such that high appearance importance was linked to greater dissatisfaction with weight. Furthermore, it was shown to moderate weight dissatisfaction in conditions assessing personality rejection and no rejection, but not in appearance rejection conditions which resulted in greater weight dissatisfaction regardless of appearance importance level. The experimental study also showed that appearance importance played a role in general body dissatisfaction in females who reported high appearance importance compared to low importance, and males.

Taken together, the findings suggest that general self-esteem and the salience of the body in self-views are central in determining the impact of stress on body dissatisfaction for both females and males. This is consistent with previous research proposing that the occurrence of uncontrollable events in the environment elicits stress in adolescence (Youngs Jr et al., 1990), and that the inability to adjust to these effectively leads to reductions in self-esteem. Furthermore, stress has been argued to lead an individual to focus on controlling the body as a means of enhancing self-worth (Vartanian, 2009). The current research program supports these hypotheses, and also suggests that these relate specifically to the peer domain, in which stressors are particularly difficult to control and have been associated with self-esteem in adolescents and young adults (Moksnes et al., 2010; Stroud et al., 2000, 2002). Study 3 provided
further support for this pathway, but results were counter to expectations. It had been suggested that, based on the multiple mediation results in the prospective data, appearance rejection would lead to body dissatisfaction for those who reported high appearance importance. Instead, results indicated peer stress led to weight dissatisfaction only in those who did not value appearance in self-evaluation, but high appearance importance did explain greater concerns around the body in the personality rejection and control conditions. This finding is surprising, suggesting that stress enhances an individual’s vulnerability to specific body dissatisfaction (focused on weight) only for those who do not already value appearance in self-evaluation.

Given that prospective findings in the current research program indicated that self-esteem exerted a stronger explanatory effect in adolescent body dissatisfaction than body importance, sociometer theory may be especially helpful in understanding the current findings. This theory posits that self-esteem functions as a way of evaluating how successful an individual is at belonging, and that based on particular attributes to which their sociometer is calibrated, perceived failure in these areas trigger losses in self-esteem (Gailliot & Baumeister, 2007; Leary et al., 1998). These findings suggest that, perhaps for females who report greater body dissatisfaction generally, appearance may be an attribute to which the sociometer is specifically calibrated in adolescence. This is consistent with Harter (2006) who highlighted the need for social approval in adolescence, and the role of physical attractiveness in particular during this time (Harter, 1999). The findings in young adults in the current study might be suggestive of calibration changes based on negative commentary from others which is perceived as a failure at belonging and triggers low self-esteem. This loss in self-esteem, in turn, is translated into body dissatisfaction. Interestingly, with regards to findings in males that personality rejection was specifically linked to body dissatisfaction, it could be that for young adult males the sociometer is specifically calibrated to personality variables,
which lead to low self-esteem and body dissatisfaction following perceived failure at belonging in this domain. For females, who report greater body dissatisfaction regardless of interpersonal interactions, the sociometer may be strongly calibrated to appearance and therefore perceptions of failures on this attribute lead to persistent body dissatisfaction. Given that prospective models in the current research suggested that stress led to reductions in self-esteem and an increased importance of the body, which in turn predicted body dissatisfaction, it is also possible this process occurs during adolescence which leads to vulnerabilities (e.g., body importance) which also persist into young adulthood.

**Depressive symptoms as a mediator of the relationship.** Depressive symptoms were also conceptualised as a potential intervening variable given their association with body dissatisfaction (Paxton, Neumark-Sztainer, et al., 2006; Presnell et al., 2004; Stice et al., 2000; Stice & Whitenton, 2002; Taylor & Cooper, 1992) and stress during adolescence (Cole et al., 2006; Hankin & Abramson, 2001; Marcotte et al., 2002). However, the current research program identified no role for depressive symptoms in cross-sectional models, and therefore it was removed from the prospective and experimental assessments. This finding is consistent with those obtained by Murray et al. (2011), suggesting that there are more important variables, such as stress, self-esteem, and body importance, in body dissatisfaction in adolescent females and males. Another possible explanation for the findings is that depression or depressive symptoms are a longer-term consequence of the stress-body dissatisfaction link that was not identified in the shorter time frame of the current research. This is consistent with models suggesting that gender differences in depression are due to differences between females and males in body dissatisfaction and self-esteem (Allgood-Merten et al., 1990), with stress also important in depression across the lifespan and
disproportionately common in females (Hampel & Petermann, 2006; Hankin, 2006; Hankin & Abramson, 2001).

**Conclusions.** The findings of the current research program support a role for self-esteem and body importance as being among the underlying mechanisms through which stress predicts body dissatisfaction. Furthermore, they indicate the possibility that stress is involved in the onset of vulnerabilities to body dissatisfaction in adolescence and young adulthood. These findings highlight the need to manage stress and its possible adverse impacts on self-esteem and body importance in order to attenuate the possible risk of body dissatisfaction and subsequent psychopathology. Findings with regards to the young adult sample highlighted the role of appearance importance in moderating the effect of appearance rejection from peers on weight dissatisfaction, providing further support for this being a target for prevention of body dissatisfaction. Conversely, depressive symptoms were not identified in models of body dissatisfaction in adolescents and removed from subsequent analyses, suggesting the potential that these may arise as a longer-term consequence of stress-induced body dissatisfaction.

**Research Question 4: The Relationship Between Stress and Body Change**

**Strategies to Decrease Body Size and Increase Muscularity**

Examination of the role of stress in additional dimensions of body image (i.e., in addition to body dissatisfaction) was undertaken in Study 1b of the current research program. The research program thus aimed to understand how stress relates to multiple aspects of the body image construct given its dimensionality and complexity (Thompson, 2004). Specifically, body change strategies to decrease body size and increase muscularity were selected to account for the gender ideals relating to females and males respectively (Ricciardelli & McCabe, 2002; Ricciardelli et al., 2009; Smolak,
These constructs assess the frequency of thoughts, feelings, and behaviours aimed at altering the body (Ricciardelli & McCabe, 2002).

The results from Study 1b indicated that while general stress displayed a linear relationship with both types of body change strategies in adolescents, it did not contribute significantly to final regression models testing cross-sectional and longitudinal models in Study 1b and Study 2 (see Appendix H for prospective analyses). Nor were specific stressor subdomains found to contribute significantly to the final regression models. These findings were surprising, particularly given past studies supporting a role for stress in eating disorder pathology, including dieting (Cain et al., 2008, 2010; Fryer et al., 1997; Levine et al., 1994; Loth et al., 2008; Rosen et al., 1990; Smolak et al., 1993), which is closely aligned with the measure focusing on decreasing body size. The findings suggest that while stress in the peer environment is closely linked to body dissatisfaction in adolescents, it is not relevant to the related dimension of body change strategies to lose weight or enhance muscularity. It is unclear why stress is salient to evaluative assessments of the body as opposed to intentions to change specific aspects of the body in adolescence. While speculative, one possibility is that individuals reporting significant stress in adolescence also possess low levels of self-efficacy, a construct shown to be a key predictor of the translation of attitudes into behaviour change (Ajzen & Madden, 1986). Therefore, while these stressed individuals may report dissatisfaction with their body, they may not be confident in their capacity to change it, for example, through dieting to lose weight or changing exercise to increase muscularity.

Another finding of note in these analyses was the presence of gender and body importance across all three body image assessments, highlighting the value of examining multiple dimensions of body image in research to understand shared (e.g., gender and body importance) and unique (e.g., peer stress) risk and protective factors.
for various components of the body image construct (Thompson, 2004). An additional factor that may be unique to the body change dimension of body image is that of depression. Specifically, a significant relationship between depressive symptoms and greater investment in body change strategies to lose weight emerged in Study 1b. This suggests the possibility that dysphoric mood is more relevant to decisions or intentions to reduce body weight as opposed to body dissatisfaction, in which stress was salient. Therefore, thoughts, feelings, and behaviours linked to change, or failed change, may be more closely associated with low mood than stress.

Extending the findings of the current research program to include additional dimensions of body image is necessary to more fully understand the stress-body image relationship. These dimensions could include perceptual dimensions, functional assessments of fitness or health, and actual behaviours (Pruzinsky & Cash, 2002; Smolak, 2004; Wertheim et al., 2009). Also of interest would be an examination of whether these alternative dimensions are differentially related to the various subdomains of stress given the finding that teacher interaction stress was associated with increased investment in increasing muscularity in the current research program.

In summary, the current findings suggest that stress is specifically associated with body dissatisfaction and does not relate to the dimension of body change strategies, assessed through intentions to lose weight or increase muscularity. The findings therefore suggest divergent risk factors in different body image dimensions, but also highlight shared features in the form of gender and body importance for body dissatisfaction and body change strategies.

Summary of Findings in the Current Research Program

The current research program tested the relationship between stress and body dissatisfaction in adolescents and young adults. It identified a strong relationship
between the two constructs, as well as a predictive role for general stress and peer stress in adolescent and young adult females and males. Subjective stress in adolescence appears to lead to changes in body satisfaction by reducing self-esteem and increasing the importance an individual places on the body in self-evaluations. However, in young adulthood, stressors relating to the peer group were linked to body dissatisfaction depending on the existing vulnerability characteristics of an individual. For example, rejection based on appearance or personality led to increases in body dissatisfaction in those initially reporting low appearance importance, and among males respectively. Both of these groups show a lower general vulnerability to body dissatisfaction, as females and those reporting greater appearance importance reported more general and weight-specific body dissatisfaction. Interestingly, stress appears to relate specifically to trait and state body dissatisfaction in a general and weight-specific sense, but did not demonstrate relations with the related but distinct dimension of body change strategies to decrease body size or increase muscularity.

Implications of the Current Research Program

The results from the current research program have theoretical and clinical implications for research and interventions in body image and eating disorders. These implications are discussed below.

