

Social Influences and Psychological and Physical Well-Being  
Among Female Adolescent Gymnasts

A DISSERTATION  
SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL  
OF THE UNIVERSITY OF MINNESOTA

BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY

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June 2012

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## ACKNOWLEDGMENTS

Completion of my dissertation and doctoral degree would not have been possible without the guidance, support, and assistance of some very important people. First and foremost, I want to thank the ultimate mentor and advisor—Mo! You have consistently challenged me to do my best work and reinforced the importance of a strong work ethic and passion for what we do. Your success and experience makes you a role model for how to conduct rigorous, systematic, and thoughtful research that makes a difference in the lives of young physical activity participants. I truly appreciate the time you take to provide quality feedback and constructive criticism to prepare me to be a successful researcher. My experiences in this program with you have been an invaluable part of my academic and professional development. I look forward to our continued collegiality and friendship. I would also like to thank my dissertation committee members who have taken time to read, discuss, and provide constructive feedback on my preliminary exam and dissertation. Thank you to Dr. Beth Lewis, Dr. Ann Masten, and Dr. Lisa Kihl for serving on my committee.

A big thank you goes to my data collection helpers—Melissa Krug and Elisabeth Schulte. Thanks for jumping on board to help the data collections run smoothly and ensure quality control. I enjoyed sharing the research process with you! Thank you also to my participants for sharing your thoughts and feelings about gymnastics! Thanks to the club coaches for allowing your gymnasts to take time out of practice and for making my venture back into gymnastics so enjoyable. This project would not have been possible without all of your cooperation. I am also grateful to have been awarded funding for my

dissertation studies from several sources—the Eloise Jaeger Scholarship, NASPSPA Research Grant, and GradSEHD Research Grant.

Thanks to my fellow graduate students—in particular Nicole Bolter and Alison Phillips—for making my doctoral experience both fun and meaningful. It’s been great talking with all of you about research ideas, teaching strategies, statistical struggles, and much more. I’ve been in great company over the last 4 years!

A huge thank you goes to my husband, Wes. Your support has been priceless. Thanks for letting me do my thing, providing encouragement, and helping me find balance! You always seem to know when I get overwhelmed and have the perfect way to help me cope—sometimes it’s leaving me alone to work, and other times it’s getting me away for a meal or a walk with the dog. Thanks to my pups, Pepper and Bailey, for being my stress relievers and for staying up with me when I had late night work to do.

And to my family—Mom, Dad, and Eric—thank you for everything! Mom and Dad, thank you for signing me up for gymnastics. It was my world for 16 years, and you guys kept supporting me because I loved it. It was that experience that led me to my career path and my dissertation topic! Mom, thanks for consistently asking how things are going and making sure I’m still doing what I love. Dad, thanks for your words of wisdom and interest in what my research is all about. Eric, I enjoyed attending your sporting events in soccer, hockey, and bmx racing and hearing about your career interests. Thanks for teaching me about sports other than gymnastics and topics other than sport psychology. Thanks, family and friends, for all of your support!

## Abstract

The purpose of the present studies was to examine relationships among social influences (coach and teammate behaviors), psychological need satisfaction, and psychological and physical well-being among female adolescent gymnasts, using self-determination theory (SDT) as a framework. Well-being indicators included self-esteem, positive affect, and disordered eating. Indicators were chosen based on gymnasts' risk of declining well-being due to demanding practice schedules and pressure to maintain a lean body. In Study 1, competitive gymnasts ( $N = 303$ ) ages 10 to 17 ( $M = 13.0$ ,  $SD = 1.9$ ) completed valid and reliable measures assessing SDT variables and physical maturity. A model of relationships was specified and tested using structural equation modeling. Coach autonomy-support and mastery climate were indirectly related to positive affect through coach relatedness. Friendship quality was associated with all three well-being indices through perceived competence and teammate relatedness. Post-pubertal girls reported lower perceived competence, self-esteem, and positive affect, and greater disordered eating, compared to pre-pubertal girls. Findings support SDT and highlight the processes related to well-being among female adolescent gymnasts.

Study 2 tested longitudinal relationships with a subset of girls from Study 1 ( $N = 174$ ). Need satisfaction and well-being indices were assessed 6 to 8 months later. Study 2 employed the time lag necessary for a more accurate test of mediation, whereby social influences predict need satisfaction over time, and need satisfaction predicts well-being over time. Coach autonomy-support, mastery climate, *and* performance climate positively predicted girls' perceived competence, which in turn predicted higher self-

esteem and lower disordered eating. Results provide evidence for coaches as an important source of influence over time and perceived competence as a mediator of the relationship between social influence and well-being. Together, the present studies extend the knowledge base by simultaneously examining coach and peer influence, assessing psychological *and* physical well-being, studying theoretical relationships with a population at risk for lower well-being (i.e., female adolescent gymnasts), and employing concurrent *and* longitudinal designs to determine strength and stability of relationships over time.

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## CHAPTER 1

## INTRODUCTION

*I am not suggesting that gymnastics and figure skating in and of themselves are destructive. On the contrary, both sports are potentially wonderful and enriching, providing an arena of competition in which the average child can develop a sense of mastery, self-esteem and healthy athleticism. (J. Ryan, 1995, p. 5)*

Joan Ryan uses this quotation to introduce her book, *Little Girls in Pretty Boxes*. The remainder of the book, however, describes numerous examples of negative experiences of adolescent female athletes. Based on nearly 100 interviews and 10 years of covering gymnastics and figure skating as a journalist, Ryan (1995) details examples of coaches who suppress girls' physical and psychological well-being by telling them their worth is contingent upon how much they weigh and their ability to do as they are told. As a result, athletes experienced low self-esteem, disordered eating, chronic injuries, and little enjoyment. Ryan's examples demonstrate the important role coaches can play in affecting the well-being of female adolescent athletes. Fortunately, theory and research provide evidence that coaches as well as teammates *can* have a positive impact on young athletes' experiences.

Two mechanisms of coach influence are consistently related to adolescent athletes' psychosocial outcomes—interpersonal style and motivational climate (Amorose, 2007; Horn, 2008). Interpersonal style includes autonomy-supportive behaviors (e.g.,

providing athletes choice within limits and a rationale for activities) and controlling behaviors (e.g., using rewards to control athletes' actions and giving overly critical feedback) (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2009; Deci & Ryan, 1987; Mageau & Vallerand, 2003). Coaches who engage in more autonomy-supportive behaviors and fewer controlling behaviors are associated with adolescent athletes who report more favorable self-perceptions, enjoyment, and adaptive forms of motivation (e.g., Amorose & Anderson-Butcher, 2007; Blanchard, Amoit, Perreault, Vallerand, & Provencher, 2009; Pelletier, Fortier, Vallerand, & Briere, 2001). For example, Amorose and Anderson-Butcher found that athletes' perceptions of greater autonomy-supportive behaviors from coaches were associated with higher levels of perceived ability and self-determined motivation.

Motivational climate, or how coaches define success in the sport environment, is also important for young athletes' psychological experiences (see Ames, 1992; Harwood, Spray, & Keegan, 2008). A coach who creates a mastery climate places emphasis on self-referenced criteria for success, such as learning, improvement, and effort. A coach who creates a performance climate emphasizes norm-referenced criteria as a means of defining success, such as social comparison, winning, and outperforming others. Coaches create a motivational climate through how they structure practices, make decisions, and evaluate participants' performance. Athletes' perceptions of a higher mastery climate are associated with higher perceived ability, enjoyment, self-determined motivation, and persistence (e.g., Kipp & Amorose, 2008; Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002; M.R. Weiss, Amorose, & Wilko, 2009). For example, Sarrazin et al. found that a

mastery climate was positively associated with self-determined motivation, which was negatively associated with dropout for female adolescent athletes. In sum, coaches are in a position to impact various psychosocial outcomes, or more broadly, adolescents' well-being, through their interpersonal style and climate emphasis.

Self-determination theory (SDT; R.M. Ryan & Deci, 2000, 2007) is an appropriate framework for studying social influences and well-being among adolescent sport participants. SDT proposes that social contexts that promote satisfaction of basic psychological needs (perceived competence, autonomy, and relatedness) contribute to well-being (i.e., health and optimal functioning). Perceiving that one is good at a task satisfies the need for competence. The need for autonomy is fulfilled when one feels that a task is self-endorsed or freely chosen. The need for relatedness is enhanced when one feels a sense of belonging or connectedness when participating in an activity. In the physical domain, coaches and teammates are key sources of social influence for female adolescents—their beliefs and behaviors can influence athletes' psychological need satisfaction and well-being (see Amorose, 2007; Horn & Amorose, 1998; M.R. Weiss & Stuntz, 2004).

Social influences and well-being among adolescent athletes have been studied in the physical domain using self-determination theory as a framework (see Gagné & Blanchard, 2007, for a review). Coaches who exhibit more autonomy-supportive behaviors, fewer controlling behaviors, and create a higher mastery climate are associated with athletes who report greater psychological need satisfaction and higher positive emotions and sport satisfaction (Blanchard, Amiot, Perreault, Vallerand, & Provencher,

2009; Quested & Duda, 2010; Reinboth, Duda, & Ntoumanis, 2004). Quested and Duda found that adolescent dancers' perceptions of a higher mastery climate were related to greater perceived competence, autonomy, and relatedness, and in turn higher positive affect. Reinboth et al. found that perceptions of a higher mastery climate were associated with higher perceived ability and greater sport satisfaction among adolescent male athletes. Taken together, results indicate the importance of coaches engaging in autonomy-supportive behaviors and creating a mastery climate for promoting athletes' psychological need satisfaction and well-being.

Only a few longitudinal studies have been conducted on coach influence, need satisfaction, and well-being among athletes (Adie, Duda, & Ntoumanis, 2012; Gagné, Ryan, & Bargmann, 2003; Quested & Duda, 2011; Reinboth & Duda, 2006). Gagné and colleagues found that higher perceived autonomy-support was positively associated with feelings of autonomy and relatedness among female gymnasts ages 7–18, and psychological need satisfaction was associated with increases in self-esteem and positive affect from pre- to post-practice, averaged over 4 weeks. Quested and Duda (2011) found that decreases in perceived teacher autonomy-support predicted decreases in need satisfaction, which predicted increases in burnout for adolescent and emerging adult dancers over nine months. Quested and Duda, along with Adie et al. (2012) and Reinboth and Duda (2006), examined relationships among variables assessed at the last time wave while controlling for variables assessed at an earlier time period. It cannot be concluded, however, that social influences at one point in time predict need satisfaction at a later time, or whether need satisfaction at one point predicts well-being several months later.

Studies are needed to more precisely test longitudinal relationships among coach influence, psychological need satisfaction, and well-being.

Teammates are also an important part of the social context and can contribute to adolescents' well-being. Friendship quality includes such characteristics as loyalty, similar interests, self-esteem enhancement, and emotional support (A.L. Smith, 2003, 2007; M.R. Weiss & Stuntz, 2004). Sharing a close friendship is associated with adolescents' self-perceptions, enjoyment, and physical activity level in organized sport (McDonough & Crocker, 2005; A.L. Smith, 1999; A.L. Smith, Ullrich-French, Walker, & Hurley, 2006; Ullrich-French & Smith, 2006, 2009; M.R. Weiss & Smith, 2002) and in physical education settings (Cox, Duncheon, & McDavid, 2009; Cox & Ullrich-French, 2010). For example, Weiss and Smith found that higher friendship quality was associated with greater enjoyment among 10-18 year-old tennis players, and Cox et al. found that greater friendship quality was associated with feelings of relatedness and enjoyment among adolescent physical education students. Collectively, studies show that when adolescents report higher friendship quality in physical activity contexts, they report more favorable emotional well-being.

Well-being is defined within SDT as optimal functioning and health, which includes eudaimonic, hedonic, and physical health indicators. Eudaimonic well-being involves personal growth and reaching one's potential, and hedonic well-being includes happiness, positive affect, and life satisfaction (Deci & Ryan, 2008; R.M. Ryan & Deci, 2001). In the present studies, well-being was operationalized based on SDT and my purposeful sample. Female adolescent gymnasts were chosen because they undergo



rigorous training, evaluative judging, and pressure to maintain a lean body, putting them at risk for low self-perceptions, low positive affect, disordered eating, and dropout of physical activity (Horn, 2004; Krane, Greenleaf, & Snow, 1997; Pate et al., 2009; Sundgot-Borgen & Torstveit, 2010). Thus, in the present studies, self-esteem represented eudaimonic well-being, positive affect represented hedonic well-being, and disordered eating and physical activity level represented the physical health aspect.

Based on self-determination theory and past research, the purpose of the present studies was to examine concurrent *and* longitudinal relationships among coach and peer influence, psychological need satisfaction, and psychological and physical well-being with female adolescent gymnasts. Study 1 involved concurrent relationships. I hypothesized that: (a) perceptions of higher coach autonomy-support, mastery climate, and friendship quality would be associated with greater psychological need satisfaction, and perceptions of greater coach controlling behaviors and performance climate would relate negatively to need satisfaction; (b) higher perceived competence, autonomy, and relatedness would be associated with more favorable well-being; and (c) coach behaviors and friendship quality would indirectly relate to well-being indices through psychological need satisfaction. Physical maturity was included as a control variable because it is a developmental marker associated with lower self-perceptions for girls (Horn, 2004; Malina, 2002).

Study 2 involved longitudinal relationships. I hypothesized that: (a) mastery climate, autonomy-support, and friendship quality would positively predict need satisfaction while controlling for each need at Time 1, (b) performance climate and

controlling behaviors would negatively predict need satisfaction while controlling for need satisfaction at Time 1, (c) need satisfaction would positively predict self-esteem, positive affect, and physical activity and negatively predict disordered eating while controlling for well-being at Time 1, and (d) the psychological needs would mediate the relationship between social influences and well-being.

The present studies extend past research in four ways. First, I examined multiple social influences simultaneously (i.e., motivational climate, interpersonal style, friendship quality) to determine unique and combined relationships of coach and peer behaviors with need satisfaction and well-being. Second, I assessed psychological *and* physical well-being—self-esteem, positive affect, disordered eating, and physical activity—to extend our knowledge of predictors of well-being. Third, SDT was used to study relationships with a population at risk for lower well-being (i.e., female adolescent gymnasts). Fourth, I employed concurrent *and* longitudinal designs to determine strength and stability of relationships over time and assess mediational influence. In the following sections, I review the literature in more depth on the concept of well-being, relevant theoretical frameworks for understanding determinants of well-being, and research on coach and peer influence on adolescents' well-being in sport, culminating in the purpose and hypotheses of the present studies.

## The Concept of Well-Being

Well-being is used in everyday conversations to refer broadly to our health and positive development. Because well-being is a layperson's term, it often lacks a consistent theoretical and operational definition. What is really meant by well-being? Is well-being the same for everyone—female, male, younger, older? This section aims to define well-being and clarify how it will be conceptualized in the present studies.

