

Florida State University Libraries

Electronic Theses, Treatises and Dissertations

The Graduate School

2013

The Relationship Between Body Image Dissatisfaction with Social Physique Anxiety and Exercise Behaviors in the Context of Romantic Relationship

Jingwen Liu



THE FLORIDA STATE UNIVERSITY
COLLEGE OF EDUCATION

THE RELATIONSHIP BETWEEN BODY IMAGE DISSATISFACTION WITH SOCIAL
PHYSIQUE ANXIETY AND EXERCISE BEHAVIORS IN THE CONTEXT OF ROMANTIC
RELATIONSHIP

By

JINGWEN LIU

A Thesis submitted to the
Department of Educational Psychology and Learning Systems
in partial fulfillment of the
requirements for the degree of
Master of Science

Degree Awarded:
Spring Semester, 2013

Jingwen Liu defended this thesis on March 18, 2013.

The members of the supervisory committee were:

Robert Eklund
Professor Directing Thesis

Gershon Tenenenbaum
Committee Member

Insu Paek
Committee Member

The Graduate School has verified and approved the above-named committee members, and certifies that the thesis has been approved in accordance with university requirements.

To My Parents: Guohua Liu and Xiaomei Kan, Thank you for all your love, care and support.

TABLE OF CONTENTS

List of Tables	vi
List of Figures	vii
Abstract	viii
1. INTRODUCTION	1
2. REVIEW OF LITERATURE	4
Body Dissatisfaction and Romantic Relationship Experience	4
Social Physique Anxiety	8
The Integrated Model of Self-Determination Theory and Cognitive-Motivational-Relational Theory	10
Self-Determination Theory	11
Cognitive-Motivational-Relational Theory and Integrated Model.....	14
The Present Study	19
3. METHOD	22
Participants	22
Power Analysis	22
Demographic Information of Participants.....	23
Measures.....	23
Informed Consent Form.....	23
Demographic Form.....	24
The Eating Disorder Inventory- Body Dissatisfaction Subscale.....	24
Partner Social Physique Anxiety Scale.....	24
Relationship Satisfaction Subscale of Dyadic Adjustment Scale.....	25
Leisure Time Exercise Questionnaire.....	26
Procedure.....	27
Data Analysis.....	27
4. RESULTS.....	30
Confirmatory Factor Analysis of Partner-Social Physique Anxiety Scale.....	30
Correlational Analysis.....	31
Moderated Multiple Regression Analysis	32
Further Analysis of Romantic Relationship Status.....	39
5. DISCUSSION.....	44
Correlation between Body Image Dissatisfaction with Partner-Social Physique Anxiety and Exercise Behaviors.....	44
Moderating Effect of Romantic Relationship Satisfaction.....	45
Moderating Effect of Romantic Relationship Status	47
Limitations, Future Research Directions and Implications for Professional Practice	49
Concluding Remarks.....	52
APPENDICES	54

A. INFORMED CONSENT FORM.....	54
B. DEMOGRAPHIC INFORMATION	59
C. EATING DISORDER INVENTORY-BODY DISSATISFACTION.....	60
D. PARTNER SOCIAL PHYSIQUE ANXIETY SCALE.....	61
E. DYADIC ADJUSTMENT SCALE	62
F. LEISURE TIME EXERCISE QUESTIONNAIRE.....	64
REFERENCES	65
BIOGRAPHICAL SKETCH.....	72

LIST OF TABLES

1	Standardized Fact Loadings and R^2 of Items in Partner-SPAS	31
2	Means, Standard Deviations, and Correlations of Variables in the Conceptual Model	32
3	R^2 of Regression Models and R^2 Change Caused by Moderating Effect	36
4	t -test of Regression Coefficients and Constants in Models of Different Moderators	37
5	t -test of Regression Coefficients of BID and Constants in Models of Different Romantic Relationship Status	40
6	F -test of Homogeneity of Error Variance among Romantic Relationship Status Subgroups	42
7	t -test of Difference in Regression Slope and Intercept among Romantic Relationship Status Subgroups	43

LIST OF FIGURES

1	An integrated model of self-determination theory and cognitive-motivational-relational theory	17
2	Constructs examined in this study based on Ntoumanis, Duda and Edmunds' (2009) integrated model.	18
3	The conceptual model of this study.....	19
4-1	The distribution of standardized residual across predictors of BID, gender and interaction between BID and gender.....	33
4-2	The distribution of standardized residual across predictors of BID, length of romantic relationship and interaction between BID and length of romantic relationship.....	33
4-3	The distribution of standardized residual across predictors of BID, status of romantic relationship and interaction between BID and status of romantic relationship.	34
4-4	The distribution of standardized residual across predictors of BID, satisfaction of romantic relationship and interaction between BID and satisfaction of romantic relationship.....	34
5	Regression lines for body image dissatisfaction on partner-SPA for different romantic relationship satisfaction	38
6	Regression lines for body image dissatisfaction on partner-SPA for different romantic relationship status.....	41

ABSTRACT

Body Image Dissatisfaction (BID) has been considered as one of the important antecedents of Social Physique Anxiety (SPA; Hart, Leary, & Rejeski, 1989). However, the context of romantic relationship has yet to be considered in extant studies on the relationship between BID and SPA. The aim of the present study was to explore moderating effect of several romantic relationship variables in the relationship between BID with partner-SPA and exercise behaviors. College age students ($N = 207$, $M_{\text{age}} = 20.92$, $SD_{\text{age}} = 1.60$) completed online questionnaires on body image dissatisfaction, romantic relationship status, length, and romantic relationship satisfaction, exercise behaviors, and partner-SPA. There was a positive yet insignificant correlation between BID and exercise behaviors ($r = .07$). Therefore, they were excluded from moderating effect analyses. Results indicated that only romantic relationship satisfaction moderated in the relationship between BID and partner-SPA. It was concluded that poor romantic relationship increased the risks of partner-SPA in college students when they were already concerned with body image. After controlling BID, the partner-SPA was consistently higher among undergraduate students who reported lower romantic relationship satisfaction than those who report higher relationship satisfaction. The threshold level of BID that led to significant difference in partner-SPA across different levels of romantic relationship satisfaction was not examined in this study, and warrants further investigation. It was suggested that romantic relationship status should be considered as an important source of body-image-related concerns in future research and counseling practices.

CHAPTER ONE

INTRODUCTION

The World Health Organization has recognized obesity as a global issue (WHO Consultation, 2000). Approximately 68% of U.S adults were overweight in 2008; a relatively high prevalence rate (Flegal, Carrol, Ogden, & Curtin, 2010). Diseases such as diabetes and hypertension are not the only hazard of being overweight because these individuals also suffer pressure from social standards relating to body composition (e.g., leanness for males; thin and sexy for females) (Fasol, 2010; Frederick et al., 2007; Hargreaves & Tiggemann, 2009).

Nonetheless, obese people are not the only population that is concerned by body appearance. An attractive appearance can facilitate success in dating and mating, job hunting, making friends and, in short, being liked by others (Tiggemann, 2011). The objective body appearance can influence social interactions, and the subjective experience of one's own body appearance can also have an influence on behaviors, cognition and emotions. Cash (2004) claimed that the subjective perception of one's body is perhaps more psychologically powerful than the objective physique. This statement is explained in Roger's person-centered perspective on therapy wherein it is considered that an individual's internal reality guides his/her behaviors, rather than the external reality (Hill, 2010). Cash (2004) described this subjective perspective of body as an "inside view" that he termed *body image*.

The term *body image* has been used in many different ways in the extant research with meanings relating to size perception accuracy, weight satisfaction, body self-esteem, and body satisfaction/dissatisfaction (Grogan, 2008). Grogan (2008) defined body image as "a person's perception, thoughts, and feelings about his or her body" (p. 3), and further defined *Body Image Dissatisfaction* (BID) as negative thoughts and feelings toward one's body.

Researchers appear to have reached a consensus that BID is sufficiently common among both men and women that might be aptly characterized as “normative discontent” (Littleton, 2008; Ogden & Taylor, 2000; Sarwer, Wadden, & Foster, 1998). BID starts at least in adolescence, and may bother both men and women for a lifetime (Egelton, 2011; McCabe & Ricciardelli, 2004). Girls are more likely to experience BID in middle childhood than boys (Cole et al., 2000). Young adults become even more vulnerable to BID, in part, because of their increased interest in becoming involved in romantic relationships (Markey & Markey, 2006). The association between BID and romantic relationship was supported in empirical studies. For example, BID was found to negatively impact relationship with romantic partners; while a supportive romantic partner can help women establish more positive body images (Ambwani & Strauss, 2007). In addition to mutual influence between BID and romantic relationship, BID has been found to be closely associated with a range of negative affective experiential states including fear of intimacy, social anxiety, and poorer self-esteem (e.g., Abell & Richards, 1996; Ackard, Croll, & Kearney-Cooke, 2002; Ackard, Kearney-Cooke, & Peterson, 2000; Cash, Theriault, & Annis, 2004). Of particular interest for this investigation, BID has been found to be positively related with social physique anxiety (Canpolat, Catikkas, Koyuncu, & Tok, 2010; Russell & Cox, 2003).

BID has been studied as an independent phenomenon in the context of romantic relationship (e.g., Ambwani & Strauss, 2007; Paap & Gardner, 2011). However, emotions and behaviors related with BID, such as social physique anxiety and exercise behaviors, has not been investigated in the context of romantic relationship. The purpose of this study, therefore, is to explore whether romantic relationship variables (i.e., satisfaction, relationship status, length of

relationship) and gender serve as moderator variables in (a) the relationship between BID and social physique anxiety, and (b) the relationship between BID and exercise behaviors.

CHAPTER TWO

REVIEW OF LITERATURE

In this chapter, extant research on four constructs including BID, social physique anxiety, romantic relationship satisfaction, and exercise as a coping strategy is discussed. Relationships among these four constructs are also described. Self-determination theory and cognitive-motivational-relational theory provide conceptual basis for this study. These theories are described separately, and then a recent proposed model integrating contentions from these two theories is displayed. A hypothesized framework that describes the associations among the four constructs is described based on the integrated model. At the end of this chapter, ten hypotheses are proposed based on the hypothesized framework.

Body Dissatisfaction and Romantic Relationship Experience

Body image is a complex and multidimensional concept consisting of global satisfaction, affective, cognitive, and behavioral facets (Menzel, Krawczyk, & Thompson, 2011). Body image can be assessed through subjective attitudes, and BID is pertained to negative body image attitudes (Cash, Theriault, & Annis, 2004; Cash, 2011). Both Western and Eastern cultures impose great importance on a person's appearance, especially in interpersonal interaction processes (Anderson-Fye, 2011; Murnen, 2011). At the same time, people are, too often, exposed to the unrealistic body ideals promoted in mass media. These ideal body images, however, are unlikely to be achieved in healthy ways, because the already thin or muscular models serving as the basis for these images are modified by digital technology to appear even thinner and/or stronger (Tiggemann, 2011). In a society that advocates unrealistic body ideals while imposing great value on body appearance, people do not have many choices to avoid BID or achieve

desired body image. It is not surprising that BID becomes a normative discontent in contemporary society.

There has been limited study on the potential association between romantic relationship involvement and body image, but more attention has been given to it recently (e.g., Compian, Gowen, & Hayward, 2004; Markey & Markey, 2006; Paap & Gardner, 2011; Tantleff-Dunn & Thompson, 1995). The relationship between involvement in a romantic relationship and BID differs across developmental stages. For post-pubertal adolescent girls, romantic involvement with boys has been associated with greater BID and more eating behavior problems than platonic involvement with boys (Compian, Gowen, & Hayward, 2004). For college students, however, it goes the other way around. College students who perceive themselves as unattractive reported less involvement in cross-sex interactions than those who believe they have attractive appearance (Mitchell & Orr, 1976). Not being involved in romantic relationship is a predictor of greater BID among college students.

It may be inferred from the influence of romantic relationship involvement on body image that romantic partner's opinions may play a very important role in body image development. Studies such as those by Tantleff-Dunn et al. (1995), Markey et al. (2006) and Weller et al. (2004) have indicated that people (especially women) tend to be less confident in body appearance than they should be, and they are very sensitive to romantic partners' compliments and judgments. Tantleff-Dunn and Thompson (1995) found that the discrepancy between an individual's ideal body size and his/her partners' rating of that individual's body size predicted the person's extent of body image disturbance. Markey and Markey (2006) suggested that, in general, young women tend to underestimate their partners' satisfaction with these women's body appearance. Weller and Dziegielewski (2004) found that romantic partners'

support is inversely correlated with body image disturbance and anxiety of physical appearance among females. Among all the support styles, esteem support (e.g., complimentary comments from a partner) is more predictive for positive body images among females than other type of partner support styles (i.e., emotional support, informational support, network support, negative behaviors, and tangible behaviors). While supporting the research discussed above, Paap and Gardner (2011) also pointed out that, perhaps, perceived partner dissatisfaction with one's body is indicative of that person's lack of satisfaction with the romantic relationship. The possibility is in need of further investigation, however, because the magnitude of prediction of perceived-partner-BID for romantic relationship satisfaction was nearly significant ($p = .052$). In summary of studies discussed above, romantic partners' evaluation is very important source of BID and romantic relationship dissatisfaction.

Sheets and Ajmere (2004) challenged previous findings that romantic partners are major sources of body dissatisfaction among college students. Specifically, they found that women who were told to lose weight (or men who were told to gain weight) by their partner were more dissatisfied with their romantic relationships, but, nonetheless, they did not report significantly lower levels of self-esteem. The major limitation in their study was that they used global self-esteem as an indicator of body satisfaction. People may maintain self-esteem by deeming areas that they are competent in of greater importance (e.g., academic performance) and undervalue areas (e.g., body appearance) where they are less competent in. In fact, Sheet and Ajmere's (2004) study provided evidence for that romantic partners' evaluation of body images could influence relationship experiences. Ogden and Taylor's (2000) research is also worth noting because they also questioned whether romantic relationships were a major source of BID. They found that a partner's evaluation of body image played a greater role in men's body

dissatisfaction than women's. Women's body satisfaction derived from a broader range of criticism regarding ideal body image, which made partner's evaluation insignificant source of body satisfaction. Ogden and Taylor's (2000) study provided one possible explanation for Paap and Gardner's (2011) finding, which indicated that perceived partner's satisfaction of respondent's body is a potential significant predictor for respondent's romantic relationship satisfaction. For women, there are other interpersonal and intrapersonal factors that can influence BID, which make romantic relationship to be a non-significant predictor for BID.