Theoretical Implications

Among the theoretical implications, the findings support and extend the tripartite model of influence in body dissatisfaction and eating disturbance, which posits that three direct influences – peer, parental, and media factors – lead to body dissatisfaction, and in turn disturbed eating behaviours such as dietary restriction and bulimia nervosa.
The model also proposes that mediating variables explain these pathways, specifically appearance comparison and internalisation of cultural standards of appearance, and that global psychological functioning (i.e., depression and self-esteem) are outcomes of these eating disturbances (Thompson et al., 1999). This model has been supported through research in adolescent and young adult females (Keery et al., 2004; Shroff & Thompson, 2006; van den Berg et al., 2002), expanded to account for preferences relating to muscularity in males (Tylka, 2011), and is unique in accounting for the sociocultural variables consistently linked to body dissatisfaction and disordered eating behaviours. However, in designing research studies informed by this model, the current research program highlights a role for additional psychological variables in body dissatisfaction, specifically stress, and indicates that this may act as a precipitant in the model. Given that stress is implicated in eating disorder pathology in past studies (Cain et al., 2010; Levine et al., 1994; Rutledge & Linden, 1998; Stroud et al., 2000, 2002, 2009; Wallis & Hetherington, 2004, 2009), this directionality is plausible. Furthermore, van den Berg et al. (2002) noted that the psychological variables currently outlined as consequences in the tripartite model (i.e., self-esteem and depression), may act as predictors of body dissatisfaction. Based on the current findings, self-esteem could be theorised as a mediating variable in addition to body importance for the effects of stress on body dissatisfaction, while depression may remain an outcome of the model as originally hypothesised by Thompson et al (1999), which is consistent with the findings reported by Stice et al. (2000) whereby body dissatisfaction predicted depressive disorder over four years in adolescent females.. In sum, the findings of the research program suggests that the tripartite model could be expanded to include stress in the peer environment as a precipitant of body dissatisfaction through body importance and self-esteem, leading to eating disturbances and impaired psychological functioning such as depression.
The current research program also holds implications for the transdiagnostic model of eating disorders (Fairburn et al., 2003). This model proposes that an overvaluation of weight and shape forms the core psychopathology of eating disorders, and that the symptoms are maintained by four key psychological factors including perfectionism, interpersonal difficulties, mood intolerance, and core low self-esteem. The current findings yield support for body importance – a measure akin to the overvaluation of weight and shape - as an early risk factor in body dissatisfaction which can be precipitated by psychological stress in adolescence. This suggests that stress plays a significant role in the onset of body image disturbances which are recognised as the strongest predictor of eating disorders (Stice, 2002), but also reveal support for stress as a maintaining mechanism through the use of critical body evaluations as a means of avoiding uncomfortable emotions (Rutledge & Linden, 1998; Stroud et al., 2002, 2009; Wallis & Hetherington, 2004). Furthermore, the pathway through which stress impacts body image disturbance has been shown in the current research to include interpersonal difficulties, distressing emotions, and low self-esteem, which comprise three of the four mechanisms identified in the transdiagnostic model. Therefore, the negative impact of stress on body image disturbance could well represent an early pathway in the development of eating disorders, and highlights its possible role in prevention and treatment programs in adolescents.

**Clinical Implications**

In expanding current understandings regarding the role of stress in body dissatisfaction among adolescents and young adults, the findings can potentially inform prevention work in body image and eating disorders in youth. Current programs have included stress management training alongside self-esteem enhancement, improving body image, and reducing the importance placed on the body (Dohnt & Tiggemann,
2006; McCabe et al., 2010; McVey & Davis, 2002; McVey et al., 2004; McVey et al., 2007; O'Dea & Abraham, 2000; Tiggemann, 2004). However, while some prevention programs have reported success in adolescent females and males on both body image and eating disorder variables (Levine & Smolak, 2006; Paxton, 2002), these programs could benefit from increased understandings of how risk factors relate to these outcomes, such as stress, in order to improve their long-term efficacy. Furthermore, identification of stress as a risk factor for body dissatisfaction in both adolescent and young adult samples indicates that this could be included as a component of universal programs as well as specific/targeted programs in these populations (Levine & Smolak, 2006).

One possibility in assisting the design of improved prevention programs is to better understand the relationship between stress and body image. The current findings suggest that these programs could be implemented effectively in both genders, and that learning to cope with the accumulation of stressors over time is vital in preventing body dissatisfaction and the establishment of vulnerability factors such as low self-esteem and body importance. Further, one specific area in which these modules could be tailored is the peer environment. The findings also support a role for stress in young adulthood, suggesting that stress increases vulnerability to body dissatisfaction for individuals who do not already possess characteristics linked with this sensitivity (i.e., males and those reporting low appearance importance). This highlights the need to prevent the early onset of vulnerabilities through effective programs in adolescence, but also in teaching stress management strategies that can assist young adults in remaining resilient.

The Student Bodies program has been found to be among the most efficacious of prevention programs (Barr Taylor et al., 2006; Jacobi et al., 2007; Jacobi et al., 2012; Winzelberg et al., 2000) and has been utilised in young adult females. The current
research findings support targeting this population by providing stress management strategies (especially to manage peer relationships), and the need to reduce the importance of the body in self-evaluation. Furthermore, the current findings suggest that such a program could be utilised in both genders and specifically target general negative feedback (as opposed to appearance-specific feedback) from peers in males. Finally, the present findings suggest that focusing on stress management may be beneficial in programs aimed at preventing body dissatisfaction but may not be effective in preventing maladaptive strategies designed to change the body.

Strengths and Limitations of the Research Program and Future Directions

Strengths

The current research program possessed a number of strengths by addressing limitations of previous studies examining body image and stress. Specifically, the current research program employed multiple methodologies, including cross-sectional, prospective, and experimental designs (Grant et al., 2003; Grant et al., 2004; Stice, 2002), and also utilised assessments of stress across multiple life domains as well as objective measures. Criticisms focusing on a lack of theory-driven research in stress and body image (Grant et al., 2003; Grant et al., 2004; Stice, 2002) were also addressed by using the stressor-psychopathology framework proposed by McMahon et al., (2003) to test the relationship between stress and body dissatisfaction, and drawing from dominant theories in body image and eating disturbance, specifically the tripartite influence model (Thompson et al., 1999) and transdiagnostic theory (Fairburn et al., 2003) to inform the inclusion of variables in the model. Specific issues in the body image literature were also addressed. For example, a multidimensional assessment of body image was undertaken, specifically focusing on the role of stress in evaluative trait and state-based dimensions, as well as the role of stress in more specific assessments.
focusing on body change strategies to decrease body size and increase musculosity (Pruzinsky & Cash, 2002; Thompson, 2004). These latter measures are also more aligned with gender-based preferences around the body (Ricciardelli & McCabe, 2002; Smolak, 2004). Examination of multiple body image dimensions is important to address the bias towards single dimension assessments which often include only body dissatisfaction (Thompson, 2004). The current research program focused on body dissatisfaction primarily because previous research has focused on this domain and therefore allowed for predictions to be made in exploring a new variable in the body image domain. However, use of multiple domains also provides the opportunity to establish shared and divergent risk and protective factors across the body image construct more broadly. The samples in the current research program also included female and male adolescents and young adults, addressing another limitation in the previous focus on females compared to males (Smolak, 2004), and the limited focus on young adulthood as a unique developmental period (Arnett, 1999; Maggs & Schulenberg, 2004). An additional strength of the current research was the recruitment of sufficient sample sizes to conduct a comprehensive assessment of the role of stress in body dissatisfaction and other dimensions of body image, as well as the mechanisms underlying this relationship, in adolescents and young adults. The current studies provide the first series of studies explicitly investigating the association between adolescent stress and body dissatisfaction, and offer insight for future studies examining this link and its implications for theory, psychopathology, prevention and treatment.

Limitations

While the limitations of each study have been noted in their respective chapters, a number of limitations of the research program as a whole must also be acknowledged. First, several of the sociocultural variables established as relevant for body
dissatisfaction were not assessed in the current studies. Thus, while examination of stressor subdomains revealed a differential role of peer stress in body dissatisfaction, it is not clear how this relates specifically to peer influences such as teasing, social comparison, or perceived pressures to change the body. Examining both stress and these sociocultural variables is an important future direction of research to elucidate the role of stress within these influences, and to offer insight into models such as the tripartite influence model. This could also inform how stress might relate to dimensions of body image in which there was no relation in the current study, such as body change strategies.

Second, a broader age range of participants could provide greater power to examine specific developmental differences in adolescents across stressor subdomains over time, and changes in the model with age as well as into young adulthood, to better inform prevention work. For example, it may be that early adolescence is the ideal time to teach stress management skills to prevent changes in self-esteem or body importance, or that these programs could occur across adolescence but be tailored to different stressor subdomains depending on the age of the individual. In addition, an examination of multiple dimensions of stress in young adulthood could elucidate differential effects on body dissatisfaction for these domains.

Third, the majority of significant findings for stress in the current research program were based on subjective measures, with only one study including an assessment of the physiological component of stress. Relatedly, the lack of additional objective measures such as behavioural outcomes is a limitation in the current research program, specifically its capacity to predict outcomes of the stress-body dissatisfaction relationship, with measures relating to body image only based on self-report. One option would be to assess clinical depression or eating behaviours in the models.
Future Directions

In addition to those already noted, several future directions are suggested by the findings of the current research program. First, conducting an experimental investigation on the effects of stress on body dissatisfaction in an adolescent sample would allow additional conclusions about the stability or changes in the stress-body dissatisfaction relationship from adolescence to adulthood to be made.

Second, research examining a broader range of stress outcomes is warranted. These could include additional aspects of eating disorder pathology and depression, as well as additional dimensions of body image such as perceptual distortions (e.g., body size overestimation) and behavioural indicators of body image disturbance (e.g., checking or avoidance behaviours). Similarly, the range of potential mediators and moderators of the stress-body dissatisfaction link could be expanded upon to include variables such as perfectionism or anxiety in adolescents and young adults.

Finally, coping strategies could provide an additional perspective on the current research program to assist in understanding the processes underlying the stress-body dissatisfaction relationship, and outcomes of this model. For example, emotion-focused coping may relate more to explanations of the relationship consistent with body dissatisfaction as an emotion regulation strategy (Fryer et al., 1997), while problem-focused coping might be more consistent with active behavioural changes to the body (Grant et al., 2006).