In two reviews, R.M. Ryan and Deci (2001; Deci & Ryan, 2008) acknowledge two traditions of studying well-being. The hedonic view includes feelings of happiness, positive affect, and life satisfaction. Researchers have often studied hedonic aspects of well-being because they are fairly straightforward and easy to assess (e.g., Diener, 1994). The eudaimonic view, on the other hand, includes personal growth and striving to reach one's potential. Eudaimonia stems from philosophic writings by Aristotle that distinguish between pleasure and virtue (i.e., choosing activities that promote one's potential) (Deci & Ryan, 2008; R.M. Ryan & Deci, 2001). For example, situations that might make us happy (e.g., skipping sport practice to go to a movie) may not be good for our development in the long run. Eudaimonic well-being involves personal growth rather than short-term pleasures. The eudaimonic approach is complex and hard to operationalize, which is why it hasn't been studied to the extent that hedonic well-being has. Ryan and Deci (2001) recommend studying *both* hedonic and eudaimonic indicators to better understand the concept of well-being.

Deci and Ryan's (1985; R.M. Ryan & Deci, 2000, 2007) self-determination theory (SDT) defines well-being as optimal functioning and health, including indicators such as subjective vitality, satisfaction, and physical health. Well-being is enhanced when three basic psychological needs are satisfied: competence (feeling that one is good at a task), autonomy (feeling that a task is self-endorsed), and relatedness (feeling a sense of belonging). Thus, Ryan and Deci (2000, 2007) view psychological need satisfaction as key in promoting well-being.

Ryff and Singer (1998, 2008; Keys, Shmotkin, & Ryff, 2002), by contrast, view the psychological needs as aspects of well-being rather than as predictors. They identify six indicators of eudaimonic well-being: (a) *autonomy*, or acting from within and resisting social pressures, (b) *positive relationships with others*, or being capable of empathy and affection and understanding the give-and-take of relationships, (c) *environmental mastery*, or having a sense of competence in managing the environment and making effective use of opportunities, (d) *self-acceptance*, or having a positive attitude toward the self, (e) *purpose in life*, or having goals and a sense of directedness, and (f) *personal growth*, or seeing oneself as continually growing and developing. The first three indicators parallel R.M. Ryan and Deci's (2000) psychological needs (i.e., autonomy, relatedness, and competence). The second three indicators are consistent with SDT's view of optimal functioning and growth. While Ryan and Deci and Ryff and Singer share similar views on some indicators of well-being, their placement of the psychological needs is what sets them apart.

Taking a different approach, Waterman (1993) has studied differences between hedonic and eudaimonic well-being. His approach focuses on hedonic enjoyment and *his* view of eudaimonia—personal expressiveness. Personal expressiveness includes doing activities that make one feel alive, engaged, fulfilled, and like their true self. Waterman views eudaimonic well-being as specific to certain activities (e.g., vitality while doing gymnastics) while Deci and Ryan and Ryff and Singer focus on a general sense of well-being (Deci & Ryan, 2008; Ryff & Singer, 2008; Waterman, Schwartz, & Conti, 2008). Thus, these researchers share some similar views regarding the well-being concept, but their differences have implications for operational definitions in well-being research.

In the present studies, I define well-being as a combination of hedonic, eudaimonic, and health aspects, which is consistent with the self-determination theory approach (R.M. Ryan & Deci, 2000). It is important to use well-being indicators that are relevant to the population of interest. For example, adolescent girls are at risk for declining self-esteem and physical activity (e.g., Harter, 1999; Horn, 2004; Pate et al., 2009). In the present studies, a purposeful sample of female adolescent gymnasts was chosen based on their risk for lower well-being. Gymnasts undergo rigorous training, evaluative judging, and pressure to maintain a lean body, which puts them at risk for low self-perceptions, low positive affect, and disordered eating (Iversen, 1990; Krane, Greenleaf, & Snow, 1997; Sundgot-Borgen & Torstveit, 2010). Thus, in the present studies positive affect represented hedonic well-being, self-esteem represented eudaimonic well-being, and eating attitudes and behaviors and physical activity represented the physical health aspect of well-being.

Self-esteem and positive affect are important well-being indicators for adolescent girls. Self-esteem is a broad evaluation concerning one's value as a person, such as, "Am I happy with myself as a person? Do I like how I'm living my life?" Girls tend to have lower self-esteem than boys, and their level of self-esteem declines throughout adolescence (Harter, 1999; Horn, 2004; Inchley, Kirby, & Currie, 2011). Because low self-esteem may have negative consequences for emotions, it is also important to study determinants of adolescent girls' affective states (Crocker, Hoar, McDonough, Kowalski, & Niefer, 2004; Harter, 1999). Affect is a global feeling state that can vary in tone (pleasant to unpleasant) and intensity (low to high); positive affect indicates the degree to which a person feels joy and enthusiasm whereas negative affect reflects the degree to which a person feels displeasure and distress.

Disordered eating is a salient well-being indicator for adolescent gymnasts because of the sport's emphasis on leanness. Disordered eating encompasses psychological and physical well-being and includes symptomatic attitudes and behaviors such as dieting and guilt after eating. Female athletes display a greater prevalence of disordered eating than female non-athletes, and athletes in sports that emphasize leanness report greater disordered eating than those in other sports (Hausenblas & Carron, 1999; Krentz & Warschburger, 2011; Sundgot-Borgen & Torstveit, 2010). In a study assessing female high school athletes from a variety of sports, 18.2% met criteria for disordered eating (Nichols, Rauh, Lawson, Ji, & Barkai, 2006). Thus, it is important to understand factors that promote healthy eating attitudes and behaviors among female adolescent athletes.

Physical activity level is another important aspect of girls' health and well-being. Activity levels decline across the adolescent years and sedentary youth are likely to become sedentary adults, so it is important to keep kids active throughout adolescence (Corbin, Pangrazi, & Le Masurier, 2004; Pate et al., 2009). It is likely that youth sport participants who grow to value being active will engage in physical activity outside of their sport sessions and continue to be active into adulthood. Thus, I examined physical activity *outside of gymnastics* as an indicator of female adolescent gymnasts' well-being.

In sum, well-being is a broad, complex construct that is defined and measured in various ways. The present studies aim to explore predictors of developmentally appropriate well-being indices for female adolescent gymnasts. The following section reviews conceptual approaches for studying determinants of adolescent well-being in the physical domain.

### Conceptual Frameworks for Understanding Determinants of Adolescent Well-Being

Several theoretical conceptual frameworks can be used to enhance our understanding of how to promote youths' well-being in physical activity contexts. Each of the following frameworks views well-being as an important topic of study, but they use differing terminology such as adaptive outcomes, optimal functioning, positive development, and mental health. Self-determination theory is the framework chosen for the present studies, and prevention science and positive youth development are complementary approaches to understanding well-being among adolescents.

### *Self-Determination Theory*

Self-determination theory (SDT; Deci & Ryan, 1985; R.M. Ryan & Deci, 2000, 2007) is the framework chosen for the present studies because it presents predictors of well-being that are applicable to the physical domain and to adolescent physical activity participants (see Gagné & Blanchard, 2007). SDT has been used to study motivation and psychological functioning and is described by Deci and Ryan as organismic and dialectic. In other words, humans are active agents in their lives and strive to grow and reach their potential. In addition, the social environment can either promote or suppress one's growth and development. Thus it is the combination of individual and social factors that affect one's psychological growth (defined as intrinsic motivation, or doing an activity for inherent enjoyment) and well-being (defined as health and optimal functioning).

According to SDT, satisfaction of three basic psychological needs contributes to one's motivation and well-being. Perceiving that one is good at a task satisfies the need for *competence*. The need for *autonomy* is fulfilled when one feels that a task is self-endorsed or freely chosen. The need for *relatedness* is enhanced when one feels a sense of belonging or connectedness when participating in an activity. The three needs are universal, meaning that humans of all cultures and developmental stages have been found to strive for satisfaction of competence, autonomy, and relatedness (R.M. Ryan & Deci, 2000, 2007).

In the physical domain, sport coaches and physical education instructors are sources of social influence that provide informational and autonomous cues to youth. Researchers have used SDT to study relationships among coach or teacher behaviors,



competence and autonomy need satisfaction, and intrinsic motivation (Amorose & Horn, 2000, 2001; Ferrer-Caja & Weiss, 2000, 2002; Whitehead & Corbin, 1991). In two studies, Amorose and Horn found that coaches who exhibit greater frequencies of positive, encouraging, and informational feedback and democratic behavior (e.g., provide athletes with choices) are associated with college athletes who report greater perceptions of competence and intrinsic motivation. In another set of studies, Ferrer-Caja and Weiss found that a learning climate (e.g., PE teachers who emphasized effort and self-improvement) indirectly predicted high school students' perceived competence through task orientation. Teacher non-directiveness (e.g., teachers who gave students a role in decision-making) positively predicted perceived autonomy. In turn, greater perceived competence and autonomy were associated with greater intrinsic motivation. Taken together, coaches and teachers who emphasize positive, informational feedback and self-improvement and provide students a role in decision-making can facilitate youths' intrinsic motivation through effects on perceived competence and autonomy.

Other studies in the physical domain have extended the research on social influences and motivation by examining *self-determined* motivation, or participating for self-chosen reasons. Coaches and teachers who emphasize informational feedback and self-improvement and provide opportunities for choices are associated with greater self-determined motivation for youth (Amorose & Anderson-Butcher, 2007; Cox, Duncheon, & McDavid, 2009; Kipp & Amorose, 2008; Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002; Standage, Duda, & Ntoumanis, 2006). For example, Amorose and Anderson-Butcher found that perceptions of greater coaches' autonomy-supportive behaviors (e.g.,

providing athletes with choices and encouragement) were positively related to high school and college athletes' perceptions of competence, autonomy, and relatedness, and in turn self-determined motivation. Results of these studies reinforce the importance of the social context (e.g., coaches) in promoting psychological need satisfaction and self-determined motivation among young physical activity participants.

Basic needs theory, a subtheory of SDT, emphasizes the importance of perceived competence, autonomy, *and* relatedness to promote growth, integration, and well-being (e.g., health and optimal functioning). Conversely, when need satisfaction is hindered, ill-being and pathology will occur (R.M. Ryan & Deci, 2000, 2007). In mainstream psychology, various hedonic and eudaimonic well-being indicators have been assessed using SDT as a framework, such as self-esteem, subjective vitality, anxiety, physical illness symptoms, depression, life satisfaction, and positive and negative affect (e.g., Brown & Ryan, 2003; Deci et al., 2001; Huta & Ryan, 2010; La Guardia, Ryan, Couchman, & Deci, 2000; R.M. Ryan, Bernstein, & Brown, 2010). Well-being has been measured with different indicators depending on the study purpose, but collectively results show that psychological need satisfaction is a consistent predictor of well-being.

According to SDT, aspects of the social environment can enhance or suppress one's psychological need satisfaction and well-being. In the physical domain, coaches are an important part of the social context because they can structure practices in ways that help youth feel competent in their skills, empowered to make decisions, and connected to their team, which should ultimately enhance youths' well-being (Amorose, 2007; Gagné & Blanchard, 2007). SDT has recently been used to study coach influence and

adolescents' well-being (Adie, Duda, & Ntoumanis, 2012; Blanchard, Amoit, Perreault, Vallerand, & Provencher, 2009; Gagné, Ryan, & Bargmann, 2003; Quested & Duda, 2010, 2011; Reinboth, Duda, & Ntoumanis, 2004; Standage & Gillison, 2007; Standage, Gillison, Ntoumanis, & Treasure, 2012). Gagné et al. found that coaches' autonomy-support was positively associated with 7–18 year-old gymnasts' sense of autonomy and relatedness. In addition, perceptions of competence, autonomy, and relatedness during practice predicted increases in well-being from pre- to post-practice. Quested and Duda (2010) found that adolescent and emerging adult dancers' perceptions of a higher mastery climate and greater autonomy-support from the teacher were associated with greater psychological need satisfaction, and a higher performance climate was associated with lower perceived competence and relatedness. In turn, greater need satisfaction was associated with higher positive affect. Collectively, studies show that coaching styles and behaviors are associated with psychological need satisfaction and well-being.

Self-determination theory has been productive for studying relationships between social influences and adolescents' motivation and well-being (Weiss, Amorose, & Kipp, 2012). While the majority of SDT research has examined motivation as an outcome, more recent studies have used basic needs sub-theory to uncover determinants of well-being. More research is needed on determinants of well-being for diverse groups of participants because there may be variations in well-being based on gender, sport type, age, and ethnicity. The present studies use SDT as a framework to explore social influences and well-being among female adolescent gymnasts, who are at risk for declining well-being. Thus, the present studies contribute to the literature on predictors of

well-being specific to gender, age, and sport type. Next, two complementary frameworks are described as alternative approaches for understanding well-being among youth physical activity participants, in an effort to be inclusive of appropriate conceptual approaches.

### *Positive Youth Development*

Positive youth development (PYD) is another relevant framework for studying adolescent well-being. A PYD perspective treats youth as resources and focuses on youths' strengths, interests, and potential, rather than treating them as problems to be fixed (Damon, 2004; Lerner, Almerigi, Theokas, & Lerner, 2005; Roth & Brooks-Gunn, 2003). Successful PYD programs should help youth develop skills and competencies (e.g., goal-setting, emotion regulation, cooperation) that can be used in many life domains (e.g., sports, school, social relationships) and can help youth contribute positively to society. Regarding positive youth development programs, O'Connell, Warner, and Boat (2009) state: "Acquisition of competence in these areas requires young people to adapt to the demands of salient social contexts and to attain a positive sense of identity, efficacy, and well-being" (p. 75). In other words, when developmental competencies and skills are promoted, positive development and enhanced well-being occur. Therefore, PYD programs can be structured to promote indices of well-being, such as self-esteem, positive emotions, and physical activity level.

Common features of successful PYD programs include a focus on developing assets or competencies, positive and supportive interactions with adults and peers, and a

structured environment that is safe and empowering (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2004; Lerner et al., 2005; Roth & Brooks-Gunn, 2003). For example, Roth and Brooks-Gunn recommend that youth programs include supportive environments that promote multiple skill-building experiences, and Catalano and colleagues cited healthy bonding with adults and peers; strengthening social, emotional, behavioral, and cognitive competencies; and structured, consistent program delivery. It is clear that purposeful programs with caring adults who teach youth skills and competencies are keys to promoting adolescents' well-being.