Gender differences in the BID have been constantly studied. Most research findings support the notion that females have higher frequency and a greater extent of dissatisfaction of their bodies than males. Adolescent girls are also more likely to be influenced by mass media and significant others than boys (Chen & Todd, 2012). Likewise, adult females are aware that their bodies are looked at and evaluated by others, especially by males (Wiederman, 2000). Extant studies indicated gender differences in many aspects of body image. However, it is not clear how men and women differ in connecting body image with romantic relationship experience. One of few study addressed this concern reported that jealousy and trust in romantic relationship predicted body self-esteem for women whereas none of romantic relationship variable predicted body self-esteem for men (Ambwani & Strauss, 2007). Along with qualitative data, Ambwani and Strauss (2007) claimed that romantic relationship is of greater importance in body self-esteem for women than for men.

In summary, inconsistent results have been reported in the extant research on the relationship between BID and romantic relationship involvement. Many studies highlighted romantic partner's influence on body image development, and that body image and romantic relationship satisfaction may mutually influence each other. Females reported greater BID than

males, and they were more easily to be influenced by partners' evaluation than males did. So far, it was not clear whether males reflect different pattern of connecting body image with romantic relationship from females.

Another important facet of body image is affect. The following section reviews the unique emotional response that is specifically related with BID, which was termed as social physique anxiety.

Social Physique Anxiety

More than twenty years ago, *Social Physique Anxiety* (SPA) was initially studied as a body image phenomenon by Hart, Leary and Rejeski (1989). It was defined as a subtype of social anxiety experienced by individuals concerned about the potential evaluation of their physiques. Over the past two decades, many research studies, articles, and public media paid attention to this concept. SPA was found to be related with many aspect of the self (e.g., self-esteem, physical self-efficacy). Researchers have also found evidence for individual differences in SPA. Females reported higher level of SPA than males, and athletes have lower level of SPA than non-athletes (Gill, 2007). There are many antecedents for SPA. In a qualitative study, Sabiston, Sedgwick, Crocker, Kowalski and Mack (2007) identified that swimming pools, malls, locker rooms, sport teams, and places where males or popular peers are surrounding were antecedents of SPA for adolescent girls.

Except for social events and situations, messages conveyed from significant others are important antecedents of SPA (Jones, 2011). Surprisingly, there has been limited research on relationship between SPA and romantic relationship. Many investigations about men-women relationships were relevant to the broad construct of social anxiety. For example, Cash, Theriault and Annis (2004) examined the relationship between body image and social anxiety. They

highlighted the importance to extend body image studies to an interpersonal context, and found that negative evaluation of body image (i.e., BID) was associated with anxious experience in evaluative social settings for both females and males. Nonetheless, because they did not measure anxious experiences specific to the physique in evaluative settings, SPA was not specifically studied in the context of romantic relationship in their study.

The relationship between SPA and BID is ambiguous. Although previous studies have supported that SPA is positively correlated with BID (Canpolat, Catikkas, Koyuncu, & Tok 2010; Russell & Cox, 2003) in general settings, the influence of a specific social agent (e.g., peers, family or romantic partners, etc) on body image, SPA and the relationship between them has yet to be fully investigated in these studies. For one thing, individuals who report the same level of trait SPA in general settings may report various levels of trait SPA when interacting with peers, parents, and romantic partners (Sabiston & Brunet, 2011). For another, the relationship between SPA and BID can be greatly impacted by the social agents that people are interacting with. For example, for late adolescent girls, peer's feedback is a more significant predictor in body-image-related concerns and SPA than parents' opinions (Holsen, Jones, & Birkeland, 2012; Jones, 2011; Presnell, Bearman, & Stice, 2004). It is possible that when interacting with peers, BID is strongly associated with SPA among adolescents. When interacting with parents, however, adolescents who are dissatisfied with their body do not necessary experience SPA, either because they do not expect negative evaluation on physique from parents or because they do not deem great importance of parents' evaluation of their physiques. Research on SPA and BID in general setting is necessary, but researchers cannot predict the relationship between SPA and BID based on these research. For a deep understanding of relationship between BID and SPA, research based on a specific interpersonal context is necessary.

The lack of study of contextualized SPA is partly due to a lack of measurement instrument. Sabiston and Brunet (2011) recently established two contextualized scales assessing SPA, and tested the reliability and validity of these scales in the context of parents and peers among adolescent girls (Parent SPA, Peer SPA). Based on these contextualized measures, they came to similar results as reported in Presnell et al.'s (2004) study where different social agents contributed differently to adolescents' SPA. Specifically, Sabiston et al. (2011) found that peer SPA was significantly higher than parent SPA among adolescent girls. These findings were consistent with developmental theories of self-concept, that the social agents that children soliciting feedback for self-evaluation change with age (Weiss & Amorose, 2005). Young children tend to rely on parental feedback whereas adolescents and young adults deemed social comparison and self-criteria as more important sources of information for judging themselves. These extant studies all pointed to the need to investigate SPA in different interpersonal contexts in order to achieve a deeper understanding of SPA.

In sum, despite that SPA was found to be related with BID in general settings, little was known about relationship between SPA and the romantic relationship experience. Future SPA research calls for context-specific studies. In the following sections, two theoretical frameworks, and an integrated model based on them are presented and discussed. These theories shed light upon the correlation among SPA, BID, and romantic relationship satisfaction.

The Integrated Model of Self-Determination Theory and Cognitive-Motivational-Relational Theory

So far, BID was found to be associated with SPA and romantic relationship. There may be underlying mechanisms linking romantic relationship experience with body image attitudes and affects. Some researchers explained this phenomenon based on attachment theory (Brown, 2009;

Cash, Theriault, & Annis, 2004; McKinley & Randa, 2005). Cognitive-behavioral theorists viewed body image attitudes (i.e., evaluation and investment) as central to emotion response and cognitive processes to an activated event, which is influenced by previous experience such as interpersonal interaction. Self-presentation theory has also been used to explain the reason why people become concerned about their body images. However, these theoretical frameworks were either deficient in explaining body image phenomenon or failed to cover the interpersonal context. An alternative framework that can explain the simultaneous interactions among body image, SPA, and interpersonal relationship is an integrated model proposed by Ntoumanis, Duda and Edmunds (2009), which incorporated Self-Determination Theory (SDT, Deci & Ryan, 1985, 2002) with Cognitive-Motivational-Relational Theory (CMRT, Lazarus, 1991). In the following paragraphs, the basic concepts in SDT, CMRT, and the framework of the integrated model are discussed in details.

Self-Determination Theory

Since Deci and Ryan's book *Intrinsic Motivation and Self-determination in Human Behavior* was published in 1985, SDT has been applied to academic, sport and exercise, and occupational domains (Edmunds, Ntoumanis, & Duda, 2008; Gagne & Deci, 2005; Reeve, 2002). SDT is a macro-theory of motivation that employs an organismic-dialectic framework (Motl, 2007). Unlike the stimulus-reaction model in behavioral theory, it is assumed in SDT that people are organisms who are actively seeking experiences and challenges in the environment in order to fulfill needs and achieve personally meaningful outcomes. Social environment and psychological need satisfaction may influence motivation and outcomes in various aspects (Deci & Ryan, 1985). Dynamic person-environment-behavior interactions are highlighted in SDT, which are also discussed in Bandura's (1986) triadic reciprocal causation.

There are four constructs in SDT: social context or social environment, basic psychological needs, motivation type, and cognitive, behavioral and affective outcomes. Deci and Ryan (1985) suggested that there are three basic psychological needs central to human beings: need for *autonomy*, *competence* and *relatedness*. Need for autonomy refers to the desire to initiate and regulate one's own actions. Need of competence means that individuals want to effectively interact with the environment so that they can achieve desired outcomes. The need for relatedness is defined as a desire to be accepted and connected to other people. These three psychological needs are viewed as the fuels of human goal-striving behaviors (Motl, 2007).

The degree to which these three psychological needs are satisfied is determined by social environment in which individuals are involved. Four facets of social environment are identified. *Autonomy support*, *structure*, and *interpersonal involvement* are the three adaptive facets which facilitate need satisfaction; whereas a *controlling environment* is considered as the maladaptive facet that obstructs need satisfaction. The three adaptive facets of social environment have been deemed of significant importance for classroom teaching and physical education (Edmunds, Ntoumanis, & Duda, 2008; Skinner & Belmont, 1993; Tessier, Sarrazin, & Ntoumanis, 2010). Structure refers to that individuals are provided information that is useful for interacting with environment effectively and achieving goals (Deci and Ryan, 1985). Autonomy support means that choice and freedom are given to individuals for determining their behaviors, and acceptance and attending to their interests, preference, and needs (Deci & Ryan, 1985). Interpersonal involvement refers to the quality of relationships individuals have with other people in the social contexts (Tessie et al., 2010), such as the affection, warmth and care perceived in a parent - child relationship, friendship or men - women relationship. According to Skinner and Belmont (1993), structure fostered need of competence, and autonomy support and interpersonal involvement

promoted needs for autonomy and relatedness, respectively. The maladaptive facet of social environment can manifest in many ways including monitoring (Ntoumanis et al., 2009), alienation, ignorance and extrinsic rewards.

A motivation continuum was proposed to link between different need satisfaction and outcomes (Deci & Ryan, 1985). According to the degree of self-determination, motivation is divided to four subtypes, including amotivation, extrinsic motivation and intrinsic motivation. Amotivation is motivational states where there is no relationship between one's behaviors and outcomes. Four types of extrinsic motivation represent more and more intrinsic components are external, introjected, identified, and integrated regulation. Intrinsic motivation is the most self-determined motivational state. It is evident among people who behave for their own interest, and for its own sake. More intrinsic motivation is believed to be related with more positive outcomes. For example, intrinsic motivation can lead to positive affect because people perceive the greatest amount of joy and satisfaction when being volitionally driven and feeling things are under their own control (Quested & Duda, 2010).

Vallerand and Losier (1999) described a motivational consequence integrating key constructs in SDT in the context of sports. They suggested that social context determined the degree to which psychological needs are satisfied, and further influence the type of motivation. Generally, higher satisfaction of psychological needs and more intrinsic type of motivation will lead to positive outcomes in cognition, affect and behaviors. This motivational consequence was supported in exercise domain too (Edmunds, Ntoumanis, & Duda, 2008). Nonetheless, some researchers disputed the motivational consequences for that the mediation of need satisfaction and motivation type was only partially supported. There are at least some direct effects of social environment or need satisfaction on various outcomes (McDonough & Crocker, 2007; Quested

& Duda, 2010), and there may be other moderators or mediators not covered in Vellerand and Losier's motivational consequence.

Conceptual framework of SDT can be used to explain the relationship among body dissatisfaction, romantic relationship and SPA suitably. According to SDT, when the maladaptive facets of social context impact individuals significantly, their needs of relatedness may not be satisfied. As a result, negative emotion will be experienced. In this study, the social context refers to people's intimate interactions with partners in romantic relationships. A supportive, caring, and non-judgmental partner is very likely to satisfy needs of relatedness, competence, and autonomy of the other person in the romantic relationship. In turn, the other person is less likely to suffer from negative emotions (e.g., SPA). SDT sheds light upon the relationship between romantic relationship satisfaction and SPA. However, it may be oversimplified to conclude that people experience SPA if their needs are not satisfied by their partners. Motivation only serves as a partial mediator between need satisfaction and outcome (McDonough & Crocker, 2007), and hence there may be covert mechanisms underlying need satisfaction and emotion response. Considering that cognition appraisal is a key component in emotion (Roseman & Smith, 2001), and both BID and SPA involve appraisal process, a stress and coping framework may advance understanding of the relationship between body image and emotion (Sabiston, Sedgwick, Crocker, Kowalski, & Mack, 2007). The following section is used to describe Lazarus' cognitive-motivational-relational theory. Integration of cognition appraisal in SDT is also illustrated.

Cognitive-Motivational-Relational Theory and Integrated Model

Embedded in the cognitive revolution, cognitive-motivational-relational theory (CMRT) contributed to understanding of cognitive appraisal process in motivation and coping. A

fundamental assumption in this theory is that stress occurs when (a) a person-environment relationship is perceived to be important to a person, (b) the person-environment relationship is unbalanced, and (c) resources needed to deal with unbalance person-environment relationship exceeds a person's capacity. When facing stress, people evaluate whether it is related to them, and the extent to which it influences their goals and values (i.e., primary appraisal). If the stressor is relevant to, and of importance to a person, s/he may consider resource availability and possibility to control the stressor (i.e., secondary appraisal). Different stress appraisals lead to different emotional and physiological responses, and further lead to various choices of coping strategies. If being coped with appropriately, stress may be reduced and health and well-being are achieved.

Lazarus (1999) viewed motivation as directly related with important goal status in stress situation. Cognitive appraisal of such status influence subsequent emotional, physiological, and behavioral responses. There are four types of appraisal reflecting individual's evaluation of stress: *benign, challenge, threat* and *harm or loss*. Appraisal of benign will not lead to further reaction or coping, which happens when a person believe the situation is beneficial to goal pursuit. Challenge is appraised when the situation is perceived to lead to development and mastery. The appraisal of threat implies potential harm or loss, whereas appraisal of harm or loss refers to injuries and damage that has happened to a person already. Negative emotion is related with threat and loss/harm appraisals, while benign and challenge appraisals are followed with positive emotions.

Coping is another important construct in CMRT. It was defined as cognitive and behavioral efforts individuals made to manage psychological stress. Coping was viewed as both as a trait and a process, which is directly influenced by cognitive appraisals (Lazarus, 1999). Two types of

coping were identified: *emotion-focused coping* (e.g., seeking social support) and *problem-focused coping* (e.g., engaging in weight training program). In general, when the result of cognitive appraisals is challenge, more problem-focused coping will be used. On the other hand, when harm or loss is appraised, emotion-focused coping is often used (Ntoumanis, Duda, & Edmunds, 2009). Some researchers suggested that women used more emotion-focused coping strategies than men when faced with BID (Ptacek, Smith, & Zanas, 1992). But Kowalski, Mack, Croker, Nierfer and Fleming (2006) found that there was no significant gender difference in problem-focused coping strategy for SPA.

Research on coping with body-image-related concerns is limited, but it has consistently indicated that avoidance, short-term appearance management, and social support are the most used coping strategies among adolescent athletes and non athletes (Kowalski, Mack, Croker, Nierfer, & Fleming, 2006; Niefer, McDonough, & Kowalski, 2010; Sabiston, Sedgwick, Croker, Kowalski, & Mack, 2007). Kowalski et al. (2006) found that physical activity is also one of the most frequently reported coping strategies used by more than 10% of participants, though less frequently reported than previous mentioned strategies. A recent meta-analysis study indicated that exercisers had more positive body images than non-exercisers. Significant improvement in body image was achieved after exercise intervention (Hausenblas & Fallon, 2006). The meta-analysis study revealed that exercise is a generally effective coping strategy for BIDs. Although Lazarus (1999) emphasized that there was no universally effective or ineffective coping strategy, exercise is a worth-noting coping strategy because it leads to substantial changes in body appearance, and will eventually improve body images. The moderator effect of romantic relationship variables and exercise behaviors on the relationship between BID and SPA were not fully studied in previous research, which become one of the aims of this study.