Conclusion

The present research program investigated the relationship between stress and body image (i.e., body dissatisfaction and body change strategies) in adolescent and young adult females and males. It used multiple methodologies in three studies to
provide a multidimensional assessment of both subjective and objective stress and self-reported body image, and examined the role of psychological and demographic variables in explaining or modifying the relationship respectively. The results support a strong relationship between stress and body dissatisfaction for both genders in adolescents and young adults, and that this particularly resides within the peer domain. Prospective tests of this model supported a small but significant predictive effect of stress on body dissatisfaction over one year, with the relationship found to be unidirectional. Furthermore, self-esteem and body importance were found to mediate this relationship in combination, with self-esteem exerting a stronger individual effect. An experimental investigation of the effect of stress in the peer domain provided further support for the causal influence of stress on body dissatisfaction, with stress increasing the vulnerability to body dissatisfaction for males experiencing interpersonal stress around personality, and to weight dissatisfaction for those reporting low initial appearance importance experiencing rejection from peers around appearance. In general, females and individuals who place a high degree of importance on the body in self-evaluations reported greater body image concerns regardless of the nature of interpersonal interactions in the peer group. Taken together, stress in adolescence and young adulthood appears to act by increasing an individual’s vulnerability to body dissatisfaction. These findings highlight the need to prevent the development of body dissatisfaction by targeting stress, self-esteem, and body importance in adolescence and to reduce a young person’s vulnerability to these concerns and their outcomes. Finally, results indicated that stress is specifically aligned with body dissatisfaction, while non-significant links were observed between stress and body change strategies to decrease body size and increase muscularity.

The current research program represents the first series of studies explicitly on stress, with a particular emphasis on peer stress, and body dissatisfaction. It holds
implications for theoretical accounts of body image and eating disorder pathology in adolescence and young adults, and offers insight for prevention and intervention programs in these domains, suggesting they focus on coping with stressors (especially in the peer domain) as well as improving self-esteem and reducing body importance. While the research possesses a number of limitations, it is the first to explicitly examine stress and body image and offers insight for new avenues in body dissatisfaction and its consequences. Specifically, it suggests stress is a key risk factor for body dissatisfaction and that it plays an important role in the prevention of psychopathology, distress, and maladjustment in the short-term and into adulthood by mitigating its impact on additional psychological constructs such as self-esteem and appearance-based self-evaluations.
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Appendices

Appendix A

ANU Human Research Ethics Clearance and Catholic Education Office Clearance for Study 1a, Study 1b and Study 2

Dear Ms Kristen Murray,

Protocol: 2009/390

The relationship between stress and body image in adolescence

I am pleased to advise you that your Human Ethics protocol received approval by the Chair of the Science/Med DERC on 23/09/2009.

For your information:
1. Under the NHMRC/AVCC National Statement on Ethical Conduct in Human Research we are required to follow up research that we have approved. Once a year (or sooner for short projects) we shall request a brief report on any ethical issues which may have arisen during your research or whether it proceeded according to the plan outlined in the above protocol.
2. Please notify the committee of any changes to your protocol in the course of your research, and when you complete or cease working on the project.
3. Please notify the Committee immediately if any unforeseen events occur that might affect continued ethical acceptability of the research work.
4. The validity of the current approval is five years' maximum from the date shown approved. For longer projects you are required to seek renewed approval from the Committee.
7 October 2009

Ms Kristen Murray

Dear Kristen,

I am writing in response to your request to undertake research titled *The relationship between stress and body image in adolescence* in MacKillop Catholic College and St Francis Xavier College. Your request has been approved subject to the following:

1. The Principal gives final permission for research to be carried out in his/her school. This letter of approval should accompany any approach to schools or teachers.
2. Confidentiality of findings and anonymity of students is adhered to. The research must comply with the requirements of the Commonwealth Privacy Amendment (Private Sector) Act 2000.
3. If you undertake research with children in an unsupervised capacity, you are obliged to obtain a “Working with Children Check” before you commence.
4. That upon completion of your research a copy of your report is forwarded to me.
5. That Mrs Mary Dorrian, Head of Religious Education and Curriculum Services in our Office, be contacted immediately should your research differ in any way from that proposed. Mrs Dorrian’s contact details are:

   Telephone: (02) 6234 5412
   Fax: (02) 6234 5496
   Email: mary.dorrian@catholic.edu.au

I look forward to the results and wish you the best over the coming months.

Yours sincerely,

[Signature]

Mona Najdecki
Director
Appendix B

Questionnaire Study 1a, Study 1b, and Study 2

EVERYDAY PROBLEMS AND
HOW I SEE MYSELF AS AN ADOLESCENT
Instructions

This survey asks about your experiences as an adolescent. Please read the instructions carefully and respond to the following questions. There are no right or wrong answers, just give your most honest response to each question to the best of your ability. Remember, all of your responses are confidential.

Before we begin, please complete the following questions about you.

---

Information about you

Please circle your gender:

Female  Male

How old are you in years and months?

___ ___ years ___ ___ months

Please circle your year group:

Year 7  Year 8  Year 9  Year 10

If you are in year 10, what College are you attending next year? _______________________

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Page 2
**Feelings**

Instructions:
Here are some statements which people have used to describe themselves. Please read each one carefully and pick out the response that best describes the way you have been feeling during the past week including today. Circle just one number next to each statement to indicate how you feel. Please choose only one response for each statement. The response scale (0 to 4) immediately below indicates what the numbers to the right of the statements mean.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Very Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have felt sad or unhappy.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. I feel like crying.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. I feel guilty without knowing why.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I have lost interest in things that used to be important to me.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. I have not enjoyed activities that I used to.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. I have felt uneasy, restless, or irritable.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. I have lost confidence in myself or put myself down.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. I have had difficulty concentrating.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. I have had difficulty making decisions.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. I have felt like I have failed.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. I have felt like things always go wrong, no matter how hard I try.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12. My sleep has been disturbed – sleeping more or less, or broken sleep.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13. My appetite has been disturbed – eating more or eating less.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. I have felt like it takes me greater effort to do things.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15. I have felt tired or have had very little energy.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
How I feel about myself

Instructions:
Please circle the response below each statement which best describes how you presently think about yourself.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. On the whole, I am satisfied with myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. At times, I think I am no good at all.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. I feel I have a number of good qualities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I am able to do things as well as most other people.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. I feel that I do not have much to be proud of.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. I certainly feel useless at times.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. I feel I am a person of worth, at least on an equal plane with others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. I wish I could have more respect for myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. All in all, I am inclined to feel that I am a failure.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. I take a positive attitude to myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Relationships

Instructions:
Please answer the following questions about your romantic relationships.

Have you had a romantic relationship in the past 12 months? Yes No

If you answered YES:

How long ago were you in this relationship?

1 currently
2 1-4 months ago
3 5-8 months ago
4 9-12 months ago
If you have had at least one romantic relationship in the past 12 months, please answer the following two questions regarding how much you believe your MOST RECENT romantic relationship:

1. Affected how you feel about yourself as a person?  
2. Affected how you feel about your physical appearance?

<table>
<thead>
<tr>
<th></th>
<th>Very positively</th>
<th>A little positively</th>
<th>No impact</th>
<th>A little negatively</th>
<th>Very negatively</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Affected how you feel about yourself as a person?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Affected how you feel about your physical appearance?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Everyday Challenges**

Instructions:
Here are some statements about things or situations which you might find stressful. Please tell us how stressful each of these things or situations has been for you in the past year, by circling one number from 1-5 depending on whether you have found this. Please respond to all of the statements in this section. If you have not experienced something, circle 1 = Not at all stressful (or is irrelevant to me).

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Disagreements between you and your father.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Not being taken seriously.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Getting up early in the morning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Little or no control over your life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Having to study things you do not understand.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Teachers expecting too much from you.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Concern about your future.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. Being hassled for not fitting in.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Keeping up with school work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Employers expecting too much of you.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. Having to take on new family responsibilities as you get older.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Not at all stressful (or not a problem)</td>
<td>A little stressful</td>
<td>Moderately stressful</td>
<td>Quite stressful</td>
<td>Very stressful</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------</td>
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</tr>
<tr>
<td>12. Difficulty of some subjects.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Abiding by petty rules at home.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Having to concentrate for too long during school hours.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Inadequate school resources.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Having to study things you are not interested in.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Being ignored or rejected by a person you want to go out with.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Disagreements between you and your teachers.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Not enough time to have fun.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Putting pressure on yourself to meet your goals.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Disagreements with your brothers and sisters.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Pressure to work to make money.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Not enough time for leisure activities.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Too much homework.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Not getting enough feedback on schoolwork in time to be helpful.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. Not enough time for activities outside school hours.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. Making the relationship work with your boyfriend/girlfriend.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. Being judged by your friends.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. Disagreements between your parents.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. Changes in your physical appearance with growing up.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. Arguments at home.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32. Pressure to fit in with peers.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33. Compulsory school attendance.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not at all stressful</td>
<td>A little stressful</td>
<td>Moderately stressful</td>
<td>Quite stressful</td>
<td>Very stressful</td>
</tr>
<tr>
<td>---</td>
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<td>---------------</td>
</tr>
<tr>
<td>34.</td>
<td>Having to make decisions about future work or education.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>35.</td>
<td>Living at home.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>36.</td>
<td>Satisfaction with how you look.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>37.</td>
<td>Disagreements between you and your mother.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>38.</td>
<td>Not enough money to buy the things you want.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>39.</td>
<td>Going to school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>40.</td>
<td>Not enough time for your boyfriend/girlfriend.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>41.</td>
<td>Teachers hassling you about the way you look.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>42.</td>
<td>Abiding by petty rules at school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>43.</td>
<td>Pressure of study.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>44.</td>
<td>Lack of trust from adults.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>45.</td>
<td>Not being listened to by teachers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>46.</td>
<td>Parents expecting too much from you.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>47.</td>
<td>Having to take on new financial responsibilities as you grow older.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>48.</td>
<td>Lack of understanding by parents.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>49.</td>
<td>Parents hassling you about the way you look.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>50.</td>
<td>Work interfering with school and social activities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>51.</td>
<td>Not enough money to buy the things you need.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>52.</td>
<td>Getting along with your boyfriend/girlfriend.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>53.</td>
<td>Lack of freedom.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>54.</td>
<td>Peers hassling you about the way you look.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>55.</td>
<td>Lack of respect from teachers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>56.</td>
<td>Disagreements between you and your peers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>57.</td>
<td>Getting along with your teachers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>58.</td>
<td>Breaking up with your boyfriend/girlfriend.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
How I cope

Instructions:
Thinking about the stressful things or situations you have experienced in the past year, please indicate the degree to which the statement below describes how well you believe you can cope with these by circling one number from 1-6:

I believe I can cope with the problems I encounter in daily life. This statement:

1. Describes me very well
2. Describes me well
3. Describes me fairly well
4. Does not quite describe me
5. Hardly describes me
6. Does not describe me at all

How I feel about my body

Instructions:
After carefully reading each of the statements below, please circle one number from 1-6 which indicates how well the statement describes you.