Several scholars have translated PYD concepts to the physical domain. Petitpas, Cornelius, Van Raalte, and Jones (2005) presented three key aspects for sport-based PYD programs: a safe and motivating *context*, *external assets* (e.g., caring adults and positive social interactions), and *internal assets* (e.g., life skills, developmental competencies). Assets that are potentially learned in youth sport programs, such as emotion management and social competence, should transfer to other domains such as academic and social settings. For example, youth who learn cooperation and getting along with others on the field can also display social competence at school. While many PYD researchers specify psychological (e.g., positive affect, stress relief, self-esteem) and social assets (e.g., feelings of social acceptance, leadership, teamwork), M.R. Weiss and Wiese-Bjornstal (2009) argue that physical activity-based youth development programs have the potential to promote psychological, social, *and* physical assets, such as motor skill competencies, physically active lifestyles, physical fitness, physical health. This makes the physical domain a unique context for promoting youth development and well-being.

Youth development programs such as school, club, and recreational sports have the potential to promote positive developmental outcomes and well-being (e.g., Bruening, Dover, & Clark, 2009; Fraser-Thomas, & Côté, 2009; Gano-Overway et al., 2009; Petitpas, Van Raalte, Cornelius, & Presbrey, 2004). For example, Gano-Overway and colleagues used the PYD framework to study caring climate and prosocial behaviors among 9–16 year-old underserved boys and girls participating in a 5-week physical-activity-based summer camp. Perceptions of a caring climate (i.e., a context of support, acceptance, and respect) were positively related to efficacy to regulate emotions and efficacy to empathize with others. In turn, youth who reported greater empathic efficacy beliefs reported greater prosocial behaviors such as helping and being nice to others. PYD studies have shown support for physical activity as a context for promoting youth development (e.g., positive self-perceptions and emotions, character, self-determined motivation and persistence, and positive relationships with significant others) (M.R. Weiss, 2008; M.R. Weiss, Kipp, & Bolter, 2012).

Although organized youth sports can promote positive psychosocial outcomes, negative aspects of sport participation have been documented as well. Negative psychological, social, and physical aspects include stress and burnout (Coakley, 1992; Gould, 1993; Passer, 1988); poor relationships with and pressure from parents, coaches, and peers (Fraser-Thomas & Côté, 2009; Krane, Greenleaf, & Snow, 1997); low self-esteem, poor body image, disordered eating, and menstrual dysfunction for girls (Iversen, 1990; M.R. Weiss, Amorose, & Allen, 2000); poor sportsmanship (M.R. Weiss, Smith & Stuntz, 2008); and non-self-determined participation motives and dropout (Klint &

Weiss, 1986; M.R. Weiss & Williams, 2004). For example, Fraser-Thomas and Côté interviewed adolescent competitive swimmers about their positive and negative experiences in sport. Youth reported several positive experiences but also some negative experiences, such as coaches who were intimidating and modeled poor work ethic, peer rivalries and jealousy, and pressure from parents, leading to feelings of stress and low self-esteem. Results point to the important role of the sport context for youths' positive or negative developmental outcomes.

Because both positive and negative outcomes are associated with youth sport participation, it is important to determine which factors *promote* development and well-being and which factors *prevent* negative outcomes. The next section addresses the importance of both promotion and prevention in understanding youths' well-being.

### *Prevention Science*

Prevention science is a complementary framework for studying well-being among adolescents. Prevention science is an interdisciplinary field focused on preventing unhealthy, maladaptive behaviors and promoting healthy, adaptive outcomes (Coie et al., 1993; O'Connell, Boat, & Warner, 2009). Prevention science scholars have shifted away from the traditional disease model to one that includes both prevention *and* promotion. Recently, O'Connell and colleagues provided a definition of mental health promotion:

Mental health promotion includes efforts to enhance individuals' ability to achieve developmentally appropriate tasks (developmental competence) and a

positive sense of self-esteem, mastery, well-being, and social inclusion and to strengthen their ability to cope with adversity. (p. 67)

Thus, well-being is viewed as an important outcome of mental health promotion.

Prevention science proponents support the view that preventive efforts can tap into promotive factors for youth and, similarly, promotion of adaptive outcomes can concurrently prevent negative behaviors. For example, Catalano, Hawkins, Berglund, Pollard, and Arthur (2002) describe the complementary qualities of prevention science and positive youth development approaches. They argue that a focus only on preventing disorders may not tap into factors that help youth thrive and, at the same time, a focus on positive factors alone may not be enough to reduce youths' risk for negative outcomes.

Prevention interventions may move youth toward an adaptive pathway that will help them navigate many life contexts (Masten & Coatsworth, 1998; O'Connell, Boat, & Warner, 2009). In other words, youth prevention interventions can get participants on the right track to achieve well-being and success in life. Specifically, prevention efforts can help adolescents achieve developmentally appropriate tasks, such as getting along with peers, forming close friendships, attaining a positive sense of self, and engaging in prosocial conduct (Masten, Burt, & Coatsworth, 2006). Effective development in these age-relevant tasks is known as *competence* in a broad sense (Masten & Coatsworth, 1998). Developing competence in early age-relevant domains is associated with competence later in life. For example, Masten et al. (1995) conducted a longitudinal study assessing competence in several domains from late childhood (ages 8–12) to late adolescence (ages 18–23). Results showed that academic competence in late childhood



predicted academic and job competence in late adolescence; behavioral conduct in late childhood predicted behavioral conduct and job and academic competence in late adolescence; and social competence in late childhood predicted social and romantic competence in late adolescence. Thus, higher competence during childhood prepares youth to be competent later in life.

Quality interventions and youth programs can promote competence and other positive mental, emotional, and behavioral outcomes (Coie et al., 1993; Nation et al., 2003; Weissberg, Kumpfer, & Seligman, 2003). Weissberg et al. report key characteristics of successful prevention programs for youth: research-based; long term, age specific, and culturally appropriate; teaches healthy development through social-emotional skills (e.g., emotion management, goal-setting); and promotes positive relationships with peers and adults. According to Coie and colleagues, prevention research should consider interactions between individuals and their environments and across periods of time. Thus, researchers interested in promoting well-being among youth should assess age-relevant individual and social factors and study outcomes over time to determine changes and varying importance of predictors.

Prevention science is relevant for studying well-being among adolescents in *physical activity* contexts because it emphasizes holistic health, or the idea that mental and physical health are inseparable (O'Connell, Boat, & Warner, 2009). For example, youth who are regularly physically active should display positive emotions, self-esteem, and perceived competence in physical skills, and youth who display a positive mental

state should also be physically healthy. Thus, physical activity participation has the potential to promote holistic well-being (i.e., psychological, social, and physical health).

Determining how to promote well-being and prevent ill-being can help researchers and practitioners understand how to enhance youths' physical activity experiences. In line with prevention science, positive youth development, and self-determination theory, the social context (e.g., coach and peer behaviors) is an important mechanism to promote well-being. Research on coach influence and youths' positive psychosocial outcomes is described in the following section.

### Coach Influence and Adolescents' Well-Being

*"I was told I was never going to make it in life because I was going to be fat. I mean in life. Things I'll never forget."* (J. Ryan, 1995, p. 10)

This quotation by former elite gymnast Kristie Phillips provides anecdotal evidence of the strong impact coaches can have on athletes' frame of mind. Some coaches believe "their job is not to turn out happy, well-adjusted young women; it is to turn out champions" (J. Ryan, 1995, p. 11). However, many educators believe it *is* the coach's job to promote the well-being of their athletes so youth can reap the benefits of sport throughout their lives (e.g., Smoll & Smith, 2002). Researchers have studied relationships between coach influence and psychosocial outcomes in the physical domain using several approaches (see Amorose, 2007; Horn, 2008, for reviews). Mechanisms of

influence include feedback and reinforcement, decision-making and interpersonal style, and motivational climate.

### *Feedback and Reinforcement*

*“You would do anything for that smile, that pat on the head,” Kristie Phillips says. And there is no creature on earth more desperate for approval than a girl inching toward puberty . . . She is the perfect clay with which coaches can create the ideal gymnast. (J. Ryan, 1995, p. 205)*

Like Kristie Phillips, athletes often seek their coach’s approval and feedback. Feedback can be informational, such as technical instruction on how to improve a performance, or motivational, such as encouragement and reinforcement after a performance (Smoll & Smith, 2002). The quantity and quality of feedback and reinforcement by coaches can shape young athletes’ experiences in a positive or negative way (Amorose, 2007; Horn, 2008; Smoll & Smith, 2002). R.E. Smith and Smoll’s line of research on coach feedback and reinforcement spans more than three decades and has provided a basis for other studies on coach influence. This research started with observations of coach behaviors. After extensive coach observations and content analysis, Smith, Smoll, and Hunt (1977) developed the Coaching Behavior Assessment System (CBAS) as a way to measure coach behaviors (e.g., reinforcement, mistake-contingent encouragement, punishment, punitive technical instruction).

Subsequent research assessed observed coach behaviors, coach perceptions of their own behaviors, and player perceptions of coach behaviors (Smith, Smoll, & Curtis, 1978; Smith, Zane, Smoll, & Coppel, 1983; Smoll, Smith, Curtis, & Hunt, 1978). In general, coaches who displayed higher levels of reinforcement for desirable performance and effort, and who responded more frequently to mistakes with encouragement and instruction, were associated with athletes with the most positive outcomes (e.g., liked their coaches and teammates more, had more fun). An interesting finding was that athletes' perceptions of their coaches' behaviors were more strongly related with observational ratings than were coaches' perceptions of their own behaviors. These findings highlight the need to assess youths' perceptions of their coaches' behaviors and how those perceptions relate to psychosocial outcomes. Based on observational and correlational studies, R.E. Smith, Smoll, and Curtis (1979) formulated guidelines for coaching that they incorporated into a coach-training program called Coach Effectiveness Training (CET). The four key behaviors emphasized in CET are: reinforcement for effort and good performance, mistake-contingent encouragement, corrective instruction (given in a supportive manner), and technical instruction. Coaches were also encouraged to decrease their use of nonreinforcement, punishment, and punitive instruction.

Smith, Smoll, and colleagues have conducted intervention studies using CET workshops and assessing young players' psychosocial and behavioral outcomes (Barnett, Smoll, & Smith, 1992; Smith, Smoll, & Barnett, 1995; Smith, Smoll, & Cumming, 2007; Smith, Smoll, & Curtis, 1979; Smoll, Smith, Barnett, & Everett, 1993). For example, the 1979 study involved 31 Little League baseball coaches who were randomly assigned to a

CET group or a control group. The CET group completed a preseason workshop where they learned about the coaching guidelines, and they completed self-monitoring forms throughout the season to increase self-awareness of their behaviors. At the end of the season, observational data with coaches and survey responses of 325 youth confirmed that the CET coaches displayed more frequent reinforcement for good performances and effort, responded to mistakes with more encouragement and instruction, and showed fewer punitive responses than the control group. Youth who played for the CET coaches showed more positive psychosocial outcomes, including intention to return the next year and greater liking for teammates and coaches. Other adaptive outcomes include reduction in anxiety levels and lower attrition rates for youth in experimental groups (Barnett et al., 1992; Smith et al., 1995; Smith et al., 2007). In sum, coaches' performance feedback and social reinforcement influence youths' self-perceptions, emotions, and motivated behaviors.

Coaches' feedback and reinforcement patterns have also been studied with other youth sport populations (Allen & Howe, 1998; Amorose & Horn, 2000; Black & Weiss, 1992; Coatsworth & Conroy, 2006; Horn, 1985; M.R. Weiss, Amorose, & Wilko, 2009). For example, Horn studied observed coach behaviors and perceptions of competence among 12–15 year-old softball players and their coaches over the course of a season. Results showed that greater reinforcement by coaches was negatively associated with athletes' perceptions of competence, and greater criticism by coaches was positively associated with athletes' perceptions of competence. These counterintuitive findings were explained in terms of contingent feedback. Criticism included instructions for future

performance that communicate to the athlete that she has the potential to improve, resulting in higher perceived competence. Reinforcement included praise that may not have been contingent on athlete performance. When players receive noncontingent praise, they may doubt their ability to improve and experience reduced perceived competence.

Black and Weiss (1992) replicated and extended Horn's research by assessing male and female adolescent swimmers' perceptions of coach behaviors and their motivational outcomes. For 12-18 year-olds, perceptions of more frequent information following desirable performances and encouragement plus corrective instruction following performance errors were related to higher perceived competence, intrinsic motivation, effort, and enjoyment. Black and Weiss also found that perceived criticism by coaches (i.e., a negative remark) was related to lower perceived competence for the older athletes. Results support Horn's findings that contingent reinforcement combined with instruction are positively related to motivational outcomes.

Overall, studies show that when coaches provide reinforcement specific to athletes' behaviors, information to help athletes improve, and sincere encouragement following skill errors, athletes report higher self-perceptions, enjoyment, and self-determined motivation. Thus, quality feedback and reinforcement from coaches contributes to well-being indicators that are important for female adolescents—self-esteem and positive emotions.

*Decision-Making and Interpersonal Style*

*“Every day you have to push them beyond what they think they can do,” [Kelli Hill] says. But it requires knowing one’s athlete well enough to read her face and her body language for clues to her state of mind. (J. Ryan, 1995, p. 220)*

This quotation demonstrates Kelli Hill’s (coach of former Olympic gymnast Dominique Dawes) decision-making and interpersonal coaching style. She acknowledges athletes’ feelings and gets to know them as individuals to help them succeed (see Amorose, 2007; Horn, 2008). Decision-making styles include autocratic and democratic forms. A democratic style enables athletes to take part in decisions regarding team goals, practices, and competition strategies. A coach exhibiting an autocratic style takes complete authority for making decisions and does not invite athlete input (Chelladurai, 2007). Coaches who primarily exhibit a democratic style are associated with athletes who report positive psychosocial outcomes such as perceived competence, autonomy, enjoyment, and intrinsic motivation (e.g., Amorose & Horn, 2000, 2001; Hollembeak & Amorose, 2005; Koka & Hagger, 2010; Price & Weiss, 2000). For example, Price and Weiss found that high school athletes’ perceptions of greater democratic behaviors and fewer autocratic behaviors by the coach were associated with higher perceived competence and enjoyment and lower anxiety and burnout.

Interpersonal style is a broader construct than decision-making style in that it encompasses how the coach interacts with athletes rather than simply the amount of

choice allowed. The two main styles that have been studied are autonomy-supportive and controlling (see Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2009; Deci & Ryan, 1987; Mageau & Vallerand, 2003 for reviews). Autonomy-supportive coaching involves providing athletes with choices within limits, a rationale for activities and rules, and opportunities to develop initiative; acknowledging athletes' feelings; and avoiding guilt-induced criticism. A controlling style involves using rewards to control behaviors, giving overly critical feedback, ignoring athletes' perspectives, engaging in intimidation behaviors, and emphasizing social comparison as a measure of success.