One criticism for CMRT is that motivational processes are restrictively viewed as a result of goal status. Ntoumanis, Duda and Edmunds (2009) argued that motivation also involves volition, self-determination, autonomy and social environment, which was fundamental to SDT. Ntoumanis et al. (2009) proposed an integrated model for a more comprehensive understanding in coping and emotion. Specifically, self-determined motivation in SDT can supplement motivation processes in CMRT, while the cognitive appraisals in CMRT explain underlying mechanism between psychological need satisfaction and outcomes in SDT (See Figure 1).

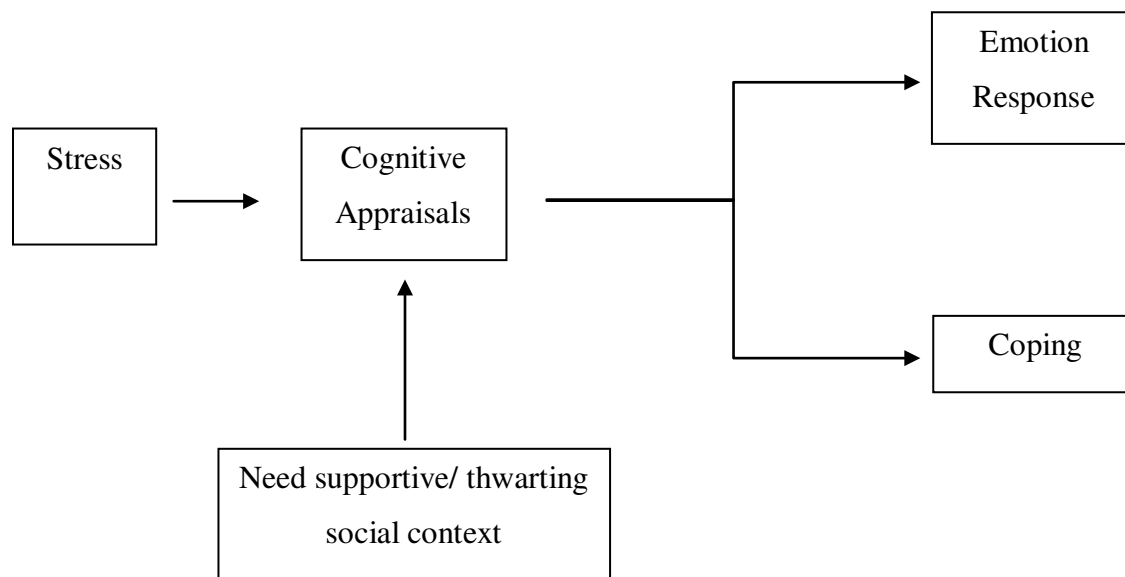


Figure 1. An integrated model of self-determination theory and cognitive-motivational-relational theory (Ntoumanis, Duda, & Edmunds, 2009).

It is impossible to examine all the constructs and pathways in Ntoumanis et al.'s (2009) integrated model in one study. Instead, in this study, the emphasis was put on four constructs and pathways among these constructs (see Figure 2).

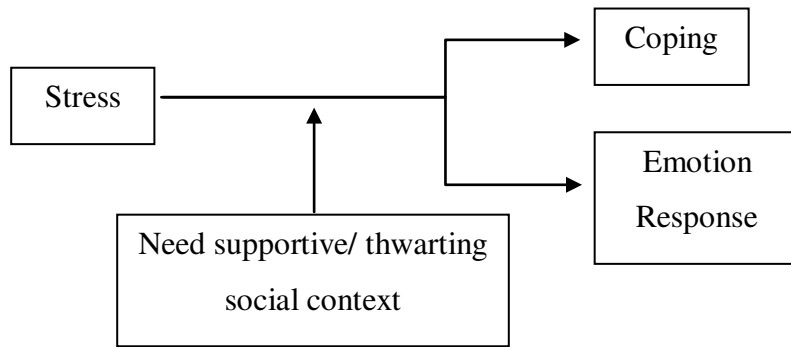


Figure 2. Constructs examined in this study in Ntoumanis, Duda and Edmunds' (2009) integrated model.

The relationship between BID, relationship satisfaction, SPA and exercise behaviors are illustrated in Figure 3. Being dissatisfied with one's own body can be stressful, because it can negatively influence personal goals, especially those related with romantic relationship, such as being attractive, gaining attention and love from a partner. When appraising such stressful situation, social context, especially the people that individual interacts with, can influence appraisal processes through facilitating or prohibiting individual's need satisfaction (Ntoumanis, Duda, & Edmunds, 2009). For example, a supportive and respectful boyfriend/girlfriend or husband/wife may provide an environment consisted of many adaptive facets, such as personal involvement and autonomy support, which enhance satisfaction of needs for autonomy and relatedness. In this condition, people are more likely to appraise BID as a challenge and an opportunity to change lifestyle. Efforts that change lifestyle such as physical activities are more likely to be taken as coping strategies. The other way around, a controlling and careless partner is less likely to make the other one in the relationship feel related and autonomous. Consequently, people may appraise negative body image as a threat to maintain attention and love from a partner, and a threat to be negatively evaluated by partners about their body appearance (i.e.,

partner-SPA). Instead of making efforts to change appearance, they may be eager to seek emotional support or avoids situations that potential evaluation of appearance may occur.

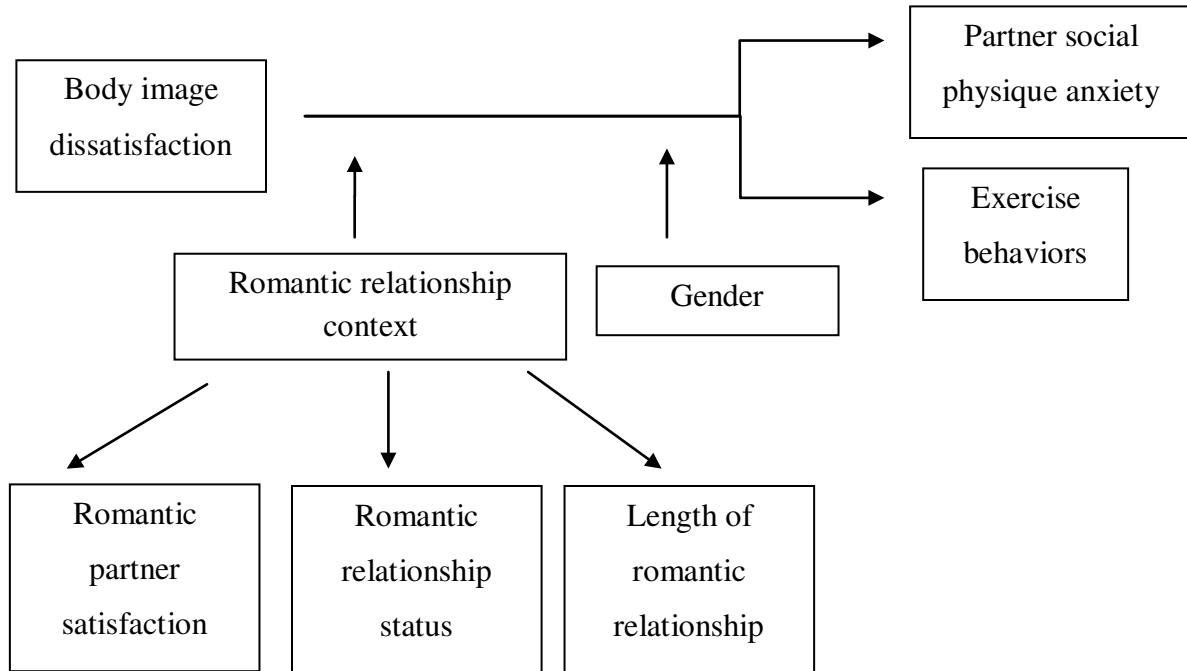


Figure 3. The conceptual model of this study. Relationship among BID, partner social physique anxiety, romantic relationship variables and exercise behaviors are based on integrated model proposed by Ntoumanis, Edmunds, and Duda (2009).

The Present Study

Body dissatisfaction has been found to be positively related with social physique anxiety, but previous investigations have yet to examine this correlation in specific interpersonal contexts. People who are dissatisfied with their bodies do not necessarily experience SPA when being with a supportive partner. This may be due to that a satisfied romantic relationship may help individuals to perceive body-image-related concerns as challenges rather than threats. Such cognitive appraisal may help reduce anxious experience related with body image and motivate individuals to make behavioral changes such as increasing exercise frequency.

The present study extended previous investigations of BID to a context of romantic relationship. The result of this study not only provided empirical evidence for Ntoumanis, Duda and Edmunds' (2009) integrated model, but also opened up a new perspective in exploration of body-image-related issues. Exercise psychologists, school counselors and family therapists may have a better understanding of issues including conflicts in romantic relationship and resistance of exercise adherence. Non-practitioners may get a better sense of how important it is to support romantic partners when they are concerned with their body images.

The purpose of this study is to explore whether gender and romantic relationship variables, including relationship satisfaction, status of relationship and length of relationship, are moderator variables in the relationship between BID and partner SPA, as well as in the relationship between BID and exercise behaviors. These purposes were achieved through participants' report of perception of body image satisfaction, romantic relationship satisfaction, partner-SPA, and leisure time exercise frequency. Along with these purposes, it was hypothesized that:

1. There would be a moderately positive correlation between BID and partner SPA.
2. There would be a moderately negative correlation between BID and exercise behaviors.
3. The length of romantic relationship (in the unit of month) would be a moderator variable in the relationship between BID and SPA. It was expected that the association between body image and SPA would be stronger among people who were involved in romantic relationship for a longer period.
4. The relationship between BID and SPA would be moderated by status of romantic relationship. It was expected that the association between BID and SPA would be stronger among people who were cohabiting or being engaged with partners than those who were just hanging out or dating with partners.

5. Individual's romantic relationship satisfaction would be a moderator variable in the relationship between BID and SPA. It was expected that the association between BID and SPA would be stronger among people who were more satisfied with romantic relationship with partners than those who were less satisfied.
6. Gender would be a moderator variable in the relationship between BID and SPA. The association between BID and SPA was expected to be stronger among female than male undergraduate students.
7. The length of romantic relationship (in the unit of month) would a moderator variable in the relationship between BID and exercise behaviors. It was expected that the association between body image and exercise behaviors would be stronger among people who were involved in romantic relationship for a longer period.
8. The relationship between BID and exercise behaviors would be moderated by status of romantic relationship. It was expected that the association between BID and exercise behaviors would be stronger among people who were cohabiting or being engaged with partners than those who were hanging out or dating with partners.
9. Individual's romantic relationship satisfaction would be a moderator variable in the relationship between BID and exercise behaviors. It was expected that the association between BID and exercise behaviors would be stronger among people who were more satisfied with romantic relationship with partners than those who were less satisfied.
10. Gender would be a moderator variable in the relationship between BID and exercise behaviors. The association between BID and exercise behaviors was expected to be stronger among female than male undergraduate students.

CHAPTER THREE

METHOD

Participants

Power Analysis

Before collecting data, power analysis and extant studies about sample size estimation in Moderated Multiple Regression (MMR) and Confirmatory Factor Analysis (CFA) was carried out. According to Cohen and Cohen (1983; 2003), the following formula was used to determining adequate sample size for hierarchical multiple regression analysis:

$$L^* = f^2(n - k_A - k_B - 1) \quad (1)$$

Where f^2 is the desired effect size; k_A is the number of predictors except for moderator variables; k_B is number of moderator variables; and n is required sample size. In this study, $k_B = 1$. The table of L value indicates a value of 13.00 for .95 power and $k_B = 1$. The total sample of 91 is required to reach a relatively large power while keeping a medium effect size of 0.15 (Cohen, 1983).

CFA was used to evaluate model fit of Partner SPAS to the data. Considering that Partner SPAS is a simple model with only one latent variable and seven items, a sample larger than 200 was considered as “large” for examining overall model fit of Partner SPAS using CFA (Harrington, 2009). Myers, Ahn, and Jin (2011) summarized rules of thumb for determining sample size in CFA, such as $N \geq 200$, or the ratio of N to number of parameters in the proposed model should be larger than 5. Myers et al. (2011) recommended a sample size of 200 or more for theoretical model CFA in sport and exercise domain.

According to these rules, a sample size larger than 200 was considered as sufficient for running CFA and MMR analysis.

Demographic Information of Participants

Male and female undergraduate students ($N = 207$, $n_{\text{male}} = 90$, $n_{\text{female}} = 117$) were recruited from Florida State University main campus for this study. Seventy participants were recruited via the College of Education wide subject pool. The rest 137 participants were recruited from undergraduate courses that were not involved in the College of Education subject pool. All the 207 participants were awarded 0.5 point course credit or a chance of winning gift card for participation in this study.

Participant ages ranged from 18 to 28 ($M = 20.92$, $SD = 1.60$). Most participants were Caucasian (77.8%). The mean BMI of the entire sample indicated a moderate body mass ($M = 22.93$, $SD = 2.94$) compare to the recommended healthy BMI range of 18.5 to 24.9 (WHO Consultation, 2000). The mean BMI of male sub-sample ($M = 23.30$, $SD = 2.93$) was slightly greater than female sub-sample ($M = 22.50$, $SD = 2.85$). All of the 207 participants were involved in romantic interactions. A large proportion of them were involved in committed relationships, such as dating with one romantic partner exclusively ($n = 104$), or living with a romantic partner ($n = 49$), or planning for engagement or marriage ($n = 6$). The rest were dating more than one person ($n = 29$) or in open relationships ($n = 19$).

Measures

Informed Consent Form

In the Informed Consent Form (see Appendix A), the purpose and procedure of this study were briefly described. In addition, confidentiality of participants' responses in this study was addressed. Participants were informed of benefits and potential risks that might happen to them. Upon clicking "Yes" at the end of consent form, students agreed to participate in this study. They were directed to complete the questionnaires presented afterwards.

Demographic Form

Information including age, gender, ethnic group, BMI (calculated as $\text{BMI} = \text{weight in kilograms} / \text{height}^2$ in meters), relationship status and length of current romantic relationship length (in month) was collected in demographic form (see Appendix B).

The Eating Disorder Inventory–Body Dissatisfaction Subscale

Eating Disorder Inventory–Body Dissatisfaction Subscale (EDI-BD, Garner, Olmstead, & Polivy, 1983; Appendix C) was used to measure BID. The EDI-2 is a widely used self-report measure of eating-related attitudes with relatively high reliability coefficients. The body dissatisfaction subscale was included in EDI-2 because body dissatisfaction was found to be related with anorexia nervosa. The scale consists of nine items with a 6-point-forced-choice response format (*always, usually, often, sometimes, rarely, never*). Response indicating the most degree of body dissatisfaction (“*always*” or “*never*” depending on the direction described in each item) scores 3. The response indicating the second most extreme body dissatisfaction scores 2; and the one in immediate adjacent to that scores 1. The rest three responses scored 0. The mean score of EDI-BD was calculated to reflect the level of BID in this study.