This statement describes me: | Very well | Well | Fairly well | Not really well | Hardly at all | Not at all
---|---|---|---|---|---|---
1. I am not satisfied with my weight because I am too light. | 1 | 2 | 3 | 4 | 5 | 6
2. I am not satisfied with my weight because I am too heavy. | 1 | 2 | 3 | 4 | 5 | 6
3. Most of the time I am happy with the way I look | 1 | 2 | 3 | 4 | 5 | 6
4. In the past year I have been very worried about my health. | 1 | 2 | 3 | 4 | 5 | 6
5. I wish that I were in better physical condition. | 1 | 2 | 3 | 4 | 5 | 6
This statement describes me:

6. I am uncomfortable with the way my body is developing.  1 2 3 4 5 6
7. I am proud of my body.  1 2 3 4 5 6
8. I am satisfied with my height.  1 2 3 4 5 6
9. I frequently feel ugly and unattractive.  1 2 3 4 5 6
10. When others look at me they must think that I am poorly developed.  1 2 3 4 5 6
11. My body is growing about as quickly as I would like it to.  1 2 3 4 5 6
12. I feel strong and healthy.  1 2 3 4 5 6

What I do

Instructions:
After carefully reading each of the statements below about how you feel and what you do, please circle the response that best applies to you.

1. How often do you feel like changing the types of foods you eat so that you can lose weight?  1 2 3 4 5
2. How often do you worry about changing your eating to decrease your body size?  1 2 3 4 5
3. How often do you worry about changing your eating to increase the size of your muscles?  1 2 3 4 5
4. How often do you worry about changing your levels of exercise to increase the size of your muscles?  1 2 3 4 5
5. How often do you change your eating to decrease your body size?  1 2 3 4 5
6. How often do you change your levels of exercise to decrease your body size?  1 2 3 4 5
7. How often do you change your levels of exercise to increase the size of your muscles?  
   1 2 3 4 5
8. How often do you change your food supplements to increase the size of your muscles?  
   1 2 3 4 5
9. How often do you think about changing your levels of exercise to decrease your body size?  
   1 2 3 4 5
10. How often do you think about exercising to lose weight?  
    1 2 3 4 5
11. How often do you think about changing your eating to increase the size of your muscles?  
    1 2 3 4 5
12. How often do you think about changing your levels of exercise to increase the size of your muscles?  
    1 2 3 4 5

And how important are these issues to you:

<table>
<thead>
<tr>
<th></th>
<th>Extremely</th>
<th>Fairly</th>
<th>In between</th>
<th>Not a lot</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. How important to you is what you weigh compared to other things in your life?</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. How important to you is the shape of your body compared to other things in your life?</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. How important to you is the size and strength of your muscles compared to other things in your life?</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You have reached the end of the questionnaire.  
Thank you for your help!  
Please sit quietly and await our instructions.
Appendix C

Forms for Study 1 (Participant Consent Form, Parent Consent Form, Information Sheet)

DEPARTMENT OF PSYCHOLOGY
Building 39
The Australian National University
Canberra ACT 0200
Telephone: 6125 2783
Facsimile: 6125 0499

Everyday problems and how I see myself as an adolescent:

Participant Consent Form

Dear Participant,

The current research forms part of the PhD research of Kristen Murray from the Department of Psychology at the ANU. The research is supervised by Professor Don Byrne and Dr Elizabeth Rieger. This research has been approved by the ANU Human Research Ethics Committee, protocol number 2009/390.

Please sign below if you agree to the following:

I agree to participate in research investigating my experiences as an adolescent. I understand that there are no right or wrong answers and I will try to answer as honestly as possible.

I understand that my participation involves completing a questionnaire by indicating my best response. I also understand that my height and weight will be measured in private by the Primary Investigator.

I have been made aware that my participation is voluntary and I am not required to participate. I have been informed that I will be surveyed again in one year, but I can withdraw at any part of the project for any reason without any consequences. I understand that my responses are confidential and that as far as the law allows no effort will be made on the part of the researchers to identify my responses at any part of the data collection or analysis process. The data collected today must remain by law at the ANU under lock and key for 7 years and thereafter will be destroyed.

Name: __________________________

Signature: _______________________

Date: ___________________________
Dear Parent or Guardian,

Your child’s school, SCHOOL NAME, has agreed to participate in a study run by the ANU Department of Psychology and approved by the ANU Human Research Ethics Committee (protocol number 2009/390). The research will be conducted by PhD Candidate (Clinical Psychology) Kristen Murray, whose research is supervised by Professor Don Byrne and Dr Elizabeth Rieger. It is possible your child may be asked to complete a set of questionnaires during class time on _______ and have his/her height and weight measured in private by Kristen Murray. The research is a longitudinal study, with a second phase of data collection taking place in one year.

The purpose of this study is to gain a greater understanding of the experience of adolescence. It investigates the impact of stress on perceptions of the body, and the role of self-esteem, depression, coping, body mass index, romantic relationships, the adoption of strategies to decrease weight or increase muscles, and the importance of the body to self-worth. Despite being implicated in many health problems in adolescence, little empirical research has investigated the link between adolescent stress and body image. However, given the rising prevalence of dysfunctional body image and its consequences, research aimed at understanding these problems is vital to prevention and intervention programs. This research hopes to provide information to health providers, schools and policy-makers to promote the mental and physical health of today’s youth.

If this letter is not returned we will assume you do not object to your child participating in this research. However, if you do object for any reason please sign the form below and have your child return it to researchers on the day. Your child will also have the opportunity to withdraw from participation. If they do complete the survey their responses will remain confidential as far as the law allows. Your child’s responses will be identified only by a unique code. All students will be debriefed upon completion of the study and provided with an information sheet. We will also inform SCHOOL NAME of our results when the study has been completed. If you have any questions regarding this research please contact Kristen on kristen.murray@anu.edu.au. You may also contact Professor Don Byrne on don.byrne@anu.edu.au or Dr Elizabeth Rieger on elizabeth.rieger@anu.edu.au.

Yours sincerely,

Kristen Murray
Intern Psychologist
PhD Candidate (Clinical Psychology)

I do not wish for my child to participate in the current study by Kristen Murray

Student Name: ... ... ... ... ... ... Year/Tutor Group: ... ... ... ... ...
Parent/Guardian Name: ... ... ... ... ... Signature: ... ... ... ... ... ... ... Date: ... ... ... ...
Dear Participant,

Thank you for taking part in the PhD research of Kristen Murray. I hope you enjoyed it! Your participation is much appreciated and will contribute to policy-makers and health professionals by helping understand the unique experience of adolescence.

The purpose of this study was to explore the impact of stress on how you feel about yourself, your body, and what you might think, feel or do as a result.

I am gathering data from year 7 to 10 students around Canberra and then following them up after one year. Once the data is collected I will analyse it to investigate the relationship between adolescent stress and body image.

If you have any further questions regarding the study please contact me or my supervisors:

Kristen Murray on kristen.murray@anu.edu.au.
Professor Don Byrne on don.byrne@anu.edu.au.
Dr Elizabeth Rieger on elizabeth.rieger@anu.edu.au.

This research was approved by the ANU Human Research Ethics Committee, protocol number 2009/390. If you have any concerns or feel uncomfortable contacting any of the researchers please contact the ANU Human Research Ethics Committee on 6125 7945 or Research.Office@anu.edu.au. You can also contact the ANU Human Research Ethics Officers, Ms Yolanda Shave on 61257945 or Ms Kim Tiffen on 61253427

If you feel you need to speak to a professional regarding any psychological concerns please contact in the first instance your school counsellor. Kid’s Helpline are there to listen at all hours on 1800 55 1800 if you need to talk to someone outside of school time.
Appendix D

Calculation of Interaction Effects for Body Change Strategies

Interaction effects for Study 1b on Body Change Strategies to Decrease Body Size and Increase Muscularity were performed by plotting regression model trends based on the two-way interaction equation (i.e., the two main effects, one two-way interaction term and intercept for the model). In order to understand how levels of one variable influenced levels of the second variable, each effect in the equation was multiplied by the corresponding B coefficient for the multiple regression outputs. Each equation was re-written at two levels of one of the variables in the interaction, that is at high and low levels of self-esteem (i.e. above and below the mean of self-esteem) for the decrease body size interaction between self-esteem and BMI, and at levels of gender (females, males) for the increase muscularity interaction between gender and body importance (Step One below). Then, values one standard deviation (SD) above and below the mean of self-esteem were substituted into the equation for the decrease body size interaction, and by substituting in dummy variables used to code for gender (females = 0, males = 1) in the increase muscularity interaction (Step Two below). This allowed separate equations pertaining to high/low self-esteem, and females/males to be constructed for the interactions respectively, so that values for the second variable in the interaction could be substituted into the equation to solve for the dependent variable.

The interactions were then solved by substituting in values one SD above and below the mean for the second continuous variable in each interaction, (BMI for the decrease body size interaction, and body importance for the increase muscularity interaction) to provide four cells with values corresponding to all possible combinations of variables (one SD above/below the mean on each) (Step Three below). SD values substituted into the equations are detailed in Table D1 for the continuous variables. Since variables were centered before constructing interaction terms, the mean is 0 on all
continuous variables, with values one SD above and below the mean corresponding to ±
the SD value on the centered variable. Calculations for each of the interactions
 corresponding to the above explanation are provided below.