Studies consistently show that perceptions of a higher autonomy-supportive style are associated with greater perceived competence, autonomy, relatedness, self-determined motivation, enjoyment, effort, and persistence (Amorose & Anderson-Butcher, 2007; Lim & Wang, 2009; Ntoumanis, 2005; Pelletier, Fortier, Vallerand, & Briere, 2001; Shen, McCaughtry, Martin, & Fahlman, 2009; Standage, Duda, & Ntoumanis, 2006; Taylor & Lonsdale, 2010). For example, Pelletier et al. found that higher perceptions of coach autonomy-supportive behaviors were associated with greater self-determined motivation and persistence, whereas perceptions of higher coach controlling behaviors were associated with non-self-determined forms of motivation and attrition among 13–22 year-old competitive swimmers. Studies on interpersonal style reinforce the psychosocial benefits of playing for coaches who provide athletes with choice within limits and avoid the use of excessive control and criticism.

Interpersonal style has also been studied in relation to well-being indicators such as positive affect and self-esteem. Studies show a positive relationship between



autonomy-supportive coach behaviors with self-esteem and positive affect and a negative relationship between controlling behaviors and well-being (Blanchard et al., 2009; Coatsworth & Conroy, 2009; Gagné et al., 2003; Quested & Duda, 2010; Standage & Gillison, 2007; Standage et al., 2012). Blanchard and colleagues found that higher perceptions of coaches' controlling style were related to lower perceived autonomy for adolescent and emerging adult basketball players. Coach controlling behaviors showed negative, indirect relationships with positive emotions and satisfaction through mediation of perceived autonomy. In sum, when coaches provide athletes with encouragement, understanding, and opportunities for taking initiative and making decisions during practice and competition, athletes report greater self-perceptions, self-determined motivation, positive emotions, and persistence.

### *Motivational Climate*

*She might be the least talented, but she possessed the qualities he wanted to reinforce in his star: hard work, discipline and stoicism. Karolyi would praise her lavishly and hold her up as an example, angering the more talented gymnasts, who resented the favoritism. Anger, Karolyi knew, was a powerful motivator. (J. Ryan, 1995, p. 211)*

In this excerpt, coach Karolyi structures his practices to emphasize social comparison and invoke rivalry among teammates. These behaviors create an ego-involving or performance climate in the gym, which has implications for the girls' well-

being. The motivational climate refers to how success is defined in a social context (e.g., sport team) (Ames, 1992; Harwood, Spray, & Keegan, 2008). Coaches who define success in self-referenced ways such as learning, improvement, and reaching self-set goals create a mastery motivational climate. In a mastery climate, mistakes are seen as part of learning, and effort is viewed as the key to success. Coaches who define success in norm-referenced ways such as winning and outperforming others create a performance motivational climate. Coaches create a motivational climate through how they structure practices, make decisions, and evaluate participants' performance.

Researchers have examined relationships between perceptions of the motivational climate and youths' psychosocial outcomes. A higher mastery climate is associated with greater perceptions of competence, autonomy, relatedness, self-determined motivation, and persistence in physical activity (Ferrer Caja & Weiss, 2000, 2002; Kipp & Amorose, 2008; Ntoumanis, 2001; Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002; Standage, Duda, & Ntoumanis, 2003; M.R. Weiss, Amorose, & Wilko, 2009). For example, Kipp and Amorose surveyed female adolescent athletes from a variety of sports and found that perceptions of a higher mastery climate were positively related to perceived competence, relatedness, and self-determined motivation; and perceptions of a higher performance climate were negatively related to perceived autonomy and relatedness.

Motivational climate has also been investigated in relation to well-being outcomes such as affect, self-esteem, and disordered eating among adolescent sport participants. Greater perceptions of a mastery climate are associated with higher positive affect, self-esteem, and physical activity; and greater perceptions of a performance climate are

associated with higher disordered eating (de Bruin, Bakker, & Oudejans, 2009; Parish & Treasure, 2003; Quested & Duda, 2010; Reinboth & Duda, 2004). de Bruin and colleagues found that perceptions of a higher performance climate were related to lower self-esteem and more frequent dieting among female adolescent gymnasts and dancers. Perceptions of a higher mastery climate were associated with higher self-esteem and less frequent dieting. Findings highlight the potential of a performance climate to evoke disordered eating due to social comparison and pressure to be successful (which has been associated with weighing less).

Intervention studies have provided further support for the positive effects of a mastery climate on youths' cognitive, affective, and behavioral outcomes (R.E. Smith, Smoll, & Cumming, 2007; Theeboom, De Knop, & Weiss, 1995). For example, Theeboom et al. randomly assigned 8–12 year-old youth to an experimental (mastery climate) or control group (traditional) during an organized sports program. Both groups participated in a 3-week martial arts session. The experimental group instructor emphasized elements of a mastery climate, such as recognizing effort and improvement, using a variety of tasks with developmental skill progressions, providing participants with choices of exercises, and incorporating partner and group tasks. The control group instructor engaged in behaviors such as recognizing successful skill performances, using basic drills, and taking on all decision-making himself. At the end of the intervention, youth in the mastery group reported significantly greater enjoyment and were rated higher in physical skills compared to the control group. Interview responses revealed that mastery group participants reported high levels of competence and intrinsic motivation.

Collectively, studies demonstrate that coaches can influence diverse aspects of adolescents' well-being. Contingent and positive feedback and reinforcement, technical instruction, and encouragement are associated with greater perceived competence, enjoyment, self-esteem, and intrinsic motivation among youth athletes. Autonomy-supportive behaviors and a democratic decision-making style are related to higher self-perceptions, self-determined motivation, enjoyment, and persistence. A mastery climate is related to higher self-determined motivation, enjoyment, and self-perceptions; more healthy eating attitudes and behaviors; and more frequent physical activity. In contrast, greater criticism, controlling behaviors, autocratic decision-making style, and a performance climate are negatively related to athletes' self-perceptions, enjoyment, self-determined motivation, and persistence. While coaches are an important part of the social context, peers in the physical domain can promote positive outcomes as well.

### Peer Influence and Adolescents' Well-Being

Youths' interactions with teammates have important implications for their well-being (A.L. Smith, 2003, 2007; M.R. Weiss & Stuntz, 2004). As youth enter adolescence, they place greater importance on using peers to judge their sport ability (i.e., peer comparison and evaluation), making peers an important source of competence information (see Horn & Amorose, 1998). Sport settings provide opportunities for children to form companionships with youth of similar interests, and coaches can foster the learning of social skills such as cooperation, leadership, and conflict resolution. Thus,

youth sport is an appropriate setting in which to study the development and benefits of peer relationships. In this section, research on peer influence is presented, including peer acceptance, close friendship, social support.

Peer influence in the physical domain has been studied using two key constructs: peer acceptance and close friendship. Peer acceptance refers to one's popularity or status in a group of others of equal age, standing, or level; and close friendship refers to a mutual, dyadic peer relationship including such characteristics as loyalty, similar interests, and emotional support (A.L. Smith, 2003, 2007; M.R. Weiss & Stuntz, 2004). Feelings of acceptance by a peer group and sharing a close friendship are associated with positive self-perceptions, enjoyment, and physical activity level (e.g., Cox, Duncheon, & McDavid, 2009; Cox & Ullrich-French, 2010; McDonough & Crocker, 2005; A.L. Smith, 1999; A.L. Smith, Ullrich-French, Walker, & Hurley, 2006; Ullrich-French & Smith, 2006, 2009; M.R. Weiss & Duncan, 1992; M.R. Weiss & Smith, 1999, 2002). For example, Weiss and Smith (2002) showed that higher friendship quality was associated with greater enjoyment and commitment to continued participation among adolescent tennis players. A.L. Smith et al. studied peer relationship profiles among adolescents from a variety of sports. Youth who reported adaptive peer profiles (i.e., higher friendship quality and peer acceptance) reported greater perceived competence, enjoyment, and self-determined motivation compared to those who reported lower friendship quality and peer acceptance. Collectively, studies show that when youth feel accepted by their peers and have a close friendship on their team, they report greater self-perceptions, positive emotions, motivation, and physical activity.

Social support is another mechanism by which peers can affect each others' well-being. Social support in physical domains includes the amount of caring, encouragement, and information that a person receives from others (Lox, Martin Ginis, & Petruzzello, 2010). Youth who report greater social support from peers report higher enjoyment, motivation, and physical activity behavior (Cox & Ullrich-French, 2010; Duncan, 1993; Garcia Bengoechea & Streaan, 2007; Sabiston & Crocker, 2008; Stuntz & Spearance, 2010; M.R. Weiss & Smith, 1999, 2002; W.M. Weiss & Weiss, 2003, 2006, 2007). For example, Sabiston and Crocker found that greater emotional support by a best friend (i.e., encouraging physical activity) was associated with higher perceived competence and physical activity level among adolescents. In a qualitative study, Garcia Bengoechea and Streaan interviewed adolescent sport participants on sources and processes of interpersonal support. Participants reported teammates as sources of companionship, informational, and emotional support, meaning they engaged in activities together, provided advice and guidance, and reassured each other in physical activity. These peer behaviors were identified as important for adolescents' motivation to participate in physical activity. These studies highlight social support as a viable way to promote positive psychosocial and behavioral outcomes in youth physical activity settings.

Several researchers have examined multiple social agents' influence on youths' well-being. Some studies have assessed influence by coaches and peers (Blanchard et al., 2009; Price & Weiss, 2012; Stuntz & Spearance, 2010); others have studied parents and peers simultaneously (Sabiston & Crocker, 2008; Ullrich-French & Smith, 2006, 2009); and a few have included the network of parents, coaches, and peers (Garcia Bengoechea

& Strean, 2007; W.M. Weiss & Weiss, 2003, 2006, 2007). Price and Weiss found that perceptions of greater coach transformational leadership behaviors (e.g., creating an inspirational vision, considering team members' individual needs) were uniquely related to female adolescent athletes' perceived competence, enjoyment, and collective efficacy, whereas perceptions of greater peer transformational leadership behaviors were uniquely associated with social cohesion. Studying multiple sources of social influence can be useful for deriving interventions to effect change in psychosocial and physical well-being.

Interventions that promote peer interactions are a promising way to foster adolescents' well-being through sport. For example, Ebbeck and Gibbons (1998) conducted an intervention where middle school physical education teachers were trained to use team-building challenges with their students throughout the school year. Team building activities (e.g., helping all group members swing, climb, and jump through an obstacle course) involved youth devising strategies to complete each task and then reflecting on issues like group involvement, cooperation, and communication. At the end of the intervention, boys and girls in the intervention group were significantly higher on perceptions of global self-worth, athletic competence, physical appearance, and social acceptance than the control group, who participated in regular physical education activities. In addition, female students in the intervention group were significantly higher on perceived academic competence and behavioral conduct than those in the control group. Gibbons, Ebbeck, Concepcion, and Li (2010) conducted a follow-up in which the same intervention was used with a large middle school sample and outcomes were

assessed at three rather than two time points. At the third time point, the experimental group was higher in global self-worth and perceived academic competence, social acceptance, athletic competence, and behavioral conduct compared to the control group. Thus, a physical activity-based intervention that required group interdependence and positive peer interactions was successful in modifying global and domain-specific self-evaluations.

In sum, research on peer influence in the physical domain shows that teammates make important contributions to youths' psychosocial outcomes. Greater peer acceptance, friendship quality, and social support are associated with higher perceptions of competence, enjoyment, self-esteem, self-determined motivation, and persistence. Thus, both peers and coaches are important social factors in the sport environment that can impact youths' well-being.

### Purpose of the Present Studies

The purpose of the present studies was to examine relationships among social influence, psychological need satisfaction, and female adolescent gymnasts' psychological and physical well-being, using self-determination theory (SDT) as a framework. Female adolescent gymnasts were the population of interest because they are at risk for declining well-being (Harter, 1999; Horn, 2004; Sundgot-Borgen & Torstveit, 2010). Coach and peer influence were included as social-contextual variables because coaches and peers are important sources of competence information for adolescents



(Horn & Amorose, 1998; Horn, Glenn, & Wentzell, 1993; M.R. Weiss, Ebbeck, & Horn, 1997). According to SDT, psychological need satisfaction mediates the relationship between social influence and well-being. Therefore, perceived competence, autonomy, and relatedness were included in the model. Figure 1 displays the hypothesized model of relationships.

In line with self-determination theory, I assessed eudaimonic, hedonic, and health indicators of well-being that are relevant for female adolescent gymnasts. Self-esteem represented eudaimonic well-being, positive affect represented hedonic well-being, and disordered eating and physical activity represented the health aspect of well-being. Put in simpler terms, these constructs make up psychological and physical well-being. These indicators are theoretically, developmentally, and practically relevant because of the risks associated with female adolescent gymnasts (e.g., Krane et al., 1997).

I included multiple social influences to examine differential associations of coach and peer behaviors with need satisfaction and well-being. Coach influences included motivational climate, autonomy-supportive behaviors, and controlling behaviors. Friendship quality was used to assess peer influence, as it has previously been linked with adolescents' perceived competence and enjoyment in sport (e.g., A.L. Smith et al., 2006; M.R. Weiss & Smith, 2002).

Physical maturity was included in the model to control for developmental differences in the sample of adolescent girls. Physical maturation is a developmental marker that is associated with lower self-perceptions for girls (e.g., Harter, 1999; Horn, 2004; Hunter Smart et al., 2012; Malina, 2002; Monsma, Malina, & Feltz, 2006).

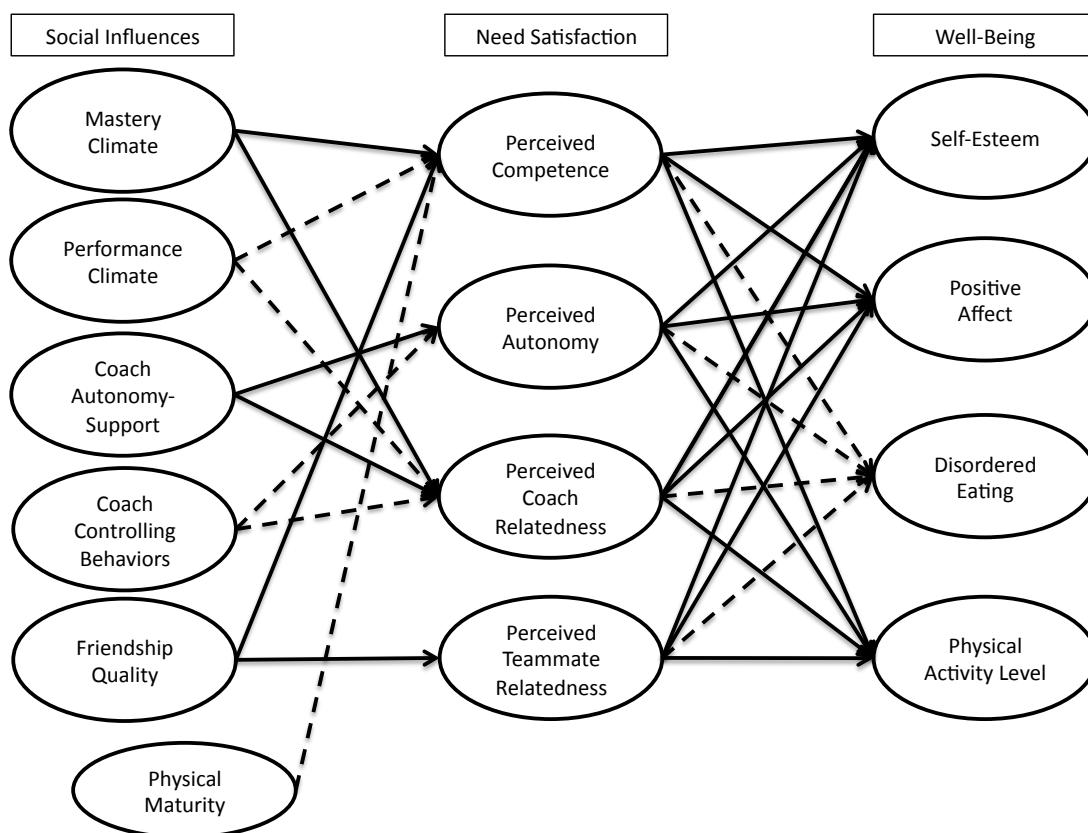


Figure 1. Hypothesized Model of Relationships  
 Note. Dashed lines represent negative relationships.