Alpha internal consistency for EDI-BD was .89 in a sample of females with eating disorders (Thiel & Paul, 2006). EDI-BD showed good discriminant validity between bulimia nervosa patients and general mental disorder patients (Schoemaker, Verbraak, Breteler, & Staak, 1997). EDI-BD and Anorexia Nervosa Inventory for Self-Rating Scale indicated satisfactory convergent validity and divergent validity (Rathner & Rumpold, 1994).

Partner Social Physique Anxiety Scale

In this study, the seven-item trait Social Physique Anxiety Scale is modified to adapt to romantic relationship context, which is termed as Partner Social Physique Anxiety Scale (Partner

SPAS, Appendix D). It was used to assess the degree to which people feel anxious about partners' negative evaluation for their physique. Participants were instructed to respond to a 5-point Likert type scale with anchors ranging from *Not at all* to *Extremely*. In each statement in Partner SPAS, there is a reference to partner (e.g., "I wish I wasn't so uptight about my physique when I am around my partner" or "There are times when I am bothered by thoughts that my partner is evaluating my weight or muscular development negatively"). Among all the seven items, only item 5 is reverse-coded. The mean score of Parent SPAS (after item 5 is reverse-coded) represented the level of partner SPA in this study.

Sabiston and Brunet (2011) modified the 9-item trait Social Physique Anxiety Scale (SPAS; Martin, Rejeski, Leary, McAuley, & Bane, 2007) in order to assess social physique anxiety in interpersonal context (i.e., peers and parents). The contextualized scale showed good psychometric properties, NNFI = .95, CFI = .96 for parent SPAS, and NNFI = .90, CFI = .92 for peer SPAS. However, Molt and Conroy (2000) suggested that compared to 9-item model of SPAS, the 7-item model showed a better fit to SPAS data. To this end, the 7-item model was used in this study to establish a SPA scale in the context of romantic relationship. The Partner SPAS showed adequate reliability, Cronbach's $\alpha = 0.84$. The structure validity are evaluated and discussed in the data analysis and result sections.

Relationship Satisfaction Subscale of Dyadic Adjustment Scale

The 10-item subscale of Dyadic Satisfaction Scale (DAS, Spanier, 1976; Appendix E) was used to measure romantic relationship satisfaction. In this study, seven items were anchored with extremes from *All the time* to *Never* on a 6-point Likert type scale with item 3 and item 4 reverse-coded. Item 8 is anchored with extremes from *Every Day* to *Never* on a 5-point Likert type scale, which is also reverse-coded. Item 9 instructs participants to evaluate general

satisfaction of relationship with partners and select one number from a linear continuum scored 0 to 6. Item 10 asks participants to select one of the six statements that most precisely described their thoughts about the future of romantic relationship they were involved. The total score of DAS relationship satisfaction subscale reflected the degree to which each participant was satisfied with their romantic relationship.

Dyadic Adjustment Scale (DAS) is one of the most widely used assessments of relationship quality (Graham, Liu, & Jeziorski, 2006). Graham et al. (2006) reported that the DAS satisfaction subscale showed acceptable reliability ($\alpha = .85$) across 403 studies. Spanier (1976) developed DAS based on 15 measures of marital satisfaction, which consisted of four subscales including dyadic satisfaction, dyadic consensus, dyadic cohesion and emotional expression. Spanier (1976) suggested that the four subscales could be used separately without losing reliability.

Leisure Time Exercise Questionnaire

The first question of Leisure Time Exercise Questionnaire (LTEQ, Godin & Shephard, 1985; Appendix F) was used to assess individual's weekly exercise behaviors during leisure time. The first question contained three items, asking participants to indicate times they take strenuous, moderate and mild exercise per week, respectively. Score of each item is calculated into totally score based on the formula of "Weekly leisure activity = $9 \times \text{Strenuous} + 5 \times \text{Moderate} + 3 \times \text{Mild}$ ". Higher total score indicates more amount of exercise in a week.

Shephard (1986) reviewed several studies using LTEQ and provided reliability and validity information. LTEQ had a moderate reliability, with Alpha coefficients ranging from .62 to .81. The correlation between LTEQ with $\text{VO}_{2\text{max}}$, body fat, and other preexisted measures of physical activities were moderate.

Procedure

A Qualtrics link was included in recruiting information, which directed interested students to an online survey. The first part of survey was an informed consent form approved by the Florida State University Human Subjects Committee. After students agreed on participation, they were instructed to complete five questionnaires including demographic information form, Leisure Time Exercise Questionnaire, Dyadic Adjustment Scale, Eating Disorder Inventory and Partner Social Physique Anxiety Scale. Except for demographic information, the other four questionnaires were presented to each individual participant in a random order. At the end of survey, participants were thanked for the time spent on this study. They were required to email the screenshot of the last page of the survey to the researcher, so that the researcher was able to assign 0.5 point credit.

Data Analysis

The first step of data analysis was to examine construct validity of Partner SPAS through CFA. This was carried out by Mplus 6.12. Because of the simple model of Partner SPAS, model chi-square (χ^2 , $p \geq .05$), Comparative Fit Index (CFI, values $\geq .95$) and the Standardized Root Mean Residual (SRMR, values $\leq .08$) were used as criteria for evaluation of model fit (Hooper, Coughlan, & Mullen, 2008). Next, descriptive statistics of age, status of relationship, length of romantic relationship, BID, partner-SPA, romantic relationship satisfaction and exercise behaviors were reported in the forms of mean and standard deviation. The third step was to analyze correlation between BID and SPA, and correlation between BID and exercise behaviors. The last step was to examine potential moderator effect of romantic relationship variables and gender through MMR analysis. Analysis of moderator effect was carried out by PAWS 18.0. MMR analysis is based upon comparing two regression equations:

$$Y = b_0 + b_1X + b_2Z + e \quad (2)$$

$$Y = b_0 + b_1X + b_2M + b_3X * Z + e \quad (3)$$

In these equations, Y is dependent variable, X is independent variable and Z is moderator variable. b_0 is the intercept, b_1 and b_2 is coefficients for X and Z , e is residual error. Moderating effect is carried out by the product of X and Z in equation 3, and therefore b_3 is the coefficient for the product of independent variable and moderator variable.

To test the significance of moderating effect, squared multiple correlation coefficient R^2 for each equation was compared. To test the null hypothesis H_0 : The difference between R_1^2 and R_2^2 is caused by chance, an F -test was carried out in four steps in PAWS 18.0. The first step was to center predictors including X , Z and product of X and Z if a score of zero does not exist in the measurement. The second step was to force variable of X and Z entering regression equation 2. The third step was to enter $X \times Z$ into regression equation. PAWS 18.0 provided R^2 for each equation and R^2 change for each step. R^2 change brought by step two reflects additional contribution of XZ product to total variance in Y . If R^2 change in step two reaches statistical significant level (i.e., $p < .05$), the null hypothesis is rejected and the moderator effect is significant. Besides, PAWS 18.0 also provided t -test for coefficients of moderating effect (i.e., the coefficient of X and Z product). If the coefficient of moderating effect reaches significant level (i.e., $p < .05$), the result supports moderating effect as well.

Graphs were created to illustrate how relationship between independent and dependent variable varies with levels of moderator. For categorical moderator variables (i.e., gender and the status of relationship), the IV- DV relationship was plotted for each moderator subgroup with selected IV value: one deviation below the mean and one deviation above the mean of BID. For continuous moderator variables (i.e., length of relationship and romantic relationship

satisfaction), the IV-DV relationship was plotted by selected moderator variable values (i.e., one deviation below the mean, the mean, and one deviation above the mean of moderator variable) and the same IV values selected for categorical moderator variables. The graphs helped understanding in how the slope of IV-DV correlation changed with different moderator values or levels.

CHAPTER FOUR

RESULTS

Confirmatory Factor Analysis of Partner-Social Physique Anxiety Scale

Model fit of Partner SPAS was evaluated through CFA. Using maximum likelihood robust estimation, fit indices of χ^2 , CFI and SRMR were used to evaluate model fit. Chi-square test result was insignificant, $\chi^2 (14, N = 207) = 13.58, p = .48$, which indicated a good model fit. CFI and SRMR value (CFI = 1.00, SRMR = .03) meets the cut-off criteria of CFI $\geq .95$ and SRMR $\leq .08$. The standardized factor loadings of each observed variable (i.e., the seven items in Partner SPAS) were significant ($p < .01$; see Table 1). There is no golden rule for a cutoff value of standardized factor loading. However, in previous literature, .50 was considered as a medium-to-high level factor loading, and .30 was considered as a minimum acceptable factor loading (e.g., Shevlin & Miles, 1998; Tinsley, Brown, Tinsley, & Brown, 2000). In this study, all the factor loadings were higher than .50 except for item 5. Nonetheless, the factor loading of item 5 was higher than recommended minimum factor loading of 0.30, and therefore was retained for further analysis. In addition, the observed R^2 values (i.e., the amount of variance in partner-SPA explained by the observed variable measured by each of seven items) were significant ($p < .01$; see Table 1). Nonetheless, item 5, item 6 and item 7 explained less variance in partner-SPA than the other items in the scale. This is in need of caution in future studies using Partner-SPAS. But overall, the observed R^2 indicated that the model can explain an adequate amount of variance in Partner-SPA.

In conclusion, based on model fit indices, factor loadings, and R^2 , the seven-item model of Partner SPAS revealed adequate structural validity for the sample employed in this study.

Table 1.

Standardized Factor Loadings and R² of Items in Partner-SPAS

	Standardized factor loadings	R²
Item 1	.79**	.62**
Item 2	.74**	.54**
Item 3	.78**	.60**
Item 4	.82**	.68**
Item 5	.47**	.22**
Item 6	.51**	.26**
Item 7	.62**	.38**

Note. ** Factor loadings significant at .01 level.

** R² significant at $p < .01$ level.

Correlational Analysis

Descriptive statistics of variables including gender, length of relationship, relationship satisfaction, BID, exercise behaviors and partner-SPA, as well as correlations among these variables are displayed in Table 2. The correlation between body image dissatisfaction and partner- SPA was positive and significant, $r = .57, p < .01$. Participants who were dissatisfied with their body images were more likely to experience partner-SPA. Partner-SPA was negatively and significantly correlated with romantic relationship satisfaction, $r = -.48, p < .01$. Participants who were satisfied with relationship were less likely to experience partner-SPA. The significant correlation between BID and partner-SPA and between romantic relationship satisfaction and partner-SPA suggested a potential moderating effect of romantic relationship satisfaction. Body image dissatisfaction and exercise behaviors were weakly and non-

significantly associated, $r = .07$, $p = .31$. The exercise behavior variable was not significantly associated with any of the other variables examined in this study, and therefore was excluded from further analysis. The association among BID, partner-SPA and romantic relationship satisfaction warranted further evaluation for further examination of moderating effects. \

Table 2.
Means, Standard deviations, and Correlations of Variables in the Conceptual Model

	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. ^a Gender	-	-	-				
2. Length	15.88	13.87	.13	-			
3. Satisfaction	38.64	3.70	.08	.01	-		
4. BID	6.10	4.54	.23**	-.01	.02	-	
5. Exercise	9.08	4.95	.06	.01	.13	.07	-
6. Partner- SPA	2.10	0.87	.18**	-.03	-.48**	.57**	-.07

Note. Length = length of romantic relationship. Satisfaction = romantic relationship satisfaction. BID = body image dissatisfaction. Exercise = exercise behaviors.

^aFemale = 1, male = 0. Values are point-biserial correlation coefficients.

** Correlation significant at $p < .01$ level

Moderated Multiple Regression Analysis

Because body image dissatisfaction was significantly related with partner-SPA, the possible moderators proposed in the conceptual model were explored using MMR analysis. But before blindly analyzing moderating effect, it is important to test the underlying assumption of homoscedasticity of variance and homogeneity of error variance among subsamples (Aguinis, 2004). Homoscedasticity means that variance of dependent variables

from regression line is consistent across all levels of all the predictors. Figure 4-1 to Figure 4-4 illustrated the distribution error variance (residual) in models involving different moderator variables. The residuals in each model were evenly distributed along regression line, and no obvious pattern of residual distribution was found. In conclusion, the assumption of homoscedasticity was supported in this study.

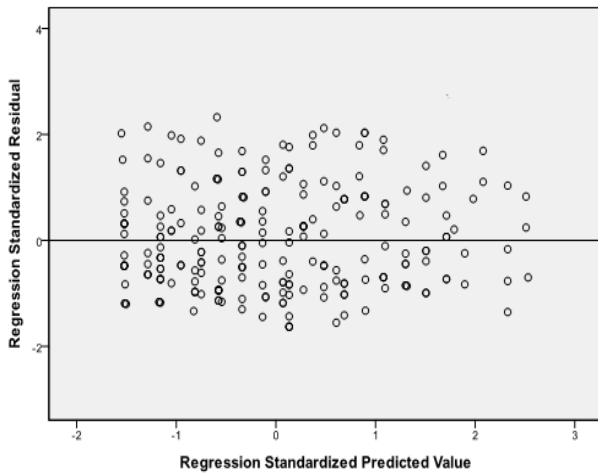


Figure 4-1. The distribution of standardized residual across predictors of BID, gender and interaction between BID and gender.

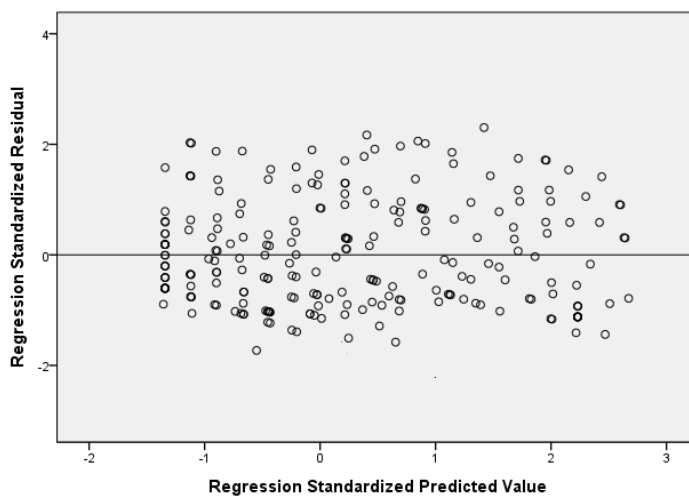


Figure 4-2. The distribution of standardized residual across predictors of BID, length of romantic relationship, and interaction between BID and length of romantic relationship.