Table D1

*Mean (SD) values for centered continuous variables in body change strategies
 interactions*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Esteem (SE) (Centered)</td>
<td>496</td>
<td>0</td>
<td>5.29725</td>
</tr>
<tr>
<td>BMI (Centered)</td>
<td>493</td>
<td>0</td>
<td>3.37228</td>
</tr>
<tr>
<td>Body Importance (BImp) (Centered)</td>
<td>494</td>
<td>0</td>
<td>2.82823</td>
</tr>
</tbody>
</table>

**Body Change Strategies to Decrease Body Size**

*Equation*

Decrease Body Size (DBS) = 25.886 + (0.156)SE + (-.593)BMI + (.029)SE×BMI

*Step One: Rewrite equation in terms of SE*

DBS = 25.886 + (0.156)SE + (0.029SE – 0.593)BMI

*Step Two: Substitute in ±5.29725) to construct equations one SD above and below mean
 of SE*

1. **One SD Above**

   DBS = 25.886 + (0.156 × 5.29725) + ((0.029 × 5.29725) – 0.593)BMI

   DBS = 25.886 + 0.826371 + (0.15362 – 0.593)BMI

   **Equation one SD above the mean of SE: DBS = 26.712371 + (-0.43938)BMI**

2. **One SD Below**
\[ DBS = 25.886 + (0.156 \times -5.29725) + ((0.029 \times 5.29725) - 0.593)BMI \]
\[ DBS = 25.886 - 0.826371 + (-0.15362 - 0.593)BMI \]

**Equation one SD below the mean of SE:** \[ DBS = 25.059629 + (-0.74662)BMI \]

**Step Three: Solve each equation by substituting one SD above and below BMI (± 3.37228)**

1. **One SD above mean of SE:** \[ DBS = 26.712371 + (-0.43938)BMI \]

<table>
<thead>
<tr>
<th>Substitute one SD below BMI ( - 3.37228)</th>
<th>Substitute one SD above BMI ( + 3.37228)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBS = 26.712371 + ( - 0.43938)( - 3.37228)</td>
<td>DBS = 26.712371 + ( - 0.43938)( + 3.37228)</td>
</tr>
<tr>
<td>DBS = 26.712371 + 1.4817</td>
<td>DBS = 26.712371 - 1.4817</td>
</tr>
<tr>
<td><strong>DBS = 28.19408</strong></td>
<td><strong>DBS = 25.23066</strong></td>
</tr>
</tbody>
</table>

2. **One SD below the mean of SE:** \[ DBS = 25.059629 + (-0.74662)BMI \]

<table>
<thead>
<tr>
<th>Substitute one SD below BMI ( - 3.37228)</th>
<th>Substitute one SD above BMI ( + 3.37228)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBS = 25.059629 + (-0.74662)( - 3.37228)</td>
<td>DBS = 25.059629 + (-0.74662)( + 3.37228)</td>
</tr>
<tr>
<td>DBS = 25.059629 + 2.5178</td>
<td>DBS = 25.059629 - 2.5178</td>
</tr>
<tr>
<td><strong>DBS = 27.57744</strong></td>
<td><strong>DBS = 22.54182</strong></td>
</tr>
</tbody>
</table>

**Body Change Strategies to Increase Muscularity**

**Equation**

\[ \text{Increase Muscles (Inc M)} = 22.653 + (-4.186)\text{Gender} + (.533)\text{Body Importance} + (.554)\text{Gender} \times \text{Body Importance} \]
Step One: Rewrite equation at levels of gender

\[ \text{IncM} = 22.653 + (-4.186)\text{Gender} + (0.554\text{Gender} + .533)\text{Body Imp} \]

Step Two: Substitute in 0 and 1 to construct equations corresponding to females and males respectively

1. Females

\[ \text{IncM} = 22.653 + (-4.186)(0) + (0.554\times0 + .533)\text{Body Imp} \]

Equation for females: \[ \text{IncM} = 22.653 + (0.533)\text{Body Imp} \]

2. Males

\[ \text{IncM} = 22.653 + (-4.186)(1) + (0.554\times1 + .533)\text{Body Imp} \]

\[ \text{IncM} = 22.653 - 4.186 + (1.087)\text{Body Imp} \]

Equation for males: \[ \text{IncM} = 18.467 + (1.087)\text{Body Imp} \]

Step Three: Solve each equation by substituting one SD above and below Body Importance (±2.82823)

1. Females: \[ \text{IncM} = 22.653 + (0.533)\text{Body Imp} \]

Substitute one SD below Body Imp (−2.82823)

\[ \text{IncM} = 22.653 + (0.533)(-2.82823) \]

\[ \text{IncM} = 22.653 - 1.50745 \]

\[ \text{IncM} = 21.1455 \]

Substitute one SD above Body Imp (+2.82823)

\[ \text{IncM} = 22.653 + (0.533)(+2.82823) \]

\[ \text{IncM} = 22.653 + 1.50745 \]

\[ \text{IncM} = 24.16045 \]
2. **Males**: \( \text{IncM} = 18.467 + (1.087)\text{Body Imp} \)

<table>
<thead>
<tr>
<th>Substitute one SD below Body Imp ( - 2.82823)</th>
<th>Substitute one SD above Body Imp ( + 2.82823)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{IncM} = 18.467 + (1.087)( - 2.82823) )</td>
<td>( \text{IncM} = 18.467 + (1.087)( + 2.82823) )</td>
</tr>
<tr>
<td>( \text{IncM} = 18.467 - 3.074286 )</td>
<td>( \text{IncM} = 18.467 + 3.074286 )</td>
</tr>
<tr>
<td>( \text{IncM} = 15.3927 )</td>
<td>( \text{IncM} = 21.5412 )</td>
</tr>
</tbody>
</table>

Note that scores one SD below the mean of body importance equate to placing a high level of importance on the body, and those one SD above the mean equate to placing a low importance on the body.
Appendix E

Forms for Study 2 (Participant Consent Form, Parent Consent Form, Information Sheet)

Everyday problems and how I see myself as an adolescent:

Participant Consent Form

Dear Participant,

The current research forms part of the PhD research of Kristen Murray from the Department of Psychology at the ANU. The research is supervised by Professor Don Byrne and Dr Elizabeth Rieger. This research has been approved by the ANU Human Research Ethics Committee, protocol number 2009/390.

Please sign below if you agree to the following:

I agree to participate in the second phase of data collection investigating my experiences as an adolescent. I understand that there are no right or wrong answers and I will try to answer as honestly as possible.

I understand that my participation involves completing a questionnaire by indicating my best response. I also understand that my height and weight will be measured in private by the Primary Investigator.

I have been made aware that my participation is voluntary and I am not required to participate. I understand that I can withdraw at any part of the project for any reason without any consequences. I understand that my responses are confidential and that as far as the law allows no effort will be made on the part of the researchers to identify my responses at any part of the data collection or analysis process. The data collected today must remain by law at the ANU under lock and key for 7 years and thereafter will be destroyed.

Name: __________________________
Signature: _______________________
Date: ___________________________
Dear Parent or Guardian,

Your child's school, SCHOOL NAME, has agreed to participate in a longitudinal study run by the ANU Department of Psychology and approved by the ANU Human Research Ethics Committee (protocol number 2009/390). The research will be conducted by PhD Candidate (Clinical Psychology) Kristen Murray, whose research is supervised by Professor Don Byrne and Dr Elizabeth Rieger. It is possible your child took part last year and might be asked to participate in the second phase during class time on _______. As part of the study your child will have his/her height and weight measured in private by Kristen Murray.

The purpose of this study is to gain a greater understanding of the experience of adolescence. It investigates the impact of stress on perceptions of the body, and the role of self-esteem, depressive symptoms, beliefs about coping, body mass index, romantic relationships, the adoption of strategies to decrease weight or increase muscles, and the importance of the body to self-worth. Little empirical research has investigated the link between adolescent stress and body image but this research can contribute to programs designed to improve body image and prevent eating disorders. This research hopes to provide information to health providers, schools and policy-makers to promote the mental and physical health of today’s youth.

If this letter is not returned we will assume you do not object to your child participating again in this research. However, if you do object for any reason please sign the form below and have your child return it to [contact] before [date], or to Kristen Murray on the day of data collection. Your child will also have the opportunity to withdraw from participation. If they do complete the survey their responses will remain confidential as far as the law allows. Your child’s responses will be identified only by a unique code which will be matched to their responses last year. All students will be debriefed upon completion of the study and provided with an information sheet. I will also inform SCHOOL NAME of the results when the study has been completed. If you have any questions regarding this research please contact Kristen on kristen.murray@anu.edu.au or 6125 2783. You may also contact Professor Don Byrne on don.byrne@anu.edu.au or 6125 3974, or Dr Elizabeth Rieger on elizabeth.rieger@anu.edu.au or 6125 4208.

Yours sincerely,

Kristen Murray
Intern Psychologist
PhD Candidate (Clinical Psychology)

I do not wish for my child to participate in the current study by Kristen Murray

Student Name: ______________________________
Grade: ______________________________
Parent/Guardian Name: ______________________________
Signature: ______________________________
Date: ______________________________

THE AUSTRALIAN NATIONAL UNIVERSITY
Everyday problems and how I see myself as an adolescent:

**Participant Information Form**

Dear Participant,

Thank you for taking part in the second part of PhD research conducted by Kristen Murray. I hope you enjoyed it! Your participation is much appreciated and will contribute to policymakers and health professionals by helping understand the unique experience of adolescence.

The purpose of this study was to explore the impact of stress on body image. It also investigated the role of self-esteem, depressive symptoms, beliefs about your ability to cope, body mass index, romantic relationships, the importance of your body, and your thoughts, feelings and behaviours about losing weight and increasing musculature.

I am gathering data from year 7 to 10 students around Canberra and following them up over one year. Once the data is collected I will analyse it to determine the relationship between adolescent stress and body image.

If you have any further questions regarding the study please contact me or my supervisors:

Kristen Murray on kristen.murray@anu.edu.au.
Professor Don Byrne on don.byrne@anu.edu.au.
Dr Elizabeth Rieger on elizabeth.rieger@anu.edu.au.