Monsma et al. found that self-perceptions varied with menarcheal status among 12–22 year-old female figure skaters. Pre-menarcheal girls reported greater perceived sport competence compared to post-menarcheal girls. Thus, in the present studies I hypothesized that physical maturity would be related to lower perceived competence (i.e., post-pubertal girls would report lower gymnastics ability).

Based on self-determination theory and previous research, I hypothesized that perceptions of coach and peer behaviors would be associated with psychological need satisfaction and, in turn, psychological and physical well-being. Specifically,

1. Mastery climate would be positively related to perceived competence and relatedness, autonomy-support would be positively related to perceived autonomy and relatedness, and friendship quality would be positively related to perceived competence and relatedness;
2. Performance climate would be negatively related to perceived competence and relatedness and coach controlling behaviors would be negatively associated with perceived autonomy and relatedness;
3. Greater psychological need satisfaction would be positively related to self-esteem, positive affect, and physical activity and negatively related to disordered eating; and
4. Coach and peer behaviors would be related to well-being indicators indirectly through need satisfaction. In other words, psychological need satisfaction would mediate the relationship between social factors and well-being.

The present studies extend past research in several ways. First, studying coach and peer influence simultaneously can determine the unique and combined relationships of social influences and athletes' need satisfaction and well-being. Second, these studies extend the recent research on well-being in youth sport and physical activity by uncovering determinants of psychological *and* physical well-being. Third, theoretical relationships were studied with female adolescent gymnasts, who are at risk for lower well-being. Fourth, concurrent *and* longitudinal relationships were analyzed in two studies with the same sample to determine strength of relationships over time.

## CHAPTER 2

### STUDY 1: RELATIONSHIPS AMONG SOCIAL INFLUENCES, PSYCHOLOGICAL NEED SATISFACTION, AND WELL-BEING

#### Method

##### *Participants*

Female gymnasts ( $N = 303$ ) ranged in age from 10 to 17 years ( $M = 13.0$ ,  $SD = 1.9$ ), trained year-round at clubs, and competed in USA Gymnastics-sanctioned meets. Girls started gymnastics participation at about age 4 ( $M = 4.6$ ;  $SD = 2.2$ ) and started competing around 8 years-old ( $M = 8.3$ ;  $SD = 1.6$ ). Gymnasts reported having trained with their current coach for 3.5 years ( $SD = 2.7$ ) and practiced an average of 15.5 hours per week ( $SD = 4.8$ ). Participants described themselves as White (86.7%), Multi-ethnic (5.0%), Asian (3.7%), African American (2.7%), Other (1.3%), Hispanic (0.3%), and Native American (0.3%).

Gymnasts of varying skill level and training commitment were included to represent a broad range of experiences rather than only an elite sample. Other inclusion criteria required that gymnasts had trained for at least 3 months with their current coach so they could accurately respond to questions about their coach's behaviors and other aspects related to their gymnastics experiences. Three months was deemed appropriate because a majority of gymnasts, such as this sample, train between 10–20 hours per

week, year-round. Thus, gymnasts have opportunities to sufficiently experience their coach's style and behaviors after 12 weeks.

### *Measures*

Gymnasts completed a survey consisting of developmentally appropriate, valid, and reliable measures to assess social influence, psychological need satisfaction, and psychological and physical well-being. In the following sections, specific measures for each of these constructs are described, including items, response format, and psychometric data. Where appropriate, words such as “sport,” “player,” and “game” were changed to “gymnastics,” “gymnast,” and “competition” or “meet.” For measures assessing coach behaviors, gymnasts responded for the coach they spent the most time with.

### *Social Influences*

*Motivational climate.* Gymnasts completed the Motivational Climate Scale for Youth Sports (MCSYS; R.E. Smith, Cumming, & Smoll, 2008). The scale includes 6 items for mastery and 6 items for performance climate (see Table 1). Participants responded on a 5-point scale ranging from *not at all true* to *very true*. The MCSYS was validated with 9–14 year-old male and female athletes and showed good reliability (R.E. Smith et al., 2008).

Table 1

*Subscales and Items for Motivational Climate*


---

Mastery Climate	<ol style="list-style-type: none"> <li>1. The coach makes gymnasts feel good when they improve a skill.</li> <li>2. The coach encourages us to learn new skills.</li> <li>3. The coach tells gymnasts to help each other get better.</li> <li>4. The coach tells us that trying our best is the most important thing.</li> <li>5. The coach says that teammates should help each other improve their skills.</li> <li>6. The coach says that all of us are important to the team's success.</li> </ol>
Performance Climate	<ol style="list-style-type: none"> <li>1. Winning meets is the most important thing for the coach.</li> <li>2. The coach spends less time with the gymnasts who aren't as good.</li> <li>3. The coach tells us which gymnasts on the team are the best.</li> <li>4. The coach pays most attention to the best gymnasts.</li> <li>5. Gymnasts are taken out of meets if they make a mistake.</li> <li>6. The coach tells us to try to be better than our teammates.</li> </ol>

---

*Coach autonomy-supportive behaviors.* Gymnasts completed the Sport Climate Questionnaire (SCQ; <http://www.selfdeterminationtheory.org/questionnaires>) to rate the extent to which their coach displays an autonomy-supportive style (see Table 2). Responses were given on a 7-point scale ranging from *strongly disagree* to *strongly agree*. The SCQ has shown good reliability with adolescent athletes (Amorose & Anderson-Butcher, 2007), and a version modified for the physical education context was reliable with youth ages 11–14 (Standage, Duda, & Ntoumanis, 2006).

Table 2

*Items for Autonomy-Supportive Coach Behaviors*

- 
1. I feel that my coach provides me choices and options.
  2. I feel understood by my coach.
  3. My coach conveys confidence in my ability to do well at gymnastics.
  4. My coach encourages me to ask questions.
  5. My coach listens to how I would like to do things.
  6. My coach tries to understand how I see things before suggesting a new way to do things.
- 

*Coach controlling behaviors.* Gymnasts completed the Controlling Coach Behaviors Scale (CCBS; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010), which assesses the degree to which coaches use controlling tactics in the gym. Four subscales constitute the CCBS, but only the *controlling use of rewards* subscale was used in the present study because: (a) it assesses the most relevant aspect of controlling behaviors given my research questions, (b) the *controlling use of rewards* and *intimidation* subscales are highly correlated (Bartholomew et al.), (c) the *excessive personal control* subscale assesses controlling behaviors *outside* the gym, and (d) the *negative conditional regard* subscale showed problems in pilot testing (see Procedure). Table 3 depicts the items used in the present study. Participants responded on a 7-point scale ranging from *strongly disagree* to *strongly agree*. The CCBS was validated with 12–17 year-old male and female individual- and team-sport athletes and showed good reliability (Bartholomew et al., 2010).

Table 3

*Items for Coach Controlling Behaviors*

- 
1. My coach tries to motivate me by promising to reward me if I do well.
  2. My coach only rewards/praises me to make me train harder.
  3. My coach only uses rewards/praise so that I stay focused on tasks during training.
  4. My coach only uses rewards/praise so that I complete all the tasks he/she sets in training.
- 

*Friendship quality.* Gymnasts completed the Sport Friendship Quality Scale (SFQS; M.R. Weiss & Smith, 1999) to assess relationship quality with their best friend in gymnastics. The SFQS contains 6 subscales (*self-esteem enhancement and supportiveness, loyalty and intimacy, things in common, companionship and pleasant play, conflict resolution, and conflict*). Only the first four subscales were used in the present study because: (a) my research question involves positive friendship quality rather than conflict-related subscales, and (b) use of 4 rather than 6 subscales was helpful in reducing survey length (see Table 4). Participants were asked to think of a person they consider their best friend in gymnastics, write that person's name down, and think of that person when answering the questions. Gymnasts responded on a 5-point scale ranging from *not at all true* to *really true*. M.R. Weiss and colleagues validated the SFQS with 8–18 year-old sport participants, and others have shown good reliability with youth (Ullrich-French & Smith, 2006; M.R. Weiss & Smith, 1999, 2002).



Table 4

*Subscales and Items for Friendship Quality*


---

Self-esteem Enhancement and Supportiveness	<ol style="list-style-type: none"> <li>1. My friend gives me a second chance to perform a skill</li> <li>2. My friend and I praise each other for doing gymnastics well</li> <li>3. After I make mistakes, my friend encourages me</li> <li>4. My friend has confidence in me during gymnastics</li> </ol>
Loyalty and Intimacy	<ol style="list-style-type: none"> <li>1. My friend and I can talk about anything</li> <li>2. My friend and I stick up for each other in gymnastics</li> <li>3. My friend looks out for me</li> <li>4. My friend and I tell each other secrets</li> </ol>
Things in Common	<ol style="list-style-type: none"> <li>1. My friend and I have common interests</li> <li>2. My friend and I do similar things</li> <li>3. My friend and I have the same values</li> <li>4. My friend and I think the same way</li> </ol>
Companionship and Pleasant Play	<ol style="list-style-type: none"> <li>1. My friend and I do fun things</li> <li>2. I like to spend time with my friend</li> <li>3. My friend and I work well together</li> <li>4. My friend and I spend time together</li> </ol>

---

*Psychological Need Satisfaction*

*Perceived competence.* Gymnasts completed the athletic competence subscale of Harter's (1988) Self-Perception Profile for Adolescents. The scale contains 5 items presented in a structured alternative format (see Table 5). Participants were provided with two statements, asked which one was most like them, and then they decided if that statement was *sort of true* or *really true*. Scores range from 1–4, with higher scores corresponding to higher perceived competence. Harter demonstrated good validity and reliability with 13–18 year-old adolescents in a general population, and others have

shown good psychometrics with 8–18 sport participants (e.g., M.R. Weiss, Ebbeck, & Horn, 1997; W.M. Weiss & Weiss, 2007).

Table 5

*Items for Perceived Competence*

- 
1. Some teenagers do very well in gymnastics BUT Other teenagers don't feel they are good when it comes to gymnastics.
  2. Some teenagers think they could do well at just about any gymnastics skill BUT Other teenagers are afraid they might not do well at a gymnastics skill.
  3. Some teenagers feel that they are better than others their age at gymnastics BUT Other teenagers don't feel they can do gymnastics as well as others their age.
  4. Some teenagers don't do well at new gymnastics skills BUT Other teenagers are good at new gymnastics skills right away.
  5. Some teenagers do not feel that they are good gymnasts BUT Other teenagers feel that they *are* good gymnasts.
- 

*Perceived autonomy.* Gymnasts responded to a scale developed by Hollembeak and Amorose (2005) to assess perceptions of choice and control in sports (see Table 6). Gymnasts responded on a 5-point scale ranging from *not at all true for me* to *completely true for me*. The scale has displayed good reliability with middle- and high school-aged youth in the physical domain (Cox & Ullrich-French, 2010; Kipp & Amorose, 2008).

Table 6

*Items for Perceived Autonomy*

- 
1. I have a say in what I do when participating in gymnastics.
  2. I feel forced to do things in gymnastics, even when I don't really want to do them.
  3. I help decide what I do when participating in gymnastics.
  4. I get to do the things I want to do when participating in gymnastics.
  5. I do not have a say in what I do when participating in gymnastics.
  6. I do not get to make decisions about what I do when I am participating in gymnastics.
- 

*Perceived relatedness.* Participants completed the relatedness subscale of the Basic Psychological Needs Scale (<http://www.selfdeterminationtheory.org/questionnaires>) to assess perceptions of connectedness in their gymnastics club. Items used in the work domain (Baard, Deci, & Ryan, 2000; Deci et al., 2001) were adapted to the physical domain. The scale contains 7 items for general feelings of relatedness, but in the sport context gymnasts may experience different levels of relatedness with coaches and teammates. Thus, I used 4 items to assess teammate relatedness and 4 items to assess coach relatedness (see Table 7). Responses were given on a 5-point scale ranging from *not at all true for me* to *completely true for me*. This scale has shown good reliability with adolescents in the physical domain (Gagné, Ryan, & Bargmann, 2003; Ntoumanis, 2005).

Table 7

*Items for Perceived Relatedness*

- 
1. I get along with my teammates.
  2. My teammates are pretty friendly towards me.
  3. I consider my teammates to be my friends.
  4. My teammates care about me.
  5. I get along with my coaches.
  6. I really like my coaches.
  7. My coaches care about me.
  8. My coaches are generally pretty friendly towards me.
- 

*Well-Being Indicators*

*Self-esteem.* Gymnasts completed the self-worth subscale of Harter's (1988) Self-Perception Profile for Adolescents, which contains 5 items presented in a structured alternative format (see Table 8). Participants were provided with two statements and asked which one was most like them. Then, participants decided if that statement was *sort of true* or *really true*. Scores range from 1–4, with higher scores corresponding to higher self-esteem. Harter demonstrated good validity and reliability with 13–18 year-old adolescents in a general population, and others have shown good psychometrics with 8–15 year-old youth sport participants (e.g., Amorose, 2001; Ebbeck & Weiss, 1998).

Table 8

*Items for Self-Esteem*

- 
1. Some teenagers are often disappointed with themselves BUT Other teenagers are pretty pleased with themselves.
  2. Some teenagers don't like the way they are leading their life BUT Other teenagers do like the way they are leading their life.
  3. Some teenagers are usually happy with themselves as a person BUT Other teenagers are not happy with themselves.
  4. Some teenagers like the kind of person they are BUT Other teenagers often wish they were someone else.
  5. Some teenagers are very happy being the way they are BUT Other teenagers wish they were different.
- 

*Positive affect.* Gymnasts completed a modified version of the Positive and Negative Affect Schedule (Ebbeck & Weiss, 1998; Watson, Clark, & Tellegan, 1988). Ebbeck and Weiss reduced the 10 items to 5 items and used words that were developmentally appropriate in their study with 8–13 year-old youth. Gymnasts responded to the stem: *Indicate to what extent you have felt this way during the past week (7 days)* (see Table 9). Responses were given on a 5-point scale ranging from *not at all* to *extremely*. The scale showed good psychometrics with youth in the physical domain (Ebbeck & Weiss, 1998).