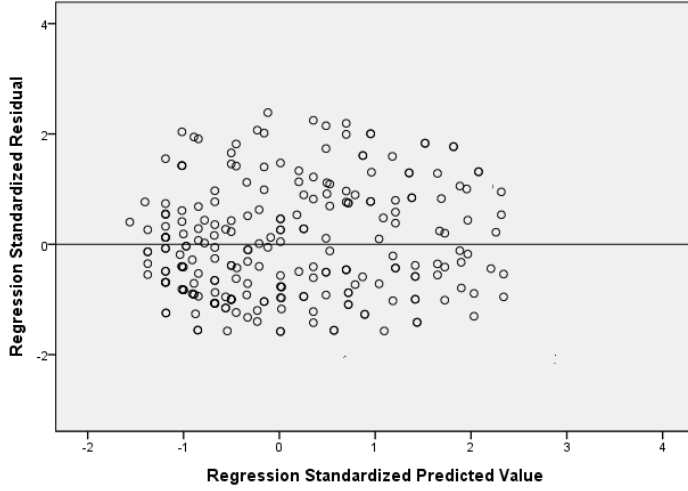


Figure 4-3. The distribution of standardized residual across predictors of BID, status of romantic relationship, and interaction between BID and status of romantic relationship.

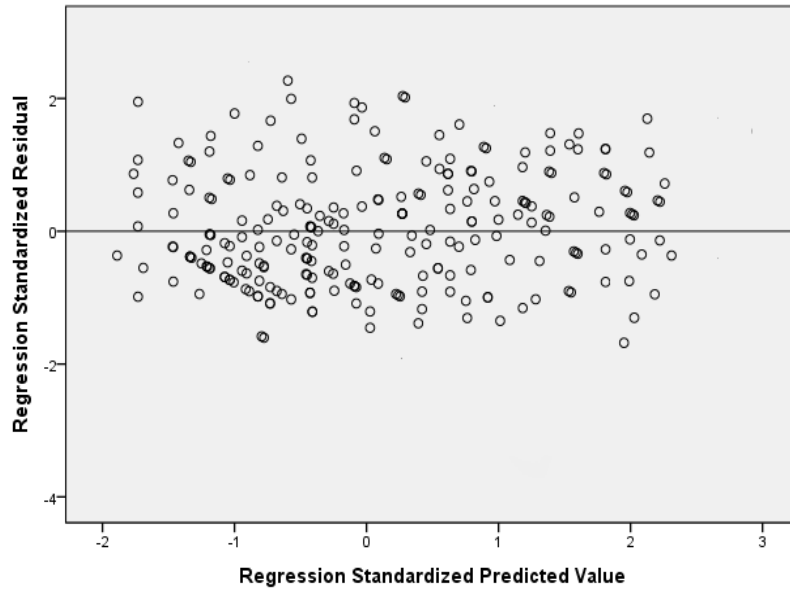


Figure 4-4. The distribution of standardized residual across predictors of BID, satisfaction of romantic relationship, and interaction between BID and satisfaction of romantic relationship.

Computer program ALTMMR developed by Aguinis (2004) was used to test homogeneity of error variance across categorical moderator subgroups (i.e., gender, romantic relationship status). ALTMMR provides Bartlett's M test as a tool of testing homogeneity. Homogeneous error variance was found between male and female subgroups, Bartlett's $M = 1.21, p = .27$. The homogeneity of error variance assumption among subgroups of different romantic relationship status, however, was not supported, Bartlett's $M = 12.45, p = .01$. Aguinis (2004) recommended using Alexander's normalized- t approximation (A) and James's second-order approximation (U) in addition to F test when homogeneity of error variance is not met, which is discussed in details in the last sections of this chapter.

After validating assumption of homoscedasticity and homogeneity, MMR analysis was carried out in PAWS 18.0 with one moderator variable being analyzed at a time. Before MMR was conducted, scores in EDI-BD, DAS and length of romantic relationship were centered in the data analyses. By centering continuous variables, the coefficients of predictors are of meaningful zero scores and are therefore more interpretable (Aguinis, 2004).

Table 3 displays the F -test of R^2 change brought by moderating effect (i.e., the interaction of IV and moderator variable) in BID-Partner SPA relation. Moderating effect of romantic relationship satisfaction contributed an additional 1% variance in partner-SPA, $F(1, 203) = 4.25, p = .04$. Similarly, moderating effect of romantic relationship status contributed an additional 3% variance in partner-SPA, $F(4, 197) = 2.62, p = .04$. These results suggest that romantic relationship satisfaction and status may moderate BID-Partner SPA relation whereas romantic relationship length and gender does not. However, considering that the homogeneity assumption for subgroups of status was not met, alternative approximations are conducted to further validate this result.

Table 3.
R² of Regression Models and R² Change Caused by Moderating Effect

Model	BID and Partner SPA	
	R ²	R ² Change
A	.33	-
A'	.36	.03*
B	.33	-
B'	.33	.00
C	.57	-
C'	.58	.01*
D	.33	-
D'	.33	.00

Note. Model A. Predictors = BID, Status

Model A'. Predictors = BID, Status, interaction of BID and Status

Model B. Predictors = BID, Length

Model B'. Predictors = BID, Status, interaction of BID and Length

Model C. Predictors = BID, Satisfaction

Model C'. Predictors = BID, Satisfaction, interaction of BID and Satisfaction

Model D. Predictors = BID, Gender

Model D'. Predictors = BID, Satisfaction, interaction of BID and Gender

* R² or R² change significant at $p < .01$ level

As discussed previously in data analysis, in addition to R² change statistics, another way to examine potential moderating effect is to examine whether coefficient of product of IV and moderator variable is significantly different from zero. PAWS 18.0 provides *t*-test for each coefficients (*B*) in the regression equation (see Table 4). Note that romantic relationship status is not discussed here, because the moderator contains more than two levels. The moderating effect of status is examined through regression plots, which is discussed at the end of this chapter. Only the coefficients of BID * romantic relationship satisfaction was significant, $t(203) = -2.062$, $p = .04$. The *t*-test results revealed the same results found in R² change test. In summary, romantic

relationship satisfaction was found to be a significant moderator in the relationship between BID and partner-SPA.

Table 4.
t-test of Regression Coefficients and Constants in Models with Different Moderators

Model		B
1	Constant	2.10**
	BID	.11**
	Length	.00
	BID* Length	.00
2	Constant	2.10**
	BID	.11**
	Satisfaction	-.12**
	BID* Satisfaction	-.01*
3	Constant	2.06**
	BID	.12**
	Gender	.09
	BID* Gender	.02

Note. Length = length of romantic relationship. BID = body image dissatisfaction. Satisfaction= romantic relationship satisfaction
 * Coefficient significant at $p < .05$ level
 ** Correlation significant at $p < .01$ level

It is easy to obtain regression equations based on coefficients and constants showed in Table 4. The regression equation for relationship between body image dissatisfaction with partner-SPA is the following:

$$\text{Partner-SPA} = 2.10 + 0.11 \text{ BID} - 0.12 \text{ Satisfaction} - 0.01 \text{ BID} \cdot \text{Satisfaction} \quad (3)$$

Based on the above regression equation, three regression lines in different levels of moderator variable were created based on above equations. Figure 4 illustrated the slope and

intercept of BID-partner-SPA relationship across different levels of romantic relationship satisfaction. Two values of BID were selected to plot the regression line of BID-partner SPA relationship: one *SD* below the mean (-4.54) and one *SD* above the mean (4.54). Three values of romantic relationship satisfaction were selected as subgroups for comparing the slope of regression line: one standard deviation below the mean (-3.70), the mean (0) and one standard deviation above the mean (3.70) score of romantic relationship satisfaction. According to these values, three regression equations for each subgroup are obtained and listed as follows:

$$\text{Partner-SPA}_{\text{low}} = 2.51 + 0.15 \text{ BID} \quad (4)$$

$$\text{Partner-SPA}_{\text{moderate}} = 2.10 + 0.11 \text{ BID} \quad (5)$$

$$\text{Partner-SPA}_{\text{high}} = 1.69 + 0.07 \text{ BID} \quad (6)$$

A regression graph is plotted based on above equations in figure 5.

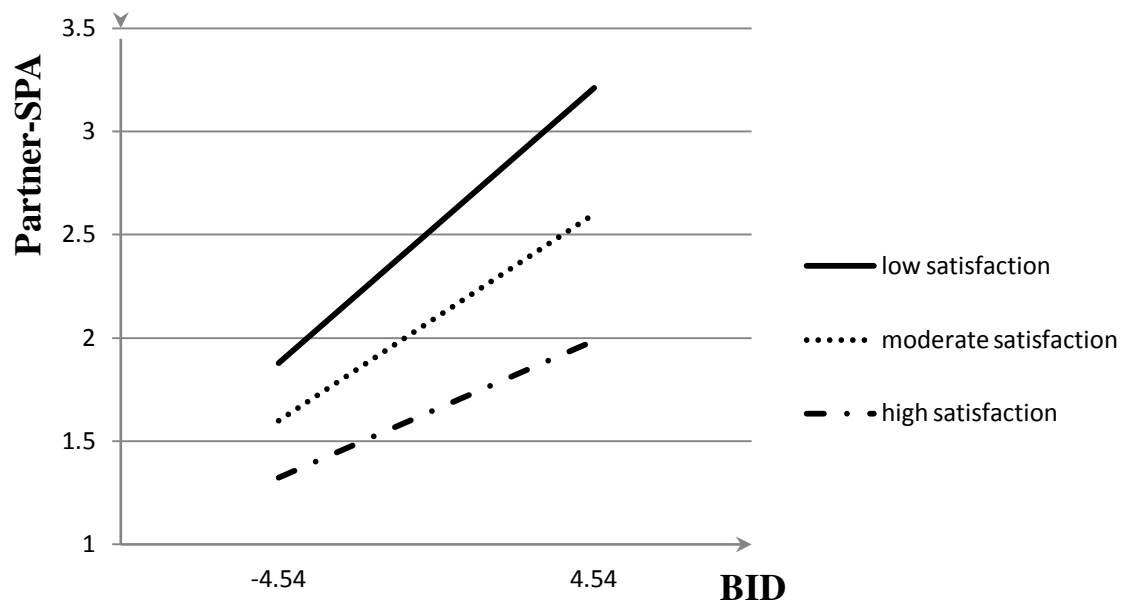


Figure 5. Regression lines for partner-SPA on body image dissatisfaction for different levels of romantic relationship satisfaction.

The slope of BID-partner SPA relationship (i.e., the rate of growth in partner-SPA) is steeper among low satisfaction subgroup than high satisfaction subgroup (see Figure 4). The association between BID and partner-SPA is stronger among participants with lower level of romantic relationship satisfaction than those with higher level. In addition, when the level of BID was the same, higher level of partner-SPA was reported consistently by participants with low romantic relationship satisfaction than those who are greatly satisfied with relationship. These results indicated that satisfaction of romantic relationship may be a moderator variable that determines the strength of association between BID and partner-SPA. After controlling BID, satisfaction of romantic relationship is a potential predictor of partner-SPA.

Further Analysis of Romantic Relationship Status

Examination of the *F*-test indicated that there was a significant moderating effect of romantic relationship status on BID-partner-SPA relationship. Because the homogeneity of error variance assumption for the model with romantic relationship status was violated, *A* statistics and *J* statistics were used to test moderating effect in addition to *F* statistics. Neither *A* statistics (*A*) nor *J* statistics (*U*) supported *F*-test results, $A = 9.29, p = 0.05; U = 10.61, p > .05$. *A* and *J* statistics indicated that no significant difference in slopes was found. According to Aguinis (2004), when *F*, *A*, *J* statistics fail to yield the same conclusion of moderating effect, it is necessary to replicate the results in order to reach a definite conclusion.

Even though the homogeneity of error variance assumption was not fully supported, it is worth of conducting a t-test to compare the slope of subgroups. This helps understanding how homogeneity assumption was violated in pair-wise comparison, and whether significant difference between slopes of BID- Partner-SPA relationship was masked by insignificant ones. The first step was to obtain a regression line describing BID- Partner-SPA relationship in each

subgroup. The data was split to five subgroups according to relationship status, and regression analysis for the predictor (BID) and the dependent variable (Partner-SPA) was carried out in PAWS 18.0 for each relationship status subgroup (see Table 5). Except status = 5 (planning for marriage or engagement), all the regression coefficients of BID and constants in other subgroups are significant, $p < .05$.

Table 5.
t-test of Regression Coefficients and Constants in Models of Different Romantic Relationship Status

Status	<i>B</i>
^a 1 Constant	2.12**
BID	.14*
2 Constant	2.06**
BID	.08**
3 Constant	2.01**
BID	.12**
4 Constant	2.40**
BID	.16*
5 Constant	2.06*
BID	0.24

Note. BID = body image dissatisfaction.

^a1 = dating with more than one person, 2 = dating with one person exclusively, 3 = dating and living with a partner, 5 = planning for marriage or engagement.

* Coefficient significant at $p < .05$ level.

** Correlation significant at $p < .01$ level.

Five regression lines are plotted based upon selected values of BID (i.e., one *SD* below the mean, one *SD* above the mean) for each romantic relationship status in Figure 6. Status 5 (planning for marriage or engagement) showed different slopes from slopes of other subgroups. However, it is unclear whether the slopes are significantly different from each other. A *t*-test

analysis was utilized here to test whether the difference in slope (i.e., $\Delta\beta = \beta_1 - \beta_2$) was significant between each two status subgroups.

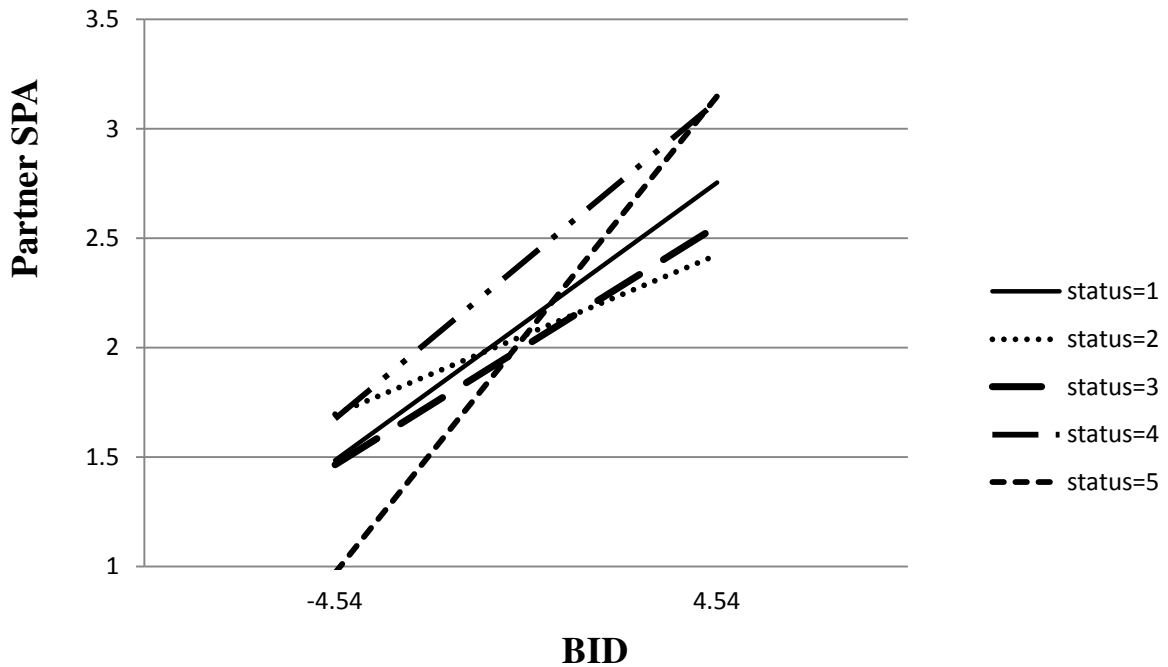


Figure 6. Regression lines for BID on partner –SPA across different romantic relationship status. Status 1 = dating with more than one person, status 2 = dating with one person exclusively, status 3 = dating and living with a partner, status 4 = in open relationships, status 5 = planning for marriage or engagement.