This research was approved by the Australian National University’s Human Research Ethics Committee, protocol number 2009/390. If you have any concerns and feel uncomfortable contacting any of the researchers please contact the Australian National University’s Human Ethics Committee on 6125 7945 or Research.Office@anu.edu.au. You can also contact the ANU Human Research Ethics Officers, Ms Yolanda Shave on 61257945 or Ms Kim Tiffen on 61253427.

If you feel you need to speak to a professional regarding any psychological concerns please contact in the first instance your school counsellor. Kid’s Helpline are there to listen at all hours on 1800 55 1800 if you need to talk to someone outside of school time.
Appendix F

Active Parent Consent Form Study 2

Dear Parent or Guardian,

Your child's school, SCHOOL NAME, has agreed to participate in a longitudinal study run by the ANU Department of Psychology and approved by the ANU Human Research Ethics Committee (protocol number 2009/390). The research will be conducted by PhD Candidate (Clinical Psychology) Kristen Murray, whose research is supervised by Professor Don Byrne and Dr Elizabeth Rieger. It is possible your child took part last year and might be asked to participate in the second phase during class time on __________. As part of the study your child will have his/her height and weight measured in private by Kristen Murray.

The purpose of this study is to gain a greater understanding of the experience of adolescence. It investigates the impact of stress on perceptions of the body, and the role of self-esteem, depression, coping, body mass index, romantic relationships, the adoption of strategies to decrease weight or increase muscles, and the importance of the body to self-worth. Little empirical research has investigated the link between adolescent stress and body image but this research can contribute to programs designed to improve body image and prevent eating disorders. This research hopes to provide information to health providers, schools and policy-makers to promote the mental and physical health of today's youth.

If you give permission for your child to take part in the research, please complete the slip below and return it to [contact] before [date of data collection], or to Kristen Murray on the day of data collection. Your child will also have the opportunity to withdraw from participation. If they do complete the survey their responses will remain confidential as far as the law allows. Your child's responses will be identified only by a unique code which will be matched to their responses last year. All students will be debriefed upon completion of the study and provided with an information sheet. I will also inform SCHOOL NAME of the results when the study has been completed. If you have any questions regarding this research please contact Kristen on kristen.murray@anu.edu.au or 6125 2783. You may also contact Professor Don Byrne on don.byrne@anu.edu.au or 6125 3974, or Dr Elizabeth Rieger on elizabeth.rieger@anu.edu.au or 6125 4208.

Yours sincerely,

Kristen Murray
Intern Psychologist
PhD Candidate (Clinical Psychology)

I give permission for my child to participate in the current study by Kristen Murray

Student Name: ____________________________
Grade: ____________________________
Parent/Guardian Name: ____________________________
Signature: ____________________________
Date: ____________________________

THE AUSTRALIAN NATIONAL UNIVERSITY
Appendix G

Details on Attrition Rates in Study 2

Detailed information regarding attrition from the study was collected where possible, but specifics were not possible for every participant who was not followed up. Possible reasons for those who were not available include deliberate withdrawal from the study, forgetting to attend scheduled data collection sessions, or absence from school. Additional reasons for attrition are outlined below in Table G1 by grade level, with approximately 40% of participants not surveyed at Time 2.

Table G1

*Follow-Up Rates and Reasons for Absence*

<table>
<thead>
<tr>
<th>Grade</th>
<th>N (T2)</th>
<th>N (T1)</th>
<th>NA (T2)</th>
<th>WD (T2)</th>
<th>NE (T2)</th>
<th>Left</th>
<th>Parent WD</th>
<th>Active NO</th>
<th>N missed</th>
<th>% missed</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>161</td>
<td>101</td>
<td>37</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>4</td>
<td>7</td>
<td>61</td>
<td>37.89</td>
</tr>
<tr>
<td>9</td>
<td>95</td>
<td>58</td>
<td>33</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>38</td>
<td>40</td>
</tr>
<tr>
<td>10</td>
<td>124</td>
<td>87</td>
<td>27</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>38</td>
<td>30.65</td>
</tr>
<tr>
<td>11</td>
<td>113</td>
<td>52</td>
<td>51</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>61</td>
<td>53.98</td>
</tr>
<tr>
<td>Unknown</td>
<td>3</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>496</td>
<td>298</td>
<td>148</td>
<td>6</td>
<td>3</td>
<td>24</td>
<td>10</td>
<td>7</td>
<td>198</td>
<td>39.92</td>
</tr>
</tbody>
</table>

Note. T1: Time 1 data, T2: Time 2 data, FU: Follow-up, NA: Absent from scheduled data collection or not available on day, WD: Participant did not consent to take part, NE: Student name at Time 1 not able to be located at Time 2, Left: No longer enrolled in Time 1 school, Parent WD: Parent actively withdrew participant from study, Active NO: Parent did not provide active consent or active consent form not returned.
Appendix H

Longitudinal Data Analysis Body Change Strategies

The longitudinal models assessing directionality in the stress-body change strategies relationship were tested using the same procedure outlined in Chapter 5. Alpha coefficients for the Time 2 sample were .95, .95, .91 for Decrease Body Size and .94, .94, .93 for Increase Muscles for the total, female and male samples respectively.

No relationship was identified cross-sectionally, but the prospective analysis was undertaken to assess whether any relationship occurred over time. Hierarchical regression was utilised for each dimension of body change strategies to decrease body size and increase muscularity. The model $R^2$ (and 95% confidence interval), $F$ change values, $\beta$ and $t$ values for each independent variable are shown in Table H1 and H2.

Table H1

Hierarchical regression for decrease body size

<table>
<thead>
<tr>
<th>DV</th>
<th>Block</th>
<th>$R^2$</th>
<th>$F$ change (df1, df2)</th>
<th>IVs</th>
<th>$\beta$</th>
<th>$t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBS T2</td>
<td>1</td>
<td>0.510</td>
<td>302.54 (1, 291)**</td>
<td>DBS T1</td>
<td>0.71</td>
<td>17.39***</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.512</td>
<td>1.31 (1, 290)</td>
<td>DBS T1</td>
<td>0.69</td>
<td>14.77***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Stress T1</td>
<td>-0.05</td>
<td>-1.14</td>
</tr>
<tr>
<td>Stress T2</td>
<td>1</td>
<td>0.403</td>
<td>196.16 (1, 291)**</td>
<td>Stress T1</td>
<td>0.64</td>
<td>14.01***</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.403</td>
<td>0.37 (1, 290)</td>
<td>Stress T1</td>
<td>0.62</td>
<td>12.03***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DBS T1</td>
<td>-0.03</td>
<td>-0.61</td>
</tr>
</tbody>
</table>

* denotes significant at $p < .05$, ** demotes significant at $p < .01$, *** denotes significant at $p < .001$.

Table H1 reveals that stress does not predict body change strategies to decrease body size over time, and body change strategies to decrease body size did not predict
stress. The correlated residuals for were -.17 \( (p < .01) \), representing a reduction from zero-order correlations of -.48 \( (p < .01) \) at Time 1 for the longitudinal sample. Therefore, while the results display a reduction in the association between the two variables in the longitudinal analysis, the prospective link was not significant.

Table H2

*Hierarchical Regression for Increase Muscularity*

<table>
<thead>
<tr>
<th>DV</th>
<th>Block</th>
<th>( R^2 )</th>
<th>( F ) change (df1, df2)</th>
<th>IVs</th>
<th>( \beta )</th>
<th>( t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>IncM T2</td>
<td>1</td>
<td>.441</td>
<td>229.13 (1, 291)***</td>
<td>IncM .66</td>
<td>15.14***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>.441</td>
<td>.49 (1, 290)</td>
<td>IncM .66</td>
<td>14.58***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Stress -.03</td>
<td>-.70</td>
<td></td>
</tr>
<tr>
<td>Stress T2</td>
<td>1</td>
<td>.412</td>
<td>196.16 (1, 291)***</td>
<td>Stress .64</td>
<td>14.01***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>.412</td>
<td>.03 (1, 290)</td>
<td>Stress .63</td>
<td>13.58***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IncM -.001</td>
<td>-.18</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* T1: Time 1, T2: Time 2, IncM: Increase muscularity

* denotes significant at \( p < .05 \), ** denotes significant at \( p < .01 \), *** denotes significant at \( p < .001 \)

Table H2 reveals that stress does not predict body change strategies to increase muscularity over time, and the reverse relationship is also non-significant. The correlated residuals were -.14 \( (p < .05) \) after the prospective model was performed,
representing a reduction from -0.23 ($p < .01$) which is the zero-order correlation for Time 1 in the longitudinal sample.
Appendix I

Poster Advertising Study 3

PARTICIPANTS NEEDED!
Self-view and Group Interaction Study

Are you an undergraduate student aged 18 to 25 years?

You are invited to participate in a study which uses physiological measures to explore how we feel about ourselves in group-based interactions.

What does the study involve?
- Completing an anonymous survey
- Reading a passage about a group interaction and writing about how this makes you feel
- Measurement of simple physiological responses (e.g. heart rate) using electrodes attached to your non-dominant hand, wrists and ankle, and measurement of height and weight (in private)

Each participant will receive $10. If you are a first year psychology student you can choose to receive $10 or 1 hour research credit.

For more information or to participate, email Kristen at kristen.murray@anu.edu.au

The following study has been approved by the ANU Human Research Ethics Committee 2011/668
Appendix J

Ethics Clearance Study 3

Dear Ms Kristen Murray,

Protocol: 2011/668
An experimental examination of stress and body image

I am pleased to advise you that your Human Ethics protocol received approval by the Chair of the Science and Medical DERC on 1 June 2012.

PLEASE NOTE: The Chair has asked that you check your wording in your debrief sheet.

For your information:
1. Under the NHMRC/AVCC National Statement on Ethical Conduct in Human Research we are required to follow up research that we have approved. Once a year (or sooner for short projects) we shall request a brief report on any ethical issues which may have arisen during your research or whether it proceeded according to the plan outlined in the above protocol.
2. Please notify the committee of any changes to your protocol in the course of your research, and when you complete or cease working on the project.
3. Please notify the Committee immediately if any unforeseen events occur that might affect continued ethical acceptability of the research work.
4. Please advise the HREC if you receive any complaints about the research work.