Table 9

*Items for Positive Affect*

- 
1. Proud
  2. Satisfied
  3. Happy
  4. Excited
  5. Relaxed
- 

*Disordered eating.* Eating attitudes and behaviors were assessed with the Children's Eating Attitude Test (ChEAT; Maloney, McGuire, & Daniels, 1988; Smolak & Levine, 1994). The ChEAT consists of 4 subscales, but only the *dieting* and *restricting and purging* subscales reflected symptoms of disordered eating relevant to my research question. The *restricting and purging* subscale showed problems in pilot testing (see Procedure), so it was removed from analysis. Table 10 depicts the items used in the present study. Responses were given on a 6-point scale including *never*, *rarely*, *sometimes*, *often*, *very often*, and *always*, where higher scores reflect more symptomatic eating attitudes and behaviors. Good psychometrics have been shown with 8–14 year-olds (Maloney, McGuire, & Daniels, 1988; Smolak & Levine, 1994).

Table 10

*Items for Disordered Eating*

- 
1. I think a lot about wanting to be thinner.
  2. I think about burning up energy (calories) when I exercise.
  3. I think a lot about having fat on my body.
  4. I am scared about being overweight.
  5. I have been dieting.
  6. I feel very guilty after eating.
  7. I am aware of the energy (calorie) content in foods that I eat.
- 

*Physical activity outside of gymnastics.* Gymnasts completed a modified version of the Leisure Time Exercise Questionnaire (LTEQ; Godin & Shephard, 1985; McGuire, Neumark-Stainer, & Story, 2002). McGuire et al. modified the question stem and response choice to aid youth in comprehending and responding to items. Participants indicated how many *hours* they engaged in mild, moderate, or vigorous physical activity in a week (see Table 11). Responses included six options: *none*; *less than ½ hour per week*; *½ to 2 hours per week*; *2¼ to 4 hours per week*; *4¼ to 6 hours per week*; *more than 6 hours per week*. The responses were re-coded to 0, 0.3, 1.3, 3.3, 5.3, and 8 hours per week, respectively, which translates to the average number of hours for each response option (e.g., *½ to 2 hours per week* = 1.3 hours). McGuire et al. showed good test-retest reliability with adolescents.

For the present study, gymnasts responded to the following question: *In the past week (7 days), how many HOURS did you spend doing the following activities outside of gymnastics?* Total number of hours in physical activity was computed by summing the responses for strenuous and moderate activity. Based on A.L. Smith's (1999)

recommended guidelines, I verbalized instructions and included a grid to aid participants in completing this measure. First, I defined mild, moderate, and strenuous physical activity with examples and read the instructions listed in Table 11. Second, I modeled the process with a sample grid on a white board and emphasized that they should include activities outside of gymnastics. Gymnasts completed the grid on their own and checked corresponding boxes for hours of mild, moderate, and strenuous activity in a week.

Table 11

*Items and Grid for Physical Activity Level*


---

Considering a typical week (7 days) in the past month, **how many hours** do you do the following kinds of physical activity **outside of gymnastics practice and meets**? Examples of activities appear in each category, but you may think of activities that are not listed. The key is to decide whether the activity makes your heart beat rapidly, requires effort but is not exhausting, or requires minimal effort.

---

1. Strenuous physical activity (heart beats rapidly)  
Examples: biking fast, aerobic dancing, running, jogging, swimming laps, rollerblading, skating, tennis, cross-country skiing, soccer, basketball
  2. Moderate physical activity (effort, but not exhausting)  
Examples: fast walking, dancing, baseball/softball, easy bicycling, volleyball, strength training, skiing, snowboarding, skateboarding
  3. Mild physical activity (little effort)  
Examples: easy walking, bowling, golf, fishing, yoga, stretching muscles, household chores
- 

	Strenuous Activity (# hours)	Moderate Activity (# hours)	Mild Activity (# hours)
Mon			
Tues			
Wed			
Thurs			
Fri			
Sat			
Sun			
TOTAL			



### *Physical Maturity*

Gymnasts responded to one item from the 5-item *Pubertal Development Scale* (PDS; Petersen, Crockett, Richards, & Boxer, 1988): “Have you begun to menstruate (have your period)?” A response of *no* was scored 1 and *yes* was scored 2. Petersen et al. recommended using the one item if researchers are interested in menarcheal status. Good psychometrics have been shown with adolescents (Petersen et al., 1988).

### *Demographic Items*

Gymnasts reported their age, birthday, race/ethnicity, competitive level, age when they started gymnastics participation and competition, years with current coach, and hours of training per week.

### *Procedure*

After approval from the university’s Institutional Review Board was attained (see Appendix A), a pilot study was conducted with 8 gymnasts ages 9–13 ( $M = 11.2$ ,  $SD = 1.3$ ). The pilot study ensured that items were understandable for the youngest ages included in the study and determined length of time needed to complete the survey. Participants completed the survey in about 30 minutes and did not verbalize any problems understanding the items. However, item analysis revealed that the negative wording of the *negative conditional regard* subscale of the CCBS was problematic, and responses on the *restricting and purging* subscale of the ChEAT were very low with no variability. Thus, these two subscales were removed from the survey for the main study.

To recruit participants for the main study, I sent letters describing the purpose of the study to coaches at 49 gymnastics clubs in the Midwest (see Appendix B). I made follow-up phone calls to coaches to request their club's participation in the study and answer any questions. Twenty-nine clubs and an average of 10 gymnasts within each club participated in the study (range = 2 to 30). Two visits were made to each participating gym. The first visit entailed describing the general study purpose to gymnasts and providing parental consent forms. The second visit consisted of administering the survey during the first or last 30 minutes of practice. Data were collected in July and August 2011, which was before gymnasts' competitive season started. Gymnasts completed the survey in an area of the gym away from coaches, parents, and non-participating teammates. I gave scripted instructions for the survey and assured gymnasts that their responses would be kept confidential. Only gymnasts with parental consent and who assented themselves were included in the study (see Appendix C). Gymnasts completed the survey in 20–35 minutes. The full survey can be seen in Appendix D.

### *Design and Data Analysis*

The study involved a cross-sectional design in which relationships were examined among social influences, need satisfaction, and well-being. Initial analyses comprised scale reliabilities and descriptive statistics. For the main analysis, structural equation modeling (SEM) was used with LISREL 8.8 (Jöreskog & Sörbom, 2001). The hypothesized model of relationships was tested using three steps: (a) model specification, (b) model fit, and (c) parameter estimation. First, the model was specified based on

theory-driven hypothesized relationships. Second, the fit of the model to observed data was tested with multiple fit indices—chi-square ( $\chi^2$ ), root mean square error of approximation (RMSEA), non-normed fit index (NNFI), comparative fit index (CFI), and goodness of fit index (GFI) (Hu & Bentler, 1999; Ullman, 2007). A good model fit is indicated by a non-significant  $\chi^2$  value ( $p \geq .05$ ),  $RMSEA \leq .05$ , and NNFI, CFI, and GFI  $\geq .95$ ; a reasonable model fit is indicated by a non-significant  $\chi^2$  value ( $p \geq .05$ ),  $RMSEA < .08$ , and NNFI, CFI, and GFI  $\geq .90$  (Hu & Bentler, 1999). Chi-square is often significant in studies with large sample sizes, but a good-fitting model is likely when the relation of  $\chi^2/df$  is less than 2 (Ullman, 2007). Third, parameter estimates (factor loadings, path coefficients) were examined for significance ( $t > 1.96$ ), and interpreted relative to hypotheses.

## Results

### *Scale Reliabilities*

Most scales achieved adequate to good internal reliability using alpha coefficients. However, item analysis (i.e., inter-item correlations, squared multiple correlations, item-total correlations) revealed some problematic items. Three items on the *performance climate* subscale<sup>1</sup>, one item on the *companionship and pleasant play* subscale<sup>2</sup>, and one item from the perceived autonomy scale<sup>3</sup> showed poor reliability and

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<sup>1</sup> *Winning meets is the most important thing for the coach; Gymnasts are taken out of meets if they make a mistake; The coach tells us to try to be better than our teammates*

<sup>2</sup> *My friend and I work well together*

<sup>3</sup> *I feel forced to do things in gymnastics, even when I don't really want to do them*

were removed. After removal, all scales achieved acceptable internal reliability (see Table 12).

### *Descriptive Statistics*

Means and standard deviations for study variables are presented in Table 12. Gymnasts reported relatively high scores for mastery climate, friendship quality, coach relatedness, teammate relatedness, and self-esteem. Gymnasts reported scores above the midpoint for coach autonomy supportive-behaviors, perceived competence, perceived autonomy, and positive affect. Girls reported relatively low scores for performance climate, coach controlling behaviors, and disordered eating. Gymnasts were fairly active outside of the gym. While they averaged 15.5 hours of gymnastics training per week, they reported an additional 5 hours of moderate and strenuous physical activity outside of the gym. In terms of physical maturity, 201 gymnasts had not started menstruating ( $M_{age} = 12.1$ ;  $SD = 1.4$ ) and 102 gymnasts had started menstruating ( $M_{age} = 14.8$ ;  $SD = 1.5$ ).

Correlations among study variables can also be seen in Table 12. Correlations among social influences, psychological need satisfaction, and well-being were in the expected direction and ranged from low associations (e.g., controlling behaviors with psychological needs) to moderate and strong associations (e.g., mastery climate with coach and teammate relatedness). Correlations between physical activity and study variables were essentially zero ( $r = |.00-.11|$ ). For this sample, physical activity *outside of the gym* may not be a pertinent well-being indicator like self-esteem, positive affect, and disordered eating. Rather, gymnastics is the context in which these girls expressed a

Table 12  
*Descriptive Statistics for Study 1 Variables*

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Mastery Climate	.73												
2. Performance Climate	-.36	.69											
3. Coach Autonomy-Supportive Behaviors	.63	-.41	.80										
4. Coach Controlling Behaviors	.07	.12	.07	.77									
5. Friendship Quality	.31	-.08	.20	.00	.89								
6. Perceived Competence	.14	-.08	.10	.02	.14	.71							
7. Perceived Autonomy	.35	-.18	.51	-.11	.23	.12	.81						
8. Perceived Coach Relatedness	.55	-.41	.66	.01	.16	.18	.37	.83					
9. Perceived Teammate Relatedness	.30	-.20	.24	-.07	.45	.18	.16	.34	.86				
10. Self-Esteem	.12	-.02	.05	-.05	.27	.35	.04	.05	.21	.72			
11. Positive Affect	.23	-.21	.26	-.08	.14	.45	.16	.31	.24	.31	.87		
12. Disordered Eating	-.10	.17	-.10	.04	-.12	-.14	-.14	-.12	-.24	-.31	-.19	.82	
13. Physical Activity	-.06	.11	-.03	.02	.02	.03	.04	.00	-.05	.04	-.02	.03	--
<i>M</i>	4.25	1.59	5.13	3.11	4.27	2.79	3.45	4.37	4.41	3.44	3.60	2.05	5.20
<i>SD</i>	.59	.72	1.12	1.32	.55	.54	.66	.59	.62	.51	.73	.98	3.19
Scale Range	1-5	1-5	1-7	1-7	1-5	1-4	1-5	1-5	1-5	1-4	1-5	1-6	--

*Note.* Alpha coefficients are presented on the diagonal.  $r > |.1|$  denote significant relationships ( $p < .05$ ).

majority of their physical activity behaviors. Because this group of gymnasts trained an average of 15 hours per week, they were sufficiently active and met the physical activity recommendations. Thus, physical activity outside of the gym was removed from further analysis, with emphasis then placed on the psychological and physical well-being indicators of self-esteem, positive affect, and disordered eating.

*Relationships Among Social Influences, Psychological Need Satisfaction, and Well-Being*

Due to the relatively large number of parameters to be estimated, subscale scores and random item parcels were used as indicators for most latent variables (Coffman & MacCallum, 2005; Little, Cunningham, Shahar, & Widaman, 2002). Subscale scores were used as observed indicators for friendship quality, while random item parcels were used as indicators for mastery climate, autonomy-support, controlling behaviors, psychological needs, and well-being. For these constructs, items were placed in random order, the first half of the items were averaged into one parcel, and the second half were averaged into another parcel. Equations for all created item parcels are presented in Appendix E. The three items for performance climate and the single item assessing menarcheal status were used as indicators for respective latent variables. Several latent variables were specified to correlate with one another because of their conceptual associations: coach and teammate influences, errors of coach and teammate relatedness, and errors of well-being indicators.