The result of homogeneity of error variance assumption test was displayed in Table 6.

Variance of regression model of BID- Partner-SPA was not homogeneous between status 1 and status 5, as well as between status 2 and status 3. These may be the source of violation of homogeneity assumption. For status 1 and status 5, larger group size is paired with smaller error variance. Such negative pair will generate more Type I error, and t-test result is liberal to reject null hypothesis that the slope in status 1 and status 5 are equal to each other (Yin & Othman, 2009). On the other hand, for status 2 and status 3, larger group size is paired with

larger error variance, and such positive pair will lead to conservative conclusion in rejecting null hypothesis.

Table 6.
F-test of Homogeneity of Error Variance among Romantic Relationship Status Subgroups

Contrast subgroup	<i>F</i>	<i>df</i>
Status 1 Vs Status 2	1.86	27, 102
Status 1 Vs Status 3	1.88	27, 47
Status 1 Vs Status 4	3.91	27, 17
Status 1 Vs Status 5	1.60*	4, 27
Status 2 Vs Status 3	1.01*	102, 47
Status 2 Vs Status 4	2.11	102, 17
Status 2 Vs Status 5	2.97	4, 102
Status 3 Vs Status 4	2.08	47, 17
Status 3 Vs Status 5	3.00	4, 47
Status 4 Vs Status 5	6.25	4, 17

* Coefficient significant at $p < .05$ level.

The *t*-test results for comparing slopes are displayed below in Table 7. There is significant difference in the slope of BID-partner SPA relationship between status 2 (dating with one person exclusively) with status 4 (in open relationship) and status 5 (planning engagement or marriage). The association between BID and Partner-SPA is significantly stronger among participants in status 4 or status 5 than in status 2. Significant difference in slopes between other contrast subgroups, including status 1 and status 5, as well as status 2 and status 3, was not found. According to previous analysis of homogeneity of variance error, the conclusion about slope

difference between status 1 and status 5 may be too liberal if it rejects null hypothesis. However, because the null hypothesis about equal slope in status 1 and status 5 was not rejected, the unequal variance between these two subgroups does not impact the final conclusion in this study. As such, the conclusion that the slope of regression line in status 2 and status 3 may be conservative if it rejects the null hypothesis. There may be significant difference between these two subgroups in this study, but this claim needs more support in future studies.

Table 7.
T-test of Difference in Regression Slope and Intercept among Romantic Relationship Status Subgroups

Contrast subgroup	$t_{\Delta\beta}$	<i>df</i>
Status 1 Vs Status 2	1.05	129
Status 1 Vs Status 3	.05	74
Status 1 Vs Status 4	-.31	44
Status 1 Vs Status 5	-.94	31
Status 2 Vs Status 3	-1.25	149
Status 2 Vs Status 4	-2.12*	119
Status 2 Vs Status 5	-2.60*	106
Status 3 Vs Status 4	-1.11	64
Status 3 Vs Status 5	-1.86	51
Status 4 Vs Status 5	-1.19	21

Note: * Coefficient significant at .05 level.
 ** Correlation significant at .01 level

CHAPTER FIVE

DISCUSSION

Extant studies have shown that BID and SPA are positively associated with one another (Canpolat, Catikkas, Koyuncu, & Tok 2010; RusseII & Cox, 2003). Physical activity has been reported as a common coping strategy for SPA (Kowalski, Mack, Crocker, Nierfer, & Fleming, 2006; Niefer, McDonough, & Kowalski, 2010; Sabiston, Sedgwick, Crocker, Kowalski, & Mack, 2007). Relationships among BID, SPA, and exercise behaviors had yet to be fully examined in the context of romantic relationships. The ten hypotheses proposed to test association between BID with partner-SPA and exercise behaviors, and potential moderators of these associations are discussed in the following paragraphs.

Correlation between Body Image Dissatisfaction with Partner-Social Physique Anxiety and Exercise Behaviors

The relationship between BID and partner-SPA, and between BID and exercise behaviors was expected to be significantly positive in this study. Results showed that BID was positively and significantly correlated with partner-SPA. This finding supported previous research on relationship between BID and SPA (e.g., Canpolat, Catikkas, Koyuncu, & Tok 2010; RusseII & Cox, 2003), and further provided empirical support for such association in the context of romantic relationship among undergraduate students. On the other hand, exercise behaviors were not found to be significantly correlated with BID. This finding was not surprising, given the fact that some strategies were found to be much more frequently used to cope with body-image-related concerns than physical activity or exercise. For example, Kowalski, Mack, Crocker, Nierfer, and Fleming (2006) found that physical activity or exercise was reported as coping strategies for SPA by about 12.0% of female participants, which ranked the third among all the

coping strategies for SPA reported by participants in their study. However, that percentage but was still relatively low compared to the mostly and the second mostly reported coping strategies, such as behavioral avoidance (41.5%) and short-term appearance management (39.9%). Because the adolescent sample in Kowalski et al.'s (2006) study may share psychological characteristics with the young adults participating in this study, it is possible that undergraduate students' coping with BID in this study were similar to that exhibited by those high school girls.

Potential moderating effects of romantic relationship variables and gender in the relationship between BID and partner-SPA were investigated through MMR analysis. Only romantic relationship satisfaction and romantic relationship status were found to be significant moderator variable. These findings are discussed separately in the following sections.

Moderating Effect of Romantic Relationship Satisfaction

Romantic relationship satisfaction was found to be a significant moderator in BID – partner-SPA relationship. The R^2 change between models involving and not involving moderating effect of romantic relationship satisfaction was .01. Auguinis (2004) suggested that R^2 change (i.e., R^2 difference between regression equations with one involving moderating effect and the other without moderating effect) between .01 and .02 is worth-noting, and therefore regression lines were plotted for further analysis. The relationship between BID and partner-SPA was stronger among participants who reported higher satisfaction in romantic relationship than those who reported lower satisfaction (see Figure 5). After controlling BID, partner SPA was consistently higher among those who were more dissatisfied with relationship satisfaction than those who were more satisfied with romantic relationship. These findings suggested that poor romantic relationship may increase risk of experiencing romantic-partner-related SPA among undergraduate students who are already dissatisfied with their body image.

BID is a negative attitude toward one's body, but it does not necessarily elicit negative emotions toward body image. If BID is unrelated with or has minimum impact on person-environment relation, neutral emotional responses may be elicited. When BID is considered of importance and relevance to personal goals and person-environment relation, the tone of emotional response to BID is dependent on a complex cognitive appraisal process that is usually simultaneously influenced by social context, need satisfaction and personal volition. Support, care, and "esteem-boost" (Weller & Dziegielewski, 2004) exemplify the nature of a healthy and satisfactory romantic relationship, which may fulfill psychological needs for competence and relatedness. Feeling confident and being accepted by romantic partners demonstrate to these undergraduate students the capacity and resources they need to overcome BID. As result, they are more likely to treat BID as a challenge that they need to cope with in order to achieve goals in romantic relationship and in life. Negative emotions, such as anxiety, are less likely to be experienced. When the core theme of person-environment relation is mostly about uncertain or existential threats to achievement of important goals, a typical emotion that people will experience is anxiety (Lazarus, 1999). In the case of this study, undergraduate students who were dissatisfied with their romantic relationships may be involved in anxious romantic attachment. They tended to be sensitive to rejection and threat to the relationship, and lack of sense of security (McKinley & Randa, 2005). When attractive body appearance is believed to be a condition of being loved by romantic partners, feeling of relatedness is diminished for those with negative body images. As a result, undergraduate students may perceive great stress caused by BID. They may tend to appraise BID as a threat to their romantic relationship, and SPA may be experienced when interacting with romantic partners.

The moderating effect of romantic relationship satisfaction in the relationship between BID and partner-SPA provided empirical support for the integrated model proposed by Ntoumanis, Duda and Edmunds (2009). Psychological need satisfaction was viewed as antecedents of stress appraisals and emotional responses. Adaptive facets of social context facilitate need satisfaction, and may lead to appraisal of challenge and pleasant emotions. Maladaptive aspects in social context, on the contrary, inhibit need satisfaction, and are associated with appraisal of threat or harm/loss, as well as negative emotions.

Moderating Effect of Romantic Relationship Status

The homoscedasticity assumption of error variance in BID-partner-SPA regression model for entire sample was met. However, the homogeneity assumption of equal error variance among romantic relationship status subgroups was not met. Although moderating effect of romantic relationship status in the BID - partner-SPA relationship was supported by *F*-test for R^2 change (see Table 3) and *t*-test for regression coefficients (see Table 4), *A* statistics and *J* statistics indicated none significant, or marginally significant difference in the strength of relationship among subgroups. The moderating effect of romantic relationship status, therefore, needs more research support for a clearer conclusion in the future.

Figure 6 illustrated the magnitude of association between BID and partner-SPA across different romantic relationship status. As expected, with BID increased, undergraduate students who were involved in more committed romantic relationship (i.e., dating with one person exclusively) experience less partner-SPA than those who are involved in open relationships. A committed romantic relationship may provide safe attachment and satisfy needs for relatedness, which function similarly as romantic relationship satisfaction in cognitive appraisal of BID.

Cohabiting (status 3) and planning for marriage or engagement (status 5) are expected to reflect more commitment in romantic relationship than just dating with one person. Therefore, they are expected to associate BID with partner-SPA less closely than those in status 4 (in open relationships). However, this expectation was not supported in this study. This may be due to the close mental and physical “distance”. The factor of intimacy among participants in status 3 and status 5 brings more interactions between romantic partners that may leads to more physical intimacy and attention on body images. Although need for relatedness seemed to be satisfied, they s may be exposed to more situations related with evaluations of body appearance at the same time. Risks of SPA among these couples are not reduced because of more intimate interactions. The non-significant difference between more intimate relationship and open relationship calls for attention in more precise definition and measurement of the psychological need for relatedness in SDT. Being connected with others may be not sufficient in describing need for relatedness. Rather, being accepted in the environment that individuals are interacting may be a key element that determines whether need for relatedness is satisfied.

Participants dating exclusively with one partner and participants planning for marriage or engagement were found to differ significantly in the BID-partner-SPA relationship. This result can be partially explained by increased intimacy as discussed before, but was not expected. People involved in more serious relationship are expected to focus on more spiritual interaction than physical characters such as weight, height or appearance. Therefore, the relationship between BID and partner-SPA were hypothesized to be loosely correlated. Considering that the sample size of this subgroup was very small ($n = 6$), this finding is in need of further examination.

Limitations, Future Research Directions and Implications for Professional Practice

Although romantic relationship satisfaction was found to be a significant moderator in the relationship between BID and SPA, the power and effect size of moderating effect in this study was relatively small, power = .53. Aguinis, Beaty, Boik, and Pierce (2005) found that the median observed effect size of research during 1969 to 1998 that involved categorical moderators was only .002. Therefore, the effect size of this study, compared to extant research involving MMR analysis, was relatively large $f^2 = .02$. Aguinis et al. (2005) suggested researchers not to solely rely on Cohen's conventional definition of a moderate effect size of .15. Instead, they advised researchers to use effect size that was observed in studies within a specific research area. When estimating sample size for this study, the desired effect size should have been set as .02 rather than .15. The sample size, according to equation 1, should be 654, in order to achieve .95 power.

The total sample size was not the only concern in this study. The inequity of sample size in subgroups of romantic relationship status has led to the violation of homogeneity of error variance and a low power of moderating effect (Aguinis, 2004), power = 0.67. This may be due to that the nature of this study was a field study based on a convenient sample rather than a well-designed experimental study in which sample size of sub-groups is usually manipulated to be equal. In this study, there were only six participants in status 5 (planning for marriage or engaged), comparing to a much greater sample size of 104 in subgroup of status 2 (dating with one partner exclusively). For a total sample size of 207, a sample size around 41 in each of five subgroups is an appropriate sample size for the consideration of homogeneity. Nonetheless, it was not clear that if the data distribution in this study fit the distribution of romantic relationship status among college student population. If so, rather than MMR analysis, approximations that designed for none-homogeneous sample should be used for MMR analysis. Otherwise, in order

to reach a conclusion about the moderating effect of romantic relationship status in the BID-partner-SPA relationship, future investigations should involve proper total sample size and equal sample size in moderator-based subgroups.

Another issues revealed in this study was the validity of Leisure-time Exercise Questionnaire (LTEQ). Participants are asked to report frequency of different intensity of exercise on a weekly base. Although duration of 15 minutes continuous exercise was stated as a criterion of exercise in the instruction of LTEQ, the questionnaire failed to take duration into consider. Duration of exercise is an aspect as important as intensity and frequency in measuring aerobic training responses (McArdle, Katch, & Katch, 2007). Participant A who takes 15 minutes to do moderate exercise daily score 21 in LTEQ, whereas participant B scored 20 in LTEQ if s/he does 60-minute strenuous exercise for 4 times per week. Even though in the later case participant B spent more time in exercise with greater intensity, s/he still scored lower than participant A. To this end, the weak relationship between BID and exercise behaviors may not be the case. As a result, moderators in BID-exercise behaviors relationship were not investigated. It is necessary to establish more proper questionnaires of exercise behaviors, in which the exercise mode, frequency, duration and intensity are assessed comprehensively. As such, the moderating variables in the relationship between BID and exercise behaviors should be examined in future investigations.

The conclusion that romantic relationship satisfaction moderated in the relationship between BID and partner SPA was based on cross-sectional study. Currently there was no longitudinal study about the effect of romantic relationship on BID and SPA. In future studies, it is necessary to investigate the change in romantic relationship satisfaction, and how such change may influence the relationship between BID and partner-SPA across time. The longitudinal data may

provide more convincing evidence that supports moderating effect of romantic relationship satisfaction.