5. The validity of the current approval is five years' maximum from the date shown approved. For longer projects you are required to seek renewed approval from the Committee.

All the best with your research,
Kim
Ms Kim Tiffen
Ethics Manager
Office of Research Integrity,
Research Services,
Ground Floor, Chancelry 10B
Ellery Road
The Australian National University

ACTON ACT 0200
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Appendix K

Questionnaire Study 3

Self-view and Group Interactions Study
Instructions

This survey asks about group-based experiences. The aim of the study is to use simple physiological measures assessing heart rate and galvanic skin response to investigate how we feel about ourselves in the context of group-based interactions. During this study you will be asked to complete a number of questionnaires about yourself, and to read and imagine passages describing group-based experiences. You will then be asked to write about your own responses to these scenarios and complete questions relating to your body's response.

Please provide honest responses to the following questions, there are no right or wrong answers. Remember, all of your responses will remain anonymous and confidential.

Before we begin, please complete the following questions about you.

Information about you

Please take a moment to complete the following questions about yourself.

Please circle your gender: Female Male Other

How old are you in years and months? ___ ___ years ___ ___ months

What degree are you completing? Bachelor of _______________________

In what year did you commence this degree? ________

Have you consumed nicotine or caffeine in the past four hours? Yes No
## Important things in your life

**Instructions:**
Please respond to each of the following statements by circling the response that best corresponds to your answer, using the scale from "Strongly disagree" to "Strongly agree." If you haven't experienced the situation described in a particular statement, please answer how you think you would feel if that situation occurred.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>My self-worth is based on God's love.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2.</td>
<td>I feel worthwhile when I perform better than others on a task or skill.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3.</td>
<td>My sense of self-worth suffers whenever I think I don't look good</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<td>4.</td>
<td>Doing something I know is wrong makes me lose my self-respect.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>6</td>
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<td>5.</td>
<td>I don't care if other people have a negative opinion about me.</td>
<td>1</td>
<td>2</td>
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<td>6.</td>
<td>Knowing that my family members love me makes me feel good about myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>6</td>
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<tr>
<td>7.</td>
<td>I feel worthwhile when I have God's love.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>6</td>
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<tr>
<td>8.</td>
<td>I can't respect myself if others don't respect me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
<td>6</td>
</tr>
<tr>
<td>9.</td>
<td>My self-worth is not influenced by the quality of my relationships with my family members.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<tr>
<td>10.</td>
<td>My self-esteem does not depend on whether or not I feel attractive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>11.</td>
<td>Whenever I follow my moral principles, my sense of self-respect gets a boost.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Somewhat Disagree</td>
<td>Neutral</td>
<td>Somewhat Agree</td>
<td>Agree</td>
<td>Strongly Agree</td>
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<td>12. Knowing that I am better than others on a task raises my self-esteem.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>13. My opinion about myself isn’t tied to how well I do in school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>14. I couldn’t respect myself if I didn’t live up to a moral code.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>15. I don’t care what other people think of me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>16. When my family members are proud of me, my sense of self-worth increases.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>17. My self-esteem would suffer if I didn’t have God’s love.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>18. My self-esteem is influenced by how attractive I think am</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>19. Doing well in school gives me a sense of self-respect.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>20. Doing better than others gives me a sense of self-respect.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>21. I feel better about myself when I know I’m doing well academically.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>22. What others think of me has no effect on what I think about myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>23. When I don’t feel loved by my family, my self-esteem goes down.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>24. My self-worth is affected by how well I do when I am competing with others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Somewhat</td>
<td>Strongly Agree</td>
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<td></td>
</tr>
<tr>
<td>25. When I think I look attractive, I feel good about myself</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>26. My self-esteem goes up when I feel that God loves me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>27. My self-esteem is influenced by my academic performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>28. My self-esteem would suffer if I did something unethical.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>29. It is important to my self-respect that I have a family that cares about me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>30. When I think that I'm disobeying God, I feel bad about myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>31. My self-worth is influenced by how well I do on competitive tasks.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>32. My self-esteem is unrelated to how I feel about the way my body looks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>33. I feel bad about myself whenever my academic performance is lacking.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>34. My self-esteem depends on whether or not I follow my moral/ethical principles.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>35. My self-esteem depends on the opinions others hold of me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Crocker et al. (2003)

You will now be asked to read about a group-based scenario in the additional papers provided to you by the experimenter. Please turn this booklet over.
Instructions:

Please write below continuously for four minutes until you are told to stop. Focus on how you would feel if you were in this situation and allow yourself to experience fully any feelings that arose while reading the passage.

If I were Alex in this situation I would think and feel...

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
How you feel right now

Instructions:
Please respond to each of the following statements by circling the response that best corresponds to how you feel right now at this moment, using the scale below from 1 to 7. Please read each statement carefully as each scale responses differ:

1. How tense are you feeling right now, at this very moment?
   
   Not tense at all
   
   1 2 3 4 5 6 7
   
   Very tense

2. How irritable are you feeling right now, at this very moment?
   
   Not irritable at all
   
   1 2 3 4 5 6 7
   
   Very irritable

3. How is your mood right now, at this very moment?
   
   Very positive
   
   1 2 3 4 5 6 7
   
   Very negative

4. How much agitation are you feeling right now, at this very moment?
   
   Not agitated at all
   
   1 2 3 4 5 6 7
   
   Very agitated

5. How calm are you feeling right now, at this very moment?
   
   Not calm at all
   
   1 2 3 4 5 6 7
   
   Very calm

6. How do you feel about your physical appearance right now, at this very moment?
   
   Very positive
   
   1 2 3 4 5 6 7
   
   Very negative

7. How rejected do you feel right now, at this very moment?
   
   Not rejected at all
   
   1 2 3 4 5 6 7
   
   Very rejected

8. How humiliated do you feel right now, at this very moment?
   
   Not humiliated at all
   
   1 2 3 4 5 6 7
   
   Very humiliated

9. How ashamed are you feeling right now, at this very moment?
   
   Not ashamed at all
   
   1 2 3 4 5 6 7
   
   Very ashamed
Your body right now

Instructions:
We now want to get some more detail about about your experiences of your body. The statements listed below are used to describe how anxious, tense, or nervous you feel *Right Now* about your body. Use the following scale:

<table>
<thead>
<tr>
<th>Not At All</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Very Much So</th>
<th>Exceptionally So</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</table>

Right now, I feel anxious, tense, or nervous about:

<p>| | |</p>
<table>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>The extent to which I look overweight.</td>
</tr>
<tr>
<td>2.</td>
<td>My thighs.</td>
</tr>
<tr>
<td>3.</td>
<td>My buttocks.</td>
</tr>
<tr>
<td>4.</td>
<td>My hips.</td>
</tr>
<tr>
<td>5.</td>
<td>My stomach (abdomen).</td>
</tr>
<tr>
<td>7.</td>
<td>My waist.</td>
</tr>
<tr>
<td>9.</td>
<td>My ears.</td>
</tr>
<tr>
<td>10.</td>
<td>My lips.</td>
</tr>
<tr>
<td>11.</td>
<td>My wrists.</td>
</tr>
<tr>
<td>12.</td>
<td>My hands.</td>
</tr>
<tr>
<td>15.</td>
<td>My chin.</td>
</tr>
<tr>
<td>16.</td>
<td>My feet.</td>
</tr>
</tbody>
</table>

Reed et al., (1991)
Your appearance right now

Instructions:
For each of the items below, check the box beside the one statement that best describes how you feel RIGHT NOW, AT THIS VERY MOMENT. Read the items carefully to be sure the statement you choose accurately and honestly describes how you feel right now.

1. Right now I feel...
   - Extremely dissatisfied with my physical appearance
   - Mostly dissatisfied with my physical appearance
   - Moderately dissatisfied with my physical appearance
   - Slightly dissatisfied with my physical appearance
   - Neither dissatisfied nor satisfied with my physical appearance
   - Slightly satisfied with my physical appearance
   - Moderately satisfied with my physical appearance
   - Mostly satisfied with my physical appearance
   - Extremely satisfied with my physical appearance

2. Right now I feel...
   - Extremely satisfied with my body size and shape
   - Mostly satisfied with my body size and shape
   - Moderately satisfied with my body size and shape
   - Slightly satisfied with my body size and shape
   - Neither dissatisfied nor satisfied with my body size and shape
   - Slightly dissatisfied with my body size and shape
   - Moderately dissatisfied with my body size and shape
   - Mostly dissatisfied with my body size and shape
   - Extremely dissatisfied with my body size and shape

3. Right now I feel...
   - Extremely dissatisfied with my weight
   - Mostly dissatisfied with my weight
   - Moderately dissatisfied with my weight
   - Slightly dissatisfied with my weight
   - Neither dissatisfied nor satisfied with my weight
   - Slightly satisfied with my weight
   - Moderately satisfied with my weight
   - Mostly satisfied with my weight
   - Extremely satisfied with my weight
Instructions:
For each of the items below, check the box beside the one statement that best describes how you feel RIGHT NOW, AT THIS VERY MOMENT. Read the items carefully to be sure the statement you choose accurately and honestly describes how you feel right now.

4. Right now I feel...
   - Extremely physically attractive
   - Very physically attractive
   - Moderately physically attractive
   - Slightly physically attractive
   - Neither attractive nor unattractive
   - Slightly physically unattractive
   - Moderately physically unattractive
   - Very physically unattractive
   - Extremely physically unattractive

5. Right now I feel...
   - A great deal worse about my looks than I usually feel
   - Much worse about my looks than I usually feel
   - Somewhat worse about my looks than I usually feel
   - Just slightly worse about my looks than I usually feel
   - About the same about my looks as usual
   - Just slightly better about my looks than I usually feel
   - Somewhat better about my looks than I usually feel
   - Much better about my looks than I usually feel
   - A great deal better about my looks than I usually feel

6. Right now I feel that I look...
   - A great deal better than the average person looks
   - Much better than the average person looks
   - Somewhat better than the average person looks
   - Just slightly better than the average person looks
   - About the same as the average person looks
   - Just slightly worse than the average person looks
   - Somewhat worse than the average person looks
   - Much worse than the average person looks
   - A great deal worse than the average person looks

Thomas F. Cash, Ph.D., 2001
Study Feedback

Instructions:
Please take a moment to answer the following question about our study. Your feedback is very important to us so please be as open and honest as possible.