The specified model, depicted in Figure 2, showed a reasonable to good fit to the data,  $\chi^2(314) = 484.82, p < .05$  ( $\chi^2/df = 1.54$ ); RMSEA = .04 (90% CI = .0344–.0493);

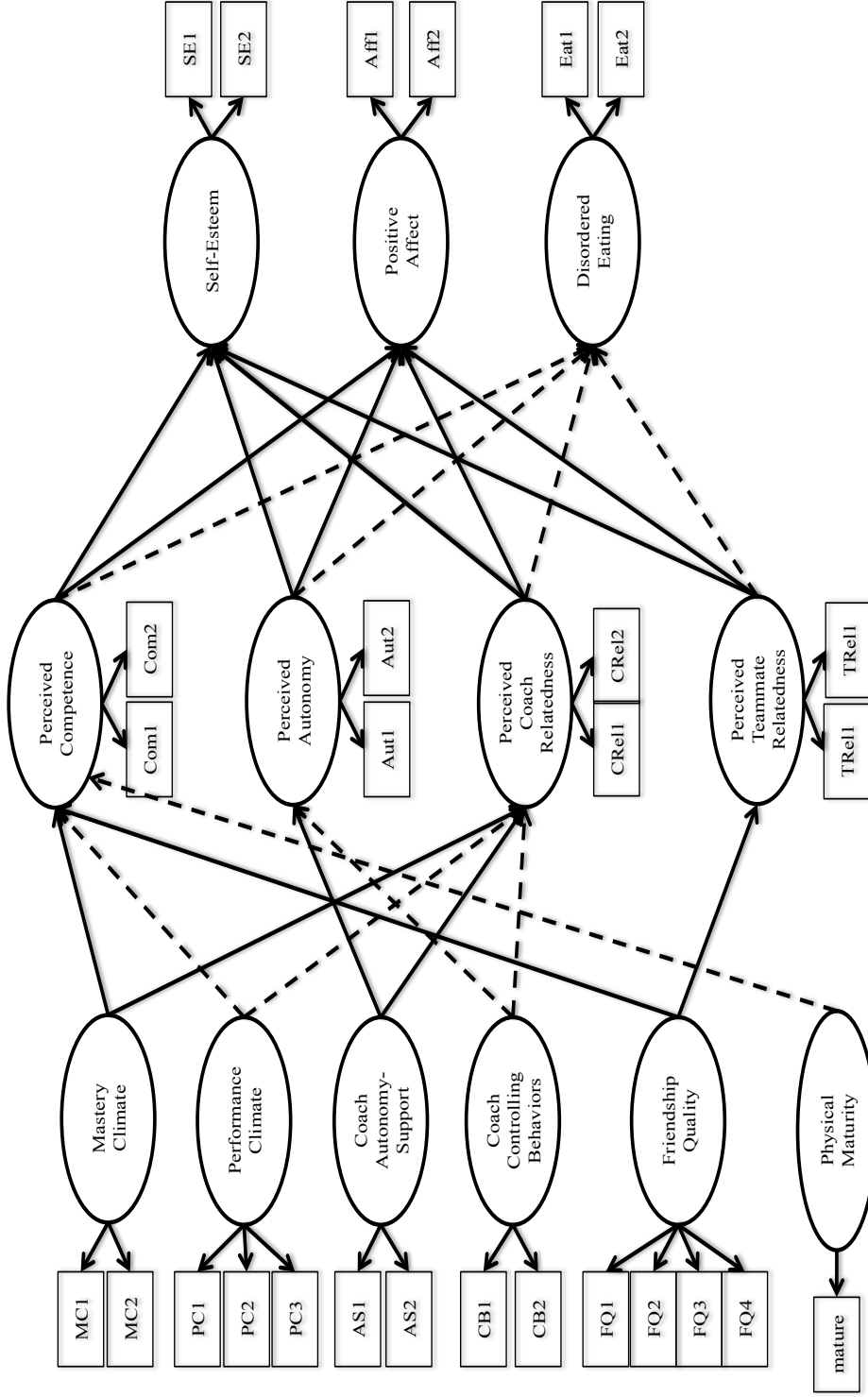


Figure 2. Specified Model for Study 1  
 Note. Dashed lines depict negative relationships. Correlations among latent variables and error terms are not drawn into the model for clarity.

NNFI = .97; CFI = .97; GFI = .90. However, the correlation between mastery climate and autonomy-supportive behaviors was very high (.79), indicating multicollinearity. Ullman (2007) recommends either removing one scale or creating a composite scale to correct for multicollinearity. Thus, I combined the two constructs into one latent variable called Mastery/Autonomy-Support. This is justifiable because mastery climate and autonomy-support share some common aspects, such as the coach initiating positive interactions with the athlete. Two indicators were used to define this latent variable—one mastery-climate and one autonomy-support score, averaged across items.

A second run with the new Mastery/Autonomy-Support latent variable (see Figure 3) showed a reasonable to good fit to the data,  $\chi^2(268) = 455.46, p < .05$  ( $\chi^2/df = 1.70$ ); RMSEA = .05 (90% CI = .0405–.0557); NNFI = .95; CFI = .96; GFI = .90. Importantly, the multicollinearity issue was resolved. The maximum modification index showed that a large improvement in chi-square (29.13) would result by allowing two of the indicators for friendship quality to correlate (i.e., the subscales *self-esteem enhancement and supportiveness* and *companionship and pleasant play*). Allowing these indicators to correlate is conceptually defensible because they represent aspects of the same construct. Thus, I ran a third model allowing the two friendship quality indicators to correlate.

This model showed a good fit to the observed data,  $\chi^2(267) = 422.12, p < .05$  ( $\chi^2/df = 1.58$ ); RMSEA = .04 (90% CI = .0355–.0514); NNFI = .96; CFI = .97; GFI = .90. Modification indices did not reveal any other theoretically justified changes. Thus, this model was deemed the final one for interpretation. All factor loadings were significant and are presented in Table 13.



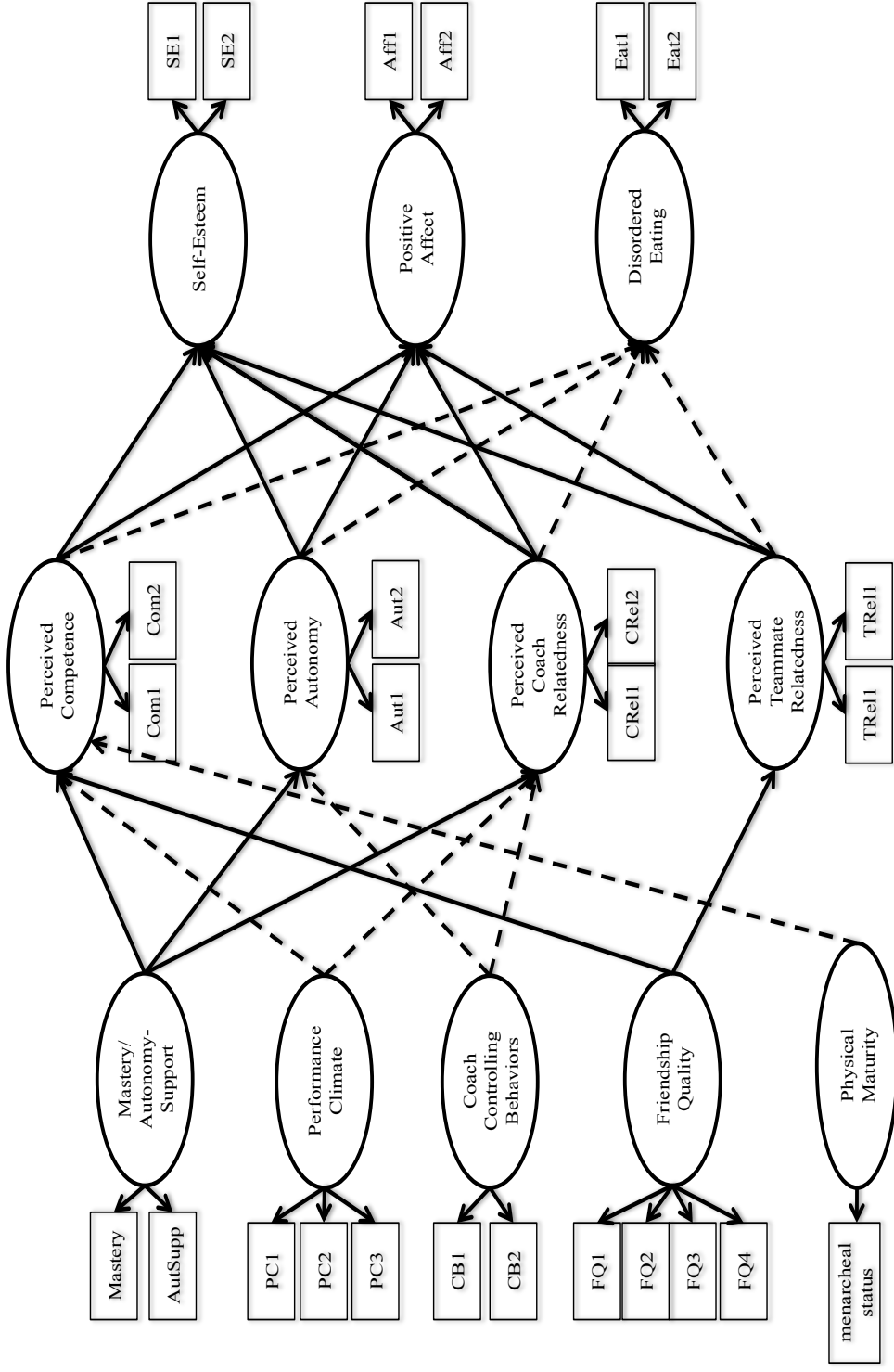


Figure 3. Final Model for Study 1  
 Note. Dashed lines depict negative relationships. Correlations among latent variables and error terms are not drawn into the model for clarity.

Table 13  
*Completely Standardized Factor Loadings*

Subscale/Parcel/Item	Latent Variable	Factor Loading	Uniqueness
Mastery	Mastery/Autonomy-Support	.73*	.47
AutSupp	Mastery/Autonomy-Support	.89	.22
PC1	Performance Climate	.72*	.48
PC2	Performance Climate	.49	.77
PC3	Performance Climate	.78	.39
CB1	Coach Controlling Behaviors	.81*	.34
CB2	Coach Controlling Behaviors	.77	.41
FQ1	Friendship Quality	.77*	.41
FQ2	Friendship Quality	.84	.30
FQ3	Friendship Quality	.65	.58
FQ4	Friendship Quality	.76	.42
Menarcheal status	Physical Maturity	1.0*	--
Com1	Perceived Competence	.70*	.51
Com2	Perceived Competence	.81	.35
Aut1	Perceived Autonomy	.86*	.27
Aut2	Perceived Autonomy	.83	.31
CRel1	Coach Relatedness	.84*	.29
CRel2	Coach Relatedness	.85	.28
TRel1	Teammate Relatedness	.92*	.16
TRel2	Teammate Relatedness	.85	.28
SE1	Self-Esteem	.94*	.12
SE2	Self-Esteem	.62	.62
Aff1	Positive Affect	.84*	.29
Aff2	Positive Affect	.79	.38
Eat1	Disordered Eating	.84*	.30
Eat2	Disordered Eating	1.03	-.06

*Note.* \* Parameter estimate was fixed to 1.0. All loadings were significant,  $t > |1.96|$ .

Several significant direct relationships emerged (see Table 14). First, strong paths emerged between coaches' mastery/autonomy-support with perceived autonomy and coach relatedness. When gymnasts perceived their coaches emphasized self-referenced

definitions of success and provided choice and encouragement, they reported a greater sense of volition in the gym and connectedness with their coach. Second, coach controlling behaviors showed a low-moderate relationship with perceived autonomy. When gymnasts perceived their coaches as using rewards and praise in a controlling way, they reported lower feelings of choice and volition. Third, friendship quality showed a

Table 14  
*Completely Standardized Path Coefficients for Direct Effects*

Path	Path Coefficient	<i>t</i> value
Mastery/Autonomy-Support → Perceived Competence	.15	1.62
<b>Mastery/Autonomy-Support → Perceived Autonomy</b>	<b>.61</b>	<b>8.41</b>
<b>Mastery/Autonomy-Support → Coach Relatedness</b>	<b>.76</b>	<b>9.24</b>
Performance Climate → Perceived Competence	-.02	-.25
Performance Climate → Perceived Coach Relatedness	-.08	-1.14
<b>Controlling Coach Behaviors → Perceived Autonomy</b>	<b>-.18</b>	<b>-2.59</b>
Controlling Coach Behaviors → Perceived Coach Relatedness	-.12	-.30
<b>Friendship Quality → Perceived Competence</b>	<b>.16</b>	<b>2.17</b>
<b>Friendship Quality → Teammate Relatedness</b>	<b>.53</b>	<b>8.21</b>
<b>Physical Maturity → Perceived Competence</b>	<b>-.27</b>	<b>-4.05</b>
<b>Perceived Competence → Self-Esteem</b>	<b>.45</b>	<b>6.13</b>
<b>Perceived Competence → Positive Affect</b>	<b>.51</b>	<b>6.59</b>
<b>Perceived Competence → Disordered Eating</b>	<b>-.18</b>	<b>-2.66</b>
Perceived Autonomy → Self-Esteem	.02	.29
Perceived Autonomy → Positive Affect	.01	.10
Perceived Autonomy → Disordered Eating	-.09	-1.28
Coach Relatedness → Self-Esteem	-.15	-1.87
<b>Coach Relatedness → Positive Affect</b>	<b>.24</b>	<b>3.04</b>
Coach Relatedness → Disordered Eating	.02	.28
<b>Teammate Relatedness → Self-Esteem</b>	<b>.21</b>	<b>3.29</b>
Teammate Relatedness → Positive Affect	.08	1.24
<b>Teammate Relatedness → Disordered Eating</b>	<b>-.21</b>	<b>-3.19</b>

*Note.* *t* values > |1.96| are significant ( $p < .05$ ) and in boldface.

strong relationship with teammate relatedness and a low-moderate relationship with perceived competence. When gymnasts felt support, loyalty, similar interests, and companionship with a best friend on the team, they reported greater feelings of belonging with their teammates and greater perceptions of gymnastics ability.

Need satisfaction was significantly related to gymnasts' well-being. First, perceived competence was significantly related to all three well-being indices—strong relationships with self-esteem and positive affect and a low-moderate association with disordered eating. When gymnasts felt good about their gymnastics ability, they reported favorable global self-evaluations, more positive emotions, and less symptomatic eating attitudes and behaviors. Second, coach relatedness and positive affect were moderately associated—gymnasts who felt they got along with their coaches reported greater feelings of happiness and pride. Finally, teammate relatedness was moderately associated with self-esteem and disordered eating. When gymnasts felt a sense of belonging with their teammates they reported more positive global self-evaluations and fewer symptoms of disordered eating.

Social factors were also indirectly associated with well-being through psychological need satisfaction (see Table 15). First, mastery/autonomy-support from coaches was related to positive affect, meaning that when coaches were perceived as emphasizing effort, improvement, and choices, gymnasts reported greater feelings of connectedness with coaches and in turn greater positive emotions. Second, friendship quality was associated with self-esteem, positive affect, and disordered eating. When gymnasts felt higher levels of support, loyalty, similar interests, and companionship with

Table 15  
*Completely Standardized Path Coefficients for Indirect Effects*

Path	Coefficient	<i>t</i> value
Mastery/Autonomy-Support → Self-Esteem	-.03	-.50
<b>Mastery/Autonomy-Support → Positive Affect</b>	<b>.26</b>	<b>3.82</b>
Mastery/Autonomy-Support → Disordered Eating	-.07	-1.30
Performance Climate → Self-Esteem	.00	.04
Performance Climate → Positive Affect	-.03	-.61
Performance Climate → Disordered Eating	.00	.14
Controlling Coach Behaviors → Self-Esteem	.00	-.09
Controlling Coach Behaviors → Positive Affect	-.01	-.29
Controlling Coach Behaviors → Disordered Eating	.02	1.18
<b>Friendship Quality → Self-Esteem</b>	<b>.18</b>	<b>3.85</b>
<b>Friendship Quality → Positive Affect</b>	<b>.12</b>	<b>2.52</b>
<b>Friendship Quality → Disordered Eating</b>	<b>-.14</b>	<b>-3.44</b>
<b>Physical Maturity → Self-Esteem</b>	<b>-.12</b>	<b>-3.63</b>
<b>Physical Maturity → Positive Affect</b>	<b>-.14</b>	<b>-3.72</b>
<b>Physical Maturity → Disordered Eating</b>	<b>.05</b>	<b>2.29</b>

*Note.* *t* values > |1.96| are significant ( $p < .05$ ) and in boldface.

a best friend on the team, they reported greater feelings of gymnastics ability and a greater sense of belonging with their teammates, and in turn reported greater self-esteem, more positive emotions, and healthier eating attitudes and behaviors.