Despite these limitations, this study provided evidence that a favorable romantic relationship may protect people from body-related anxious experience. Nonetheless, the protection may not be statistically significant across all levels of BID. As displayed in Figure 5, the difference in partner-SPA seemed to be more distinct at higher level of BID than in lower level. In other words, while romantic relationship matters in partner-SPA for people who do not like their body images, it does not have much impact on those who are not concerned with body images. The threshold in BID, by which point the level of partner-SPA becomes significantly different across romantic relationship status, calls for further exploration.

Social support has been frequently reported as a coping strategy for body-image-related concerns (Sabiston & Brunet, 2011). Social support from significant others can improve romantic relationship and psychological need satisfaction, which can help people with BID “look on the bright side”. Based on the results of this study, social support is considered as an effective coping strategy. Personal trainers, fitness instructors, exercise psychology counselors and school counselors should pay attention to interpersonal relationship when working with clients. Personal trainers and fitness instructor should strive to create a non-judgmental, supportive interpersonal relationship with clients. Exercise psychologists may check with clients if romantic partner is the potential obstacle for exercise participation, or the stimuli of body-image-related concerns. Significant others can be involved during and after counseling sessions in many ways. For example, counselors may discuss experience of romantic relationship as a method to understand body-image concerns deeply. Counselors can also involve romantic partners as supporting source that facilitate changes in clients outside counseling session.

Exercise is another effective way to improve body appearance and to foster a positive body image (Hausenblas & Fallon, 2006). However, it was not found to be related with BID or partner-SPA in this study. Researchers interested in coping with BID may investigate the reason why people were reluctant to adopt physical activities as a coping strategy in future studies. As discussed in conceptual model of this study, a dynamic person-environment-behavior interactions influence individual's choice of coping strategy. Factors in this triadic reciprocal causation, such as social context, cognitive appraisal, motivation, and psychological need satisfaction, were not investigated in this study. Researchers should further examine these factors separately and simultaneously in order to achieve a comprehensive understanding in coping strategies for body-image-related concerns.

Concluding Remarks

The purpose of this study was to explore possible moderators in the relationship between BID and partner-SPA and in the relationship between BID and exercise behaviors among undergraduate students. BID and exercise behaviors were found to be insignificantly related. BID and partner SPA was found to be significantly correlated, and therefore moderator variables including romantic relationship satisfaction, status and length as well as gender were examined in further analysis. Romantic relationship satisfaction was found to be a significant moderator in the relationship between BID and partner-SPA. This can be explained by Ntoumanis, Duda and Edmund's (2009) integrated model. Because MMR analysis and modified MMR analysis did not yield the same conclusion about the moderating effect of romantic relationship status in BID-partner-SPA, future research is needed in order to reach a conclusion. The major limitation of this study was that the total sample size is insufficient to reach a .95 power, and sample size was not equal across romantic relationship status subgroups. The unequal subgroup sample size has

led to heterogeneous error variance among subgroups. In addition, exercise duration was not included in LTEQ, which made LTEQ inadequate to reflect accurate exercise behaviors. In the end of this study, recommendations for future studies and fitness and psychology practices were discussed.

APPENDIX A

INFORMED CONSENT FORM

Dear participant:

I am a graduate student in the Department of Educational Psychology and Learning Systems at Florida State University. I am conducting a research about interpersonal relationship, self-perception and exercise under guidance of Professor Dr. Robert Eklund.

There is no personal benefit in participating in this research except for 0.5 point course credit. Also, your response will contribute to understanding human psychological functioning for the researchers.

Your participation will include completing questionnaires. You will be asked to provide demographic information and to complete four short questionnaires. The total time to complete these questionnaires is about 20 minutes. At the end of the survey, you will need to save screenshot of the webpage and email the screenshot and your FSU ID to the researcher. Upon received your email, the researcher will assign you 0.5 course credit.

Your participation in this research is voluntary, and you have the right to withdraw from this research at any time without any penalty. Your responses to the questionnaires are kept confidential to the extent allowed by law. Please be noted that your responses are not linked to your FSU ID. Only aggregate information on the sample will be accessed and your participation and personal information will not be disclosed.

Please contact the researcher, Jingwen Liu, at *****@my.fsu.edu or (***) ***-*****, or Dr. Robert Eklund, at *****@fsu.edu or (***) ***-***** with any question regarding this research or your participation. If you have questions or feels of being put at risks because of your participation, you may contact the Human Subjects Committee of Florida State University Institutional Review Board, at 2010 Levy Street, Research Building B, Suite 276, Tallahassee, FL 32306-2742, or (850) 644-8633, or by email at jjccoper@fsu.edu.

I give my consent to participate in this study.

Yes No

Office of the Vice President for Research

Human Subjects Committee

Tallahassee, Florida 32306-2742

(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 09/14/2012

To: Jingwen Liu

Address: **

Dept.: EDUCATIONAL PSYCHOLOGY AND LEARNING SYSTEMS

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Relationship between Body Image Dissatisfaction with Social Physique Anxiety and Exercise Behaviors in the Context of Romantic Relationship

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped

consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 09/12/2013 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Robert Eklund, Advisor

HSC No. 2012.8520

Office of the Vice President for Research

Human Subjects Committee

Tallahassee, Florida 32306-2742

(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM (for change in research protocol)

Date: 10/18/2012

To: Jingwen Liu

Address: **

Dept.: EDUCATIONAL PSYCHOLOGY AND LEARNING SYSTEMS

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research

Projected entitled: Relationship between Body Image Dissatisfaction with Social Physique Anxiety and Exercise Behaviors in the Context of Romantic Relationship

The application that you submitted to this office in regard to the requested change/amendment to your research protocol for the above-referenced project has been reviewed and approved.

Please be reminded that if the project has not been completed by 09/12/2013, you must request renewed approval for continuation of the project.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection.

The Assurance Number is IRB00000446.

Cc: Robert Eklund, Advisor

HSC No. 2012.9219

APPENDIX B

DEMOGRAPHIC INFORMATION

Please fill out the following information about yourself.

1. What is your age? _____

2. What is your gender? Female Male

3. What is your ethnic group?

White African American Latino/ Hispanic Asian American Indian

Other (Specify) _____

4. Height: _____ cm

5. Weight: _____ kg

6. Are you currently involved in romantic interactions with others? Yes No

7. If answered Yes to question 6, please select the status that describes your relationship

status the best:

only hanging out with one or more than one person

dating one person exclusively

dating and living with a partner

in open relationships

planning for marriage or engaged

married

8. How long have you been involved in your relationship? _____ months.

APPENDIX C

EATING DISORDER INVENTORY – BODY DISSATISFACTION

This assessment aimed at assessing people's feeling and evaluation of their body. There are in sum nine statements. There is no right or wrong answer to these statements, so you do not need to think too much on each statement. Just provide the answer that applies to you the best. Please rate how often you feel the same as described in each statement. Thank you.

- | | Always | Usually | Often | Sometimes | Rarely | Never |
|--|--------|---------|-------|-----------|--------|-------|
| 1. I think that my stomach is too big. | | | | | | |
| 2. I think that my thighs are too large. | | | | | | |
| 3. I think that my stomach is just the right size. | | | | | | |
| 4. I feel satisfied with the shape of my body. | | | | | | |
| 5. I like the shape of my buttocks. | | | | | | |
| 6. I think my hips are too big. | | | | | | |
| 7. I think that my thighs are just the right size. | | | | | | |
| 8. I think my buttocks are too large. | | | | | | |
| 9. I think that my hips are just the right size. | | | | | | |

APPENDIX D

PARTNER SOCIAL PHYSIQUE ANXIETY SCALE

This questionnaire is to understand how people feel about their physique **when interacting with your romantic partner(s)** (e.g, girlfriend, boyfriend, fiancée, fiancé, or a person whom you are dating). Here **physique** is defined as body form and structure, including body fat, muscle tone and general body proportion. This questionnaire included seven statements in total. Please rate the degree to which each statement is true of you when you are with your partner. There is no right or wrong answer, so please give the response that seems to correspond best to your feeling.

Not
at all Slightly Moderately Very Extremely

1. I wish I wasn't so uptight about my physique when I am around my partner.
2. There are times when I am bothered by thoughts that my partner is evaluating my weight or muscular development negatively.
3. Unattractive features of my physique/figure make me nervous when I am around my partner.
4. In the presence of my partner, I feel apprehensive about my physique.
5. I am comfortable with how fit my body appears to my partner.
6. It would make me uncomfortable to know others were evaluating my physique.
7. When it comes to displaying my physique to my partner, I am a shy person.

APPENDIX E

DYADIC ADJUSTMENT SCALE

This questionnaire is to understand how people feel about their romantic relationship with their partners. In this survey, your partner(s) is the one(s) **currently** involved in romantic interaction with you, including boyfriend, girlfriend, fiancé, fiancée, or people you are dating with.

- | | All
the
time | Most
of the
time | More
often than
not | Occasi
-onally | Rarely | Never |
|---|--------------------|------------------------|---------------------------|-------------------|--------|-------|
| 1. How often do you discuss or have you considered terminating your relationship with your partner? | | | | | | |
| 2. How often do you or your partner leave you alone after a fight? | | | | | | |
| 3. In general, how often do you think that things between you and your partner are going well? | | | | | | |
| 4. Do you confide in your partner? | | | | | | |
| 5. Do you ever regret that you were in a relationship with your current partner? | | | | | | |
| 6. How often do you and your partner quarrel? | | | | | | |
| 7. How often do you and your partner "get on each other's nerves?" | | | | | | |

	Every Day	Almost Every Day	Occasionally	Rarely	Never
8. Do you kiss your partner?					

9. The numbers on the following line represent different degrees of happiness in your relationship. The middle point, "happy," represents the degree of happiness of most relationships. Please select the number which best describes the degree of happiness, all things considered, of your relationship.

0	1	2	3	4	5	6
Extremely Unhappy	Fairly Unhappy	A Little Unhappy	Happy	Very Happy	Extremely Happy	Perfect

10. Which of the following statements best describes how you feel about the future of your relationship?

5 I want desperately for my relationship to succeed, and *would go to almost any length to see that it does.*

4 I want very much for my relationship to succeed, and *will do all I can to see that it does.*

3 I want very much for my relationship to succeed, and *will do my fair share to see that it does.*

2 It would be nice if my relationship succeeded, but *I can't do much more than I am doing now to help it succeed.*

1 It would be nice if it succeeded, but *I refuse to do any more than I am doing now to keep the relation-ship going.*

0 My relationship can never succeed, and *there is no more that I can do to keep the relationship going.*

APPENDIX F

LEISURE TIME EXERCISE QUESTIONNAIRE

Considering a 7-Day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time? Please write the number of time on the line after each condition.

a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY)

(e.g., running, jogging, hockey, football, soccer, squash, basketball , cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

Times per week _____

b) MODERATE EXERCISE (NOT EXHAUSTING)

(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

Times per week _____

c) MILD EXERCISE (MINIMAL EFFORT)

(e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)

Times per week _____

REFERENCES

- Abell, S. C., & Richards, M. H. (1996). The relationship between body shape satisfaction and self-esteem: An investigation of gender and class differences. *Journal of Youth and Adolescence*, 25(5), 691-703. doi: 10.1007/bf01537361
- Ackard, D. M., Croll, J. K., & Kearney-Cooke, A. (2002). Dieting frequency among college females: Association with disordered eating, body image, and related psychological problems. *Journal of Psychosomatic Research*, 52(3), 129-136. doi: 10.1016/s0022-3999(01)00269-0
- Ackard, D. M., Kearney-Cooke, A., & Peterson, C. B. (2000). Effect of body image and self-image on women's sexual behaviors. *International Journal of Eating Disorders*, 28(4), 422-429.
- Aguinis, H. (1995). Statistical power problems with moderated multiple regression in management research. *Journal of Management*, 21(6), 1141-1158. doi: 10.1016/0149-2063(95)90026-8
- Aguinis, H. (2004). *Regression analysis for categorical moderators*. New York: Guilford Press.
- Aguinis, H., Beaty, J. C., Boik, R. J., & Pierce, C. A. (2005). Effect size and power in assessing moderating effects of categorical variables using multiple regression: A 30-year review. *Journal of Applied Psychology*, 90, 94-107.
- Ambwani, S. (2007). Love thyself before loving others? A qualitative and quantitative analysis of gender differences in body image and romantic love. *Sex roles*, 56(1-2), 13-21.
- Anderson-Fye, E. P. (2011). Body images in non-western cultures. In T.F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (2nd ed., chap. 28, pp. 244-252). New York, NY: The Guilford Press.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NY: Prentice Hall.
- Brown, K. L. (2009). *Attachment anxiety and avoidance: Relationship to body image and exercise behavior*. PhD dissertation, University of Southern Mississippi, Hattiesburg, MS.
- Canpolat, A. M., Catikkas, F., Koyuncu, M., & Tok, S. (2010). Body image satisfaction and dissatisfaction, social physique anxiety, self-esteem, and body fat ratio in female exercisers and nonexercisers. *Social Behavior and Personality: an international journal*, 38(4), 561-.
- Cash, T. F. (2004). Body image: Past, present, and future. *Body Image*, 1(1), 1-5. doi: 10.1016/s1740-1445(03)00011-1

- Cash, T. F., Thériault, J., & Annis, N. M. (2004). Body image in an interpersonal context: Adult attachment, fear of intimacy and social anxiety. *Journal of Social and Clinical Psychology*, 23(1), 89-103. doi: 10.1521/jscp.23.1.89.26987
- Cash, T. F. (2011). Cognitive-behavioral perspectives on body image. In T.F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (2nd ed., chap. 5, pp. 39-47). New York, NY: The Guilford Press.
- Chen, H., & Jackson, T. (2012). Gender and age group differences in mass media and interpersonal influences on body dissatisfaction among Chinese adolescents. *Sex Roles*, 66(1), 3-20. doi:10.1007/s11199-011-0056-8
- Cohen, J., Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences*. Hillsdale, NJ: L. Erlbaum Associates.
- Cole, D. A., Maxwell, S. E., Martin, J. M., Peeke, L. G., Seroczynski, A. D., Tram, J. M., . . . Tracy, M. (2001). The development of multiple domains of child and adolescent self-concept: A cohort sequential longitudinal design. *Child Development*, 72(6), 1723-1746.
- Compian, L., Gowen, L. K., & Hayward, C. (2004). Peripubertal girls' romantic and platonic involvement with boys: Associations with body image and depression symptoms. *Journal of Research on Adolescence*, 14(1), 23-47.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.
- Deci, E. L. & Ryan, R. M. (Eds.), (2002). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.
- Cramer, D. (2003). Acceptance and need for approval as moderators of self-esteem and satisfaction with a romantic relationship or closest friendship. *The Journal of Psychology*, 137(5), 495-505. doi: 10.1080/00223980309600631
- Edmunds, J., Ntoumanis, N., & Duda, J. L. (2008). Testing a self-determination theory-based teaching style intervention in the exercise domain. *European Journal of Social Psychology*, 38(2), 375-388. doi: 10.1002/ejsp.463
- Egelton, K. (2011). *A lifetime of body image dissatisfaction among women*. Master thesis, Department of Kinesiology and Physical Education, McGill University, Montreal, Canada.
- Fasol, M. (2010). *A study of body satisfaction, internalization of media messages, and spiritual well being in college males*. PhD dissertation, School of Church and Family Ministries, Southwestern Baptist Theological Seminary, Fort Worth, TX.
- Flegal, K. M., Carroll, M.D., Ogden, C.L., & Curtin, L.R. (2010). Prevalence and trends in obesity among US adults, 1999-2008. *JAMA*, 303(3), 235-241. doi:10.1001/jama.2009.2014