What do you believe this experiment was designed to test?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

You have reached the end of the questionnaire.
Thank you for your help!
Please sit quietly and await our instructions.
Appendix L

Vignette Examples (female) Study 3 and Instructions for Group-Based Task

Group-based experiences task

You will now be asked to read through a passage carefully. The passage contains five sections which you will read one at a time.

While you are reading the passage, please take your time to experience the event as vividly as possible by imagining yourself in the position of the central character in the scenario and imagining people you know as the other characters in the situation. Once you have read the passage, you will be asked to write continuously for four minutes focusing on how you would feel if you had experienced the scenario yourself.

Please take a moment now to clear your mind of any thoughts. You will be asked to commence reading shortly.

GROUP VIGNETTE

Instructions:

1. Please take your time to read and imagine the following paragraphs. The researcher will tell you when to move onto the next section.

2. Please experience the event as vividly as possible by imagining yourself as the central character in the scenario and imagining people you know as the other characters in the situation.

3. Imagine what it would feel like and what you would be thinking about in the same circumstances.
Appearance Rejection Vignette (females)

Note: Each section was presented on a separate piece of paper and examined for 30 seconds before participants were asked to move to the next section.

Alex is a first-year student at the Australian National University. On one very hot day, she decides to go to the pool to cool down with a swim.

Pause...Experience the event vividly.

After a swim, Alex walks alongside the pool in her bathers towards her towel and belongings and notices a group of people standing near her things.

Pause...Experience the event vividly.

She recognises the group and realises that they went to the same high school as her. As she draws nearer, she waves and says hello to them, and notices that the group is looking at her and laughing.

Pause...Experience the event vividly.

When Alex walks past the group she overhears the group making negative comments about her physical appearance, and hears the group laughing loudly.

Pause...Experience the event vividly.

As Alex packs up her belongings she hears one member of the group say, “If I looked like that in a swimsuit I wouldn’t go out in public!” Alex quickly grabs her things and rushes away, still hearing the group laughing as she leaves.

Pause...Experience the event vividly.
Personality Rejection Vignette (females)

Alex is a first-year student at the Australian National University. One Friday night, she is invited to a party at a friend’s house that she went to high school with. 

Pause...Experience the event vividly.

When she arrives at the party and walks inside, she scans the room for people she knows. She notices a group of people standing close by. 

Pause...Experience the event vividly.

She recognises the group and realises that they went to the same high school as her. She says hello to the group and asks what they have been up to. As she is talking, Alex notices some group members looking at each other and laughing. 

Pause...Experience the event vividly.

Alex decides to excuse herself, and as she walks away she overhears the group making negative comments about her personality, and hears the group laughing loudly. 

Pause...Experience the event vividly.

Alex hears one member of the group say, “I thought she would never leave. She’s as lame as ever!” Alex quickly rushes away, still hearing the group laughing and joking behind her. 

Pause...Experience the event vividly.
No Rejection Control Vignette (females)

Alex is a first-year student at the Australian National University. One Wednesday afternoon, she finishes a tutorial and has one lecture to go for the day.

Pause...Experience the event vividly.

She walks through Union Court on her way to the Manning Clarke Building. As she walks up the stairs towards the lecture theatre, she notices someone walking nearby.

Pause...Experience the event vividly.

She recognises the person and realises that they went to the same high school as her. As they draw nearer, she walks over and says hello. She asks them about their degree, what classes they are taking, and if they are enjoying university.

Pause...Experience the event vividly.

After briefly catching up, they talk about who else from high school is at uni, what they did over the summer holidays, and what their plans are for this year.

Pause...Experience the event vividly.

Alex suddenly remembers that she has a lecture to get to. She wishes her old school colleague good luck with their studies and continues up the ramp on her way to class.

Pause...Experience the event vividly.
Self-view and Group Interaction Study

PARTICIPANT CONSENT FORM

Dear Participant,

Please sign below if you consent to the following:
I agree to participate in research which uses simple physiological measures (heart rate and galvanic skin response) to investigate how we feel about ourselves in the context of group-based interactions.

I acknowledge that I have read the Information Statement which explains the aims of the study, and the statement has been explained to my satisfaction. I have been given the opportunity to ask questions related to participation and I have received satisfactory responses.

I understand that there are no right or wrong answers and I will try to answer as honestly as possible.

I understand that I can withdraw from the study at any time without any repercussion.

I understand that my responses are confidential and that as far as the law allows no effort will be made on the part of the researchers to identify my responses at any part of the data collection or analysis process. The data collected today must remain by law at the ANU under lock and key for 7 years and thereafter will be destroyed.

I agree that research data gathered from the results of the study may be published provided that I am not identified.

I understand that if I have any questions relating to my participation in this research, I may contact Ms Kristen Murray (email: kristen.murray@anu.edu.au)

I acknowledge receipt of a copy of this Consent Form and the Information Statement.

Name: ___________________________ Signature: ___________________________

Date: ____________________________
Self-view and Group Interaction Study

PARTICIPANT INFORMATION STATEMENT

You are invited to take part in a study which uses simple physiological measures (heart rate and galvanic skin response) to investigate how we feel about ourselves in the context of group-based interactions.

The current research forms part of the PhD research of Kristen Murray from the Research School of Psychology at the ANU. The research is supervised by Professor Don Byrne and Dr Elizabeth Rieger. This research has been approved by the ANU Human Research Ethics Committee, protocol number 2011/668.

If you decide to take part in the study, you will first be asked to complete a number of tasks, including a series of questionnaires examining demographic variables and what is important to you in the way you view yourself. You will then be asked to read about and imagine a group-based scenario and then briefly write about how this situation would make you feel.

Throughout this study you will be attached to equipment on your non-dominant hand and ankles which receives physiological data. This will monitor your physical responses throughout the experiment which we will compare to a number of questions related to your experience of your body. At the conclusion of the study we will also measure your height and weight in private.

This study will take approximately one hour for which you will receive $10 cash for your participation. If you are completing first year psychology you can choose to receive $10 or 1 hour course credit.

Participation in this study is voluntary and you are not under any obligation to consent to take part. If you decide to participate, you are free to withdraw at any time.

All aspects of the study, including results, will be strictly confidential and only the researchers will have access to information on participants. In the event the study should be published, individual participants will not be identifiable.

It is important that you do not discuss any part of the study with your friends or fellow classmates as they may decide to take part in the research and it may jeopardise the results. When you have read this information, the primary researcher will discuss it with you further and answer any questions you may have. If you would like to know more at any stage, please feel free to contact Kristen by email (Kristen.murray@anu.edu.au) or her supervisors Professor Don Byrne (don.byrne@anu.edu.au) or Dr Elizabeth Rieger (elizabeth.rieger@anu.edu.au).

This research was approved by the ANU Human Research Ethics Committee, protocol number 2011/668. If you have any concerns or feel uncomfortable contacting any of the researchers please contact the ANU Human Research Ethics Committee by phone on 6125-3427 or email human.ethics.officer@anu.edu.au.
Self-view and Group Interaction Study

PARTICIPANT DEBRIEF

Dear Participant,

Thankyou for taking part in the PhD research of Kristen Murray. This debrief information sheet aims to provide you with more information about the study you have just participated in, and to give you the opportunity to provide feedback about the study or discuss any questions or concerns you may have regarding your participation.

All data collected in the study will have a numeric identifier and no names will be present on any data sheets. This is to ensure your confidentiality.

The main purpose of the study is to explore the effect of stress on body image satisfaction, specifically stress relating to the peer group. In order to successfully carry out the study, it was essential that you were not aware of this main focus in order to receive unbiased responses on the various questionnaires. The study included three main components:

The first questionnaire identified how important your physical appearance is in the way you evaluate yourself. This was measured to test whether stress is more likely to affect body image satisfaction in individuals to whom the body is important in their self-evaluation compared to those in which it is not.

The second task involved reading scenarios involving group-based experiences and imagining how these would make you feel. Participants were randomly allocated to three conditions in which the protagonist was rejected from a group either based on their personality or physical appearance, or not rejected at all. We asked you to engage strongly in these scenarios to increase your experience of stress, and writing about your experience was designed to increase this engagement. The three scenarios were selected based on previous results in this PhD associating body image dissatisfaction with stressors in the peer group, and suggesting these stressors related to physical appearance and not fitting in. Therefore, this study aimed to identify which of these two types of stress were more closely related to body image, leading to scenarios involved rejection based on appearance or personality. A no rejection condition was included to determine the effect of the stress scenarios compared to no stress.

The third part of the study involved you completing questionnaires evaluating your experience of your physical body and how you felt about your body after the different stressor stimulus you engaged in. Throughout the study we also tested physiological stress responses to the
scenarios to compare the reported psychological stress with objective stress associated with each scenario. Height and weight were measured to control for its influence on body image across the situations.

In order to obtain accurate and unbiased results, it is important that participants are not made aware of the true nature of the study until the debriefing session. So please do not discuss any aspect of this study with anyone else until the end of the academic year.

For those of you who are interested, I would be happy to email you the results and the main conclusions from the study when they are available. I can be contacted by email on kristen.murray@anu.edu.au. Any feedback you may have regarding this study would be of great interest, so please take the opportunity now, or you can contact me at a later date. Thank you for your participation in this study – both your time and effort are much appreciated.

This sheet is for you to keep.

If you feel you need to speak to a professional regarding any psychological concerns please contact Lifeline on 13 11 14 or the Crisis Assessment and Treatment Team on 1800 629 354.

You may also contact the University Counselling Centre if you require support. They are located above the Health Service on North Road and can be contacted between 9am-5pm by phone on 6125 2442.

Your GP can also provide you with information about how to access services in the ACT. headspace ACT also offers psychological services to young people aged between 12 and 25 years. You may contact them for an appointment by phone on (02) 6201 5343.
### Appendix N

**Descriptive statistics for Pilot Study: One-Way ANOVA Means Per Condition on Subjective Manipulation Checks and Dependent Variables**

Note that high scores equate to greater reports on the scales indicated.

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