- Frederick, D. A., Buchanan, G. M., Sadehgi-Azar, L., Peplau, L. A., Haselton, M. G., Berezovskaya, A., & Lipinski, R. E. (2007). Desiring the muscular ideal: Men's body satisfaction in the United States, Ukraine, and Ghana. *Psychology of Men & Masculinity*, 8(2), 103-117. doi: 10.1037/1524-9220.8.2.103
- Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26(4), 331-362. doi: 10.1002/job.322
- Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, 2(2), 15-34.
- Gill, D. L. (2007, March). *Social physique anxiety in sport and exercise psychology research*. Symposium conducted at the 2007 National Convention and Exposition of the American Alliance for Health, Physical Education, Recreation and Dance, Baltimore, DC.
- Graham, J. M., Liu, Y. J., & Jeziorski, J. L. (2006). The dyadic adjustment scale: A reliability generalization meta-analysis. *Journal of Marriage and Family*, 68(3), 701-717. doi: 10.1111/j.1741-3737.2006.00284.x
- Godin, G., Shephard, R.J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Science*, 10(3), 141-146.
- Grogan, S. (2008). *Body image : Understanding body dissatisfaction in men, women, and children* (2nd ed. ed.). New York: Routledge.
- Hargreaves, D. A., & Tiggemann, M. (2009). Muscular ideal media images and men's body image: Social comparison processing and individual vulnerability. *Psychology of Men & Masculinity*, 10(2), 109-119. doi: 10.1037/a0014691
- Harrington, D. (2009). *Confirmatory Factor Analysis*. New York: Oxford University Press.
- Hart, E. A., Leary, M. R., & Rejeski, W. J. (1989). The measurement of social physique anxiety. *Journal of Sport & Exercise Psychology*, 11(1), 94-104.
- Hausenblas, H. A., & Fallon, E. A. (2006). Exercise and body image: A meta-analysis. *Psychology and Health*, 21(1), 33-47. doi:10.1080/14768320500105270
- Hill, C. E. (2010). Overview of the exploration stage. In *Helping skills: Facilitating exploration, insight and action* (3rd ed., chap. 4). Washington, DC: APA
- Holsen, I., Jones, D. C., & Birkeland, M. S. (2012). Body image satisfaction among Norwegian adolescents and young adults: A longitudinal study of the influence of interpersonal relationships and BMI. *Body Image*, 9(2), 201-208. doi: 10.1016/j.bodyim.2012.01.006
- Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modeling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, 6(1), 53-60.

- Jones, D.C. (2011). Interpersonal and familial influences on the development of body image. In T.F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (2nd ed., chap. 13, pp. 110-118). New York, NY: The Guilford Press.
- Kowalski, K. C., Mack, D. E., Crocker, P. R. E., Niefer, C. B., & Fleming, T. (2006). Coping with social physique anxiety in adolescence. *Journal of Adolescent Health, 39*(2), 275.e9-275.e16. doi:10.1016/j.jadohealth.2005.12.015
- Lazarus, R. S. (1991). *Emotion and adaptation*. New York: Oxford University Press.
- Lazarus, R. S. (1999). *Stress and emotion: A new synthesis*. New York: Springer.
- Littleton, H. (2008). Body Image Dissatisfaction: Normative Discontent? *Sex roles, 59*(3), 292-293. doi: 10.1007/s11199-008-9399-1
- Markey, C. N., & Markey, P. M. (2006). Romantic relationships and body satisfaction among young women. *Journal of Youth and Adolescence, 35*(2), 256-264. doi: 10.1007/s10964-005-9013-6
- Martin, K. A., & Rejeski, W. J. (1997). Is the social physique anxiety scale really multidimensional? Conceptual and statistical arguments for a unidimensional model. *Journal of Sport & Exercise Psychology, 19*(4), 359-367.
- McArdle, W. D., Katch, F. I., & Katch, V. L. (2007). *Exercise physiology: Energy, nutrition, and human performance*. Baltimore, Md: Williams & Wilkins.
- McCabe, M. P., & Ricciardelli, L. A. (2004). Body image dissatisfaction among males across the lifespan: A review of past literature. *Journal of Psychosomatic Research, 56*(6), 675-685. doi: 10.1016/s0022-3999(03)00129-6
- McDonough, M. H., & Crocker, P. R. E. (2007). Testing self-determined motivation as a mediator of the relationship between psychological needs and affective and behavioral outcomes. *Journal of Sport & Exercise Psychology, 29*(5), 645-663.
- McKinley, N. M., & Randa, L. A. (2005). Adult attachment and body satisfaction. *Body Image, 2*(3), 209-218. doi: 10.1016/j.bodyim.2005.04.003
- Menzel, K. E., Krawczyk, R., & Thompson, J. K. (2011). Attitudinal assessment of body image for adolescents. In T.F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (2nd ed., chap. 18, pp. 154-169). New York, NY: The Guilford Press.
- Mitchell, K. R., & Orr, F. E. (1976). Heterosexual social competence, anxiety, avoidance, and self-judged physical attractiveness. *Perceptual and Motor Skills, 43*, 553-554.
- Motl, R. W. (2007). Chapter 2: Theoretical models for understanding physical activity behavior among children and adolescents -- Social cognitive theory and self-determination theory. *Journal of Teaching in Physical Education, 26*(4), 350-357.

- Motl, R. W., & Conroy, D. E. (2000). Validity and factorial invariance of the Social Physique Anxiety Scale. *Medicine and Science in Sports and Exercise*, 32(5), 1007-1017. doi: 10.1097/00005768-200005000-00020
- Murnen, S. K. (2011). Gender and body images. In T.F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (2nd ed., chap. 19, pp. 173-179). New York, NY: The Guilford Press.
- Myers, N., Ahn, S., & Jin, Y. (2011). Sample size and power for confirmatory factor analysis: A monte carlo approach. *Research Quarterly for Exercise and Sport*, 82(3), 412-423.
- Niefer, C.B., McDonough, M.H., & Kowalski, K.C. (2010). Coping with social physique anxiety among adolescent female athletes. *International Journal of Sport Psychology*, 41(4), 369-386.
- Ntoumanis, N., Edmunds, J., & Duda, J. L. (2009). Understanding the coping process from a self-determination theory perspective. *British Journal of Health Psychology*, 14(2), 249-260. doi: 10.1348/135910708x349352
- Ogden, J., & Taylor, C. (2000). Body dissatisfaction within couples. *Journal of Health Psychology*, 5(1), 25-32. doi: 10.1177/135910530000500107
- Paap, C. E., & Gardner, R. M. (2011). Body image disturbance and relationship satisfaction among college students. *Personality and Individual Differences*, 51(6), 715-719. doi: 10.1016/j.paid.2011.06.019
- Presnell, K., Bearman, S. K., & Stice, E. (2004). Risk factors for body dissatisfaction in adolescent boys and girls: A prospective study. *International Journal of Eating Disorders*, 36(4), 389-401. doi: 10.1002/eat.20045
- Ptacek, J. T., Smith, R.E., & Zanas, J. (1992). Gender, appraisal, and coping: A longitudinal analysis. *Journal of Personality*, 60(4), 747-770.
- Quested, E., & Duda, J. L. (2010). Exploring the social-environmental determinants of well- and ill-being in dancers: A test of basic needs theory. *Journal of Sport & Exercise Psychology*, 32(1), 39-60.
- Rathner, G., & Rumpold, G. (1994). Convergent validity of the eating disorder inventory and the anorexia nervosa inventory for self-rating in an austrian nonclinical population. *International Journal of Eating Disorders*, 16(4), 381-393. doi: 10.1002/1098-108x(199412)16:4<381::aid-eat2260160407>3.0.co;2-q
- Reeve, J. (2002). Self-determination theory applied to educational settings. In E. L. Deci & R.M. Ryan (Eds.), *Handbook of self-determination research* (chap. 9, pp. 183-204). Rochester, NY: University of Rochester Press.
- Roseman, I. J., & Smith, C. A. (2001). Appraisal theory: Overview, assumption, varieties, controversies. In K. R. Scherer, A. Schorr & T. Johnstone (Eds.), *Appraisal processes in*

- emotion: Theory, methods, research (Chap. 1, pp. 3-19). New York, NY, US: Oxford University Press.
- Russell, W. D., & Cox, R. H. (2003). Social physique anxiety, body dissatisfaction, and self-esteem in college females of differing exercise frequency, perceived weight discrepancy, and race. *Journal of Sport Behavior*, 26(3), 298-318.
- Sabiston, C. M., & Brunet, J. (2010). In the company we keep: Social physique anxiety levels differ around parents and peers. *Journal of Health Psychology*, 16(1), 42-49. doi: 10.1177/1359105310367530
- Sabiston, C. M., Sedgwick, W. A., Crocker, P. R. E., Kowalski, K. C., & Mack, D. E. (2007). Social Physique Anxiety in Adolescence: An Exploration of Influences, Coping Strategies, and Health Behaviors. *Journal of Adolescent Research* 22(1), 78-101.
- Sarwer, D. B. W., Thomas A.; Foster, Gary D. (1998). Assessment of body image dissatisfaction in obese women. *Journal of Consulting and Clinical Psychology*, 66(4), 651-654. doi: 10.1037/0022-006X.66.4.651
- Schoemaker, C., Verbraak, M., Breteler, R., & van der Staak, C. (1997). The discriminant validity of the Eating Disorder Inventory-2. *British Journal of Clinical Psychology*, 36(4), 627-629. doi: 10.1111/j.2044-8260.1997.tb01268.x
- Scott, L. A., Burke, K. L., Joyner, A. B., & Brand, J. S. (2004). Examining the stability of the 7-Item social physique anxiety scale using a test-retest method. *Measurement in Physical Education and Exercise Science*, 8(2), 57-62. doi: 10.1207/s15327841mpee0802_1
- Sheets, V., & Ajmere, K. (2005). Are romantic partners a source of college students' weight concern? *Eating Behaviors*, 6(1), 1-9. doi: 10.1016/j.eatbeh.2004.08.008
- Shephard, R. Godin leisure-time exercise questionnaire . (1997). *Medicine and Science in Sports and Exercise*, 29(suppl 6):S36-S38.
- Shevlin, M., & Miles, J. N. V. (1998). Effects of sample size, model specification and factor loadings on the GFI in confirmatory factor analysis. *Personality and Individual Differences*, 25(1), 85-90. doi: 10.1016/S0191-8869(98)00055-5
- Shieh, G. (2009). Detecting interaction effects in moderated multiple regression with continuous variables: Power and sample size considerations. *Organizational Research Methods*, 12(3), 510-528. doi: 10.1177/1094428108320370
- Shultz, A. M. (2003). *Development and validation of a scale to measure state physique anxiety*. PhD dissertation, Department of Kinesiology, University of North Carolina at Greensboro, Greensboro, NC.
- Shultz, A. M. (2007, March). *Current issues and research directions for social physique anxiety*. Symposium conducted at the 2007 National Convention and Exposition of the American Alliance for Health, Physical Education, Recreation and Dance, Baltimore, DC.

- Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*(4), 571-581. doi: 10.1037/0022-0663.85.4.571
- Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and Family, 38*(1), 15-28.
- Tantleff-Dunn, S., & Thompson, J. K. (1995). Romantic partners and body image disturbance: Further evidence for the role of perceived-actual disparities. *Sex roles, 33*(9-10). doi: 10.1007/bf01547719
- Tessier, D., Sarrazin, P., & Ntoumanis, N. (2010). The effect of an intervention to improve newly qualified teachers' interpersonal style, students motivation and psychological need satisfaction in sport-based physical education. *Contemporary Educational Psychology, 35*(4), 242-253. doi: 10.1016/j.cedpsych.2010.05.005
- Thiel, A., & Paul, T. (2006). Test–retest reliability of the Eating Disorder Inventory 2. *Journal of Psychosomatic Research, 61*(4), 567-569. doi: 10.1016/j.jpsychores.2006.02.015
- Tiggemann, M. (2011). Sociocultural perspectives on human appearance and body image. In T.F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (2nd ed., chap. 2, pp. 12-19). New York, NY: The Guilford Press.
- Tinsley, H. E. A., Brown, S., Tinsley, H., & Brown, S. D. (2000). *Handbook of applied multivariate statistics and mathematical modeling*. London: Academic.
- Vallerand, R. J., & Losier, G. F. (1999). An integrative analysis of intrinsic and extrinsic motivation in sport. *Journal of Applied Sport Psychology, 11*(1), 142-169. doi: 10.1080/10413209908402956
- Weiss, M. R., & Amorose, A. J. (2005). Children's self-perceptions in the physical domain: Between- and within-age variability in level, accuracy, and sources of perceived competence. *Journal of Sport & Exercise Psychology, 27*(2), 226-244.
- Weller, J.E., & Dziegielewska, S.F. (2004). The relationship between romantic partner support styles and body image disturbance. *Journal of Human Behavior in the Social Environment, 10*(2), 71-92.
- Wiederman, M. W. (2000). Women's body image self-consciousness during physical intimacy with a partner. *The Journal of Sex Research, 37*(1), 60-68.
- World Health Organization. *Obesity: preventing and managing the global epidemic*. Report of a WHO Consultation. Geneva; 2000. (WHO – Technical Report Series, 894)
- Yin, T. S., & Othman, A. R. (2009). When does the pooled variance t-test fail? *African Journal of Mathematics and Computer Science Research, 2*(4), 56-62.

BIOGRAPHICAL SKETCH

Jingwen Liu was born on September 25, 1987 in Wuxi, Jiangsu Province in People's Republic of China. She grew up in Wuxi and competed as a member of Wuxi Swimming Team for five years. In 2006, Jingwen was admitted to Nanjing Normal University, where she studied psychology while instructing and coaching swimming. She obtained her Bachelor's degree from Nanjing Normal University in July, 2010. After that, she left China and attended Florida State University to pursue her master's degree in sport psychology. During her graduate study, she became a Red Cross certified swimming instructor and lifeguard and she worked closely with athletes and exercisers. Jingwen will continue to pursue her PhD degree in exercise psychology after she finishes her master thesis.