Finally, physical maturity emerged as a meaningful variable in the model.

Maturity was negatively related to perceived competence, meaning that post-pubertal gymnasts reported lower gymnastics ability. Physical maturity was also indirectly related to all three well-being indicators through perceived competence. Post-pubertal gymnasts reported lower self-esteem, lower positive affect, and more symptomatic eating attitudes

and behaviors. Thus, physical maturity was an important developmental factor that was related to female adolescent gymnasts' physical and psychological well-being.

Effect sizes indicated that relationships were meaningful in addition to being statistically significant. According to Cohen (1988), a small effect is reflected by 1–8% of variance explained, a medium effect 9–24%, and a large effect  $\geq 25\%$ . The final model explained a medium amount of variance for perceived competence (13.5%) and disordered eating (9.4%) and a large amount of variance for perceived autonomy (38.1%), coach relatedness (64.2%), teammate relatedness (28.1%), self-esteem (25.0%), and positive affect (38.9%).

## Discussion

The purpose of the present study was to examine relationships among social influences, psychological need satisfaction, and well-being for adolescent gymnasts. The majority of results supported hypotheses stemming from self-determination theory. The social context (i.e., motivational climate, coaches' interpersonal style, friendship quality) was significantly related to psychological need satisfaction (i.e., perceived competence, autonomy, relatedness), and perceived competence and relatedness were associated with well-being (i.e., self-esteem, positive affect, disordered eating). Few studies have simultaneously studied coaches and peers in sport (Blanchard et al., 2009; Price & Weiss, 2012; Stuntz & Spearance, 2010; W.M. Weiss & Weiss, 2007). Findings extend the

knowledge base by examining coach and peer behaviors together as sources of adolescent gymnasts' psychological and physical well-being.

Coach and peer behaviors related differentially to the psychological needs. First, mastery climate and autonomy-supportive behaviors were positively associated with coach relatedness, and friendship quality was positively associated with teammate relatedness. Second, mastery/autonomy-support and controlling behaviors were associated with gymnasts' perceptions of autonomy in the gym, while friendship quality was associated with gymnasts' perceptions of competence. Thus, coaches were more important for establishing a sense of choice and volition, and a high-quality friendship with a teammate was more salient for gymnasts' perceptions of ability. Findings are consistent with other studies showing relationships between coach/teacher and peer behaviors with psychological need satisfaction (Blanchard et al., 2009; Cox et al., 2009; Quested & Duda, 2010; Reinboth et al., 2004). My findings extend these studies by showing that mastery climate and autonomy-support were associated with gymnasts' perceived autonomy and relatedness, while friendship quality was associated with gymnasts' perceived competence and relatedness.

In line with hypotheses, perceived competence was significantly associated with self-esteem, positive affect, *and* disordered eating. Thus, perceived ability in the gymnastics context was associated with psychological and physical well-being on a general level. Perceived competence has been a robust predictor of youths' well-being in the physical domain, such as self-esteem and positive affect (e.g., Gagné et al., 2003; Quested & Duda, 2010; Reinboth et al., 2004). Results of the present study additionally

showed an association between perceived competence and disordered eating, which contributes to knowledge about predictors of diverse well-being indices.

Coach and teammate relatedness were uniquely associated with well-being indices. Coach relatedness was associated with positive affect, whereas teammate relatedness was associated with self-esteem and disordered eating. Thus, a sense of connection with coaches was more important for short-term, hedonic well-being (i.e., positive affect) whereas feelings of belonging with teammates were more important for eudaimonic well-being and health (i.e., self-esteem and healthy eating attitudes and behaviors). In some studies, perceived relatedness has not been associated with well-being (Amorose, Anderson-Butcher, & Cooper, 2009; Reinboth et al., 2004), but in others it has been significantly associated with indicators such as enjoyment, positive affect, and self-esteem (Gagné et al., 2003; Cox et al., 2009; Quested & Duda, 2010). The present study deconstructed the relatedness construct into coach and teammate forms, which may explain why more substantial relationships were found with well-being.

Physical maturity was an important developmental factor related to female adolescent gymnasts' psychological and physical well-being. Post-pubertal girls reported lower perceived competence, lower self-esteem, lower positive affect, and greater disordered eating compared to pre-pubertal girls. Past research has shown associations between physical maturity and self-perceptions, affect, and disordered eating (Harter, 1999; Horn, 2004; Hunter Smart et al., 2012; Monsma, Malina, & Feltz, 2006; Stice, 2002). Monsma et al. found that physical maturity was associated with lower perceived competence among female adolescent figure skaters. In the present study, physical



maturity was associated with lower self-perceptions and also lower positive affect and greater disordered eating. While puberty appears to be a risk factor for gymnasts' well-being, coaches and teammates may counter these effects by promoting gymnasts' feelings of competence and relatedness.

Some hypothesized paths were not significant. First, mastery/autonomy-support and performance climate were not associated with perceived competence, contrary to previous research on coach influence (e.g., Amorose & Anderson-Butcher, 2007; Reinboth et al., 2004). For this sample, mastery/autonomy-support was associated with perceived autonomy and relatedness, but friendship quality and physical maturity were stronger correlates of perceived competence than were coach behaviors. Second, performance climate and controlling coach behaviors were not associated with coach relatedness. The strong, positive relationship of mastery/autonomy-support with coach relatedness may have outweighed any negative association for performance climate or controlling behaviors. Also, scores for performance climate and controlling behaviors were relatively low with little variability, which may have contributed to nonsignificant findings. Third, perceived autonomy was not significantly associated with well-being indicators. Previous research has shown perceived autonomy to be a significant predictor of well-being (e.g., Gagné et al., 2003; Quested & Duda, 2010), but for this sample the needs for competence and relatedness were more salient. This may be because opportunities for choice and decision-making are not as prevalent in gymnastics as they might be in other sports.

Collectively, findings are consistent with self-determination theory (SDT; R.M. Ryan & Deci, 2000, 2007). The theory posits that social-contextual factors influence health and well-being through satisfaction of the psychological needs. Results show that social influences such as a mastery climate, autonomy-supportive coach behaviors, and quality friendships are significantly associated with adolescent gymnasts' well-being. Specifically, mastery/autonomy support was associated with positive affect through coach relatedness, and friendship quality was associated with all three well-being indicators through teammate relatedness and perceived competence. Thus, in line with SDT, social factors and need satisfaction in the sport domain were associated with eudaimonic, hedonic, and health aspects of well-being, including self-esteem, positive affect, and disordered eating (Deci & Ryan, 2008; R.M. Ryan & Deci, 2001).

In conclusion, findings provide support for SDT and suggest the social, psychological, and developmental processes that are related to higher and lower well-being among female adolescent gymnasts. As Joan Ryan (1995) suggests, gymnastics can *potentially* be an enriching experience in which youth can develop a sense of mastery and self-esteem. The present study highlighted several mechanisms whereby coaches and teammates can promote enriching experiences and maximize psychological and physical well-being. Coaches can emphasize self-referenced criteria for defining success, provide opportunities for choice, and structure activities to promote positive teammate interactions to optimize gymnasts' self-esteem, positive affect, and healthy eating attitudes and behaviors.

## CHAPTER 3

STUDY 2: SOCIAL INFLUENCES, PSYCHOLOGICAL NEED SATISFACTION,  
AND WELL-BEING: A LONGITUDINAL ANALYSIS

Study 1 examined cross-sectional relationships among social influences, psychological need satisfaction, and well-being with female adolescent gymnasts. Mastery climate and autonomy-support were associated with gymnasts' positive affect through coach relatedness, and friendship quality was related to girls' self-esteem, positive affect, and disordered eating through teammate relatedness and perceived competence. In Study 2, gymnasts were reassessed 6–8 months later to determine whether social influences *predict* psychological need satisfaction and well-being over time. Study 2 also allowed for a more accurate test of mediation. According to Cole and Maxwell (2003), “Disentangling the effects of concurrent, correlated predictors is an important enterprise, but it does not represent a test of a mediational model” (p. 561). While cross-sectional designs can provide support for hypothesized indirect relationships, the estimated indirect effects are only accurate under fairly restrictive conditions and thus are often overestimated (Cole & Maxwell, 2003). Study 2 employed the time lag necessary to test for mediation.

Only a few longitudinal studies have been conducted on social influence, psychological need satisfaction, and athletes' well-being (Adie, Duda, & Ntoumanis, 2012; Gagné et al., 2003; Quested & Duda, 2011; Reinboth & Duda, 2006). Reinboth and Duda found that increases in perceived mastery climate predicted increases in perceived

autonomy and relatedness and, in turn, increases in subjective vitality among university athletes over five months. Quested and Duda (2011) found that decreases in perceived teacher autonomy-support predicted decreases in need satisfaction, which predicted increases in burnout for adolescent and emerging adult dancers over nine months. These two studies examined relationships among variables assessed at the last time wave while controlling for variables assessed at an earlier time period. The authors concluded that changes in the predictor variables were associated with changes in the criterion variable. It cannot be concluded, however, that social influences at one point in time predict need satisfaction at a later time, or whether need satisfaction at one point predicts well-being later. Studies are needed to more precisely test longitudinal relationships among social influence, psychological need satisfaction, and well-being.

Study 2 extends previous cross-sectional and longitudinal studies in two ways. First, the present study allowed for a more rigorous test of strength and reliability of relationships and a more accurate test of mediation than cross-sectional studies (Cole & Maxwell, 2003). Second, the study extends past longitudinal studies by using a different approach to draw distinct conclusions. Results from past studies cannot untangle whether need satisfaction at one point predicts well-being at a later point. Also in past studies, mediation analyses involved variables from the same time wave, but Cole and Maxwell (2003) point out that mediation occurs when the independent variable precedes the mediator in time, and the mediator precedes the dependent variable in time. The present study resolves these issues and incorporates the necessary time lag to conduct mediation analyses.

The purpose of the present study was to examine longitudinal relationships among coach and peer influence, psychological need satisfaction, and well-being with female adolescent gymnasts. I examined two models of longitudinal relationships in which (a) social influences at Time 1 predict psychological need satisfaction at Time 2, controlling for need satisfaction at Time 1 (see Model A in Figure 4), and (b) need satisfaction at Time 1 predicts well-being at Time 2, controlling for well-being at Time 1 (see Model B in Figure 5). I hypothesized that: (a) mastery climate, autonomy-support, and friendship quality would positively predict need satisfaction while controlling for each need at Time 1, (b) performance climate and controlling behaviors would negatively predict need satisfaction while controlling for need satisfaction at Time 1, (c) need satisfaction would positively predict self-esteem and positive affect and negatively predict disordered eating, while controlling for well-being at Time 1, and (d) the psychological needs would mediate the relationship between social influences at Time 1 and well-being at Time 2.

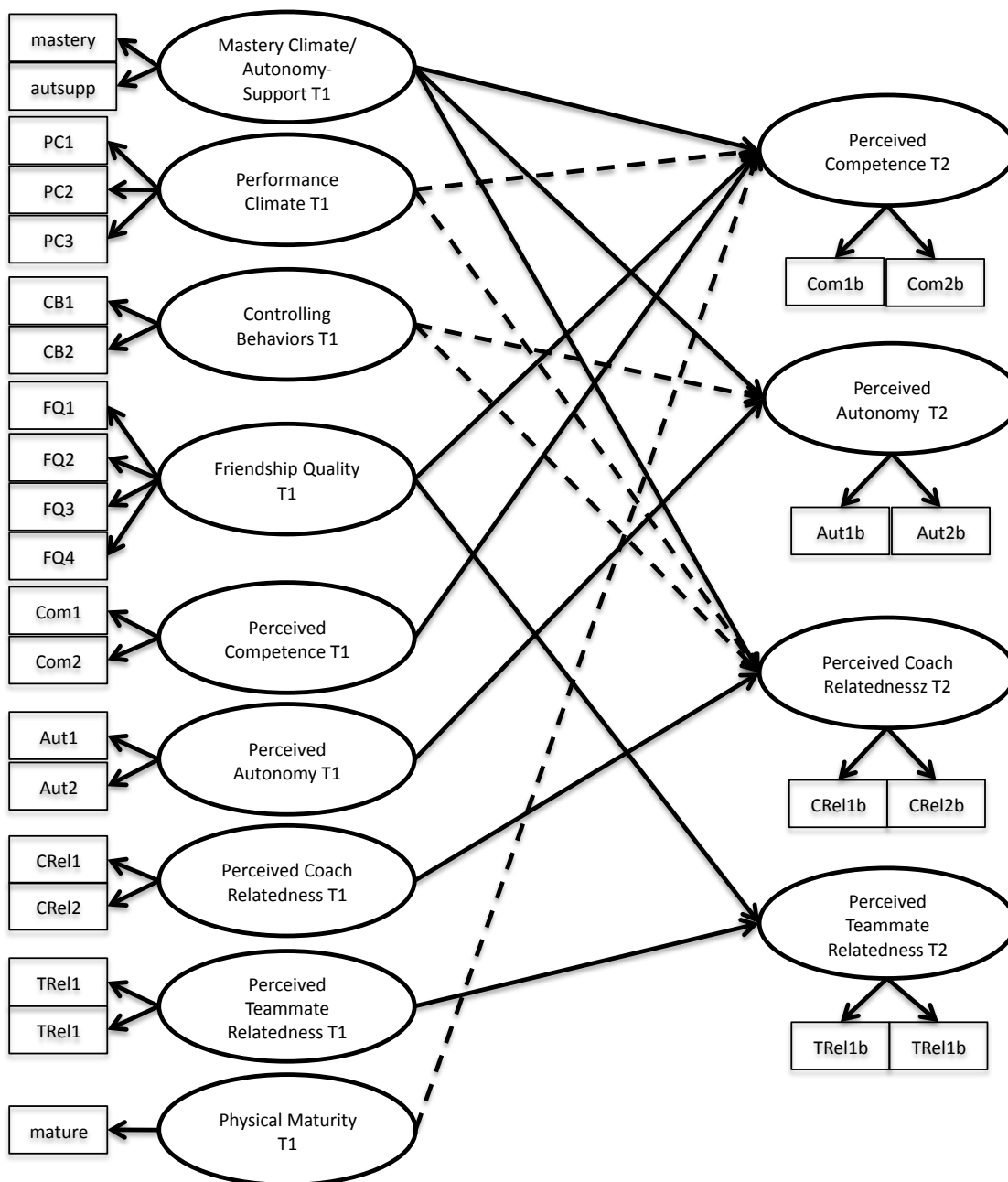


Figure 4. Model A: Social Influences Predicting Psychological Need Satisfaction, Controlling for Need Satisfaction at Time 1

Note. Dashed lines represent hypothesized negative relationships. Correlations among latent variables and error terms are not drawn for clarity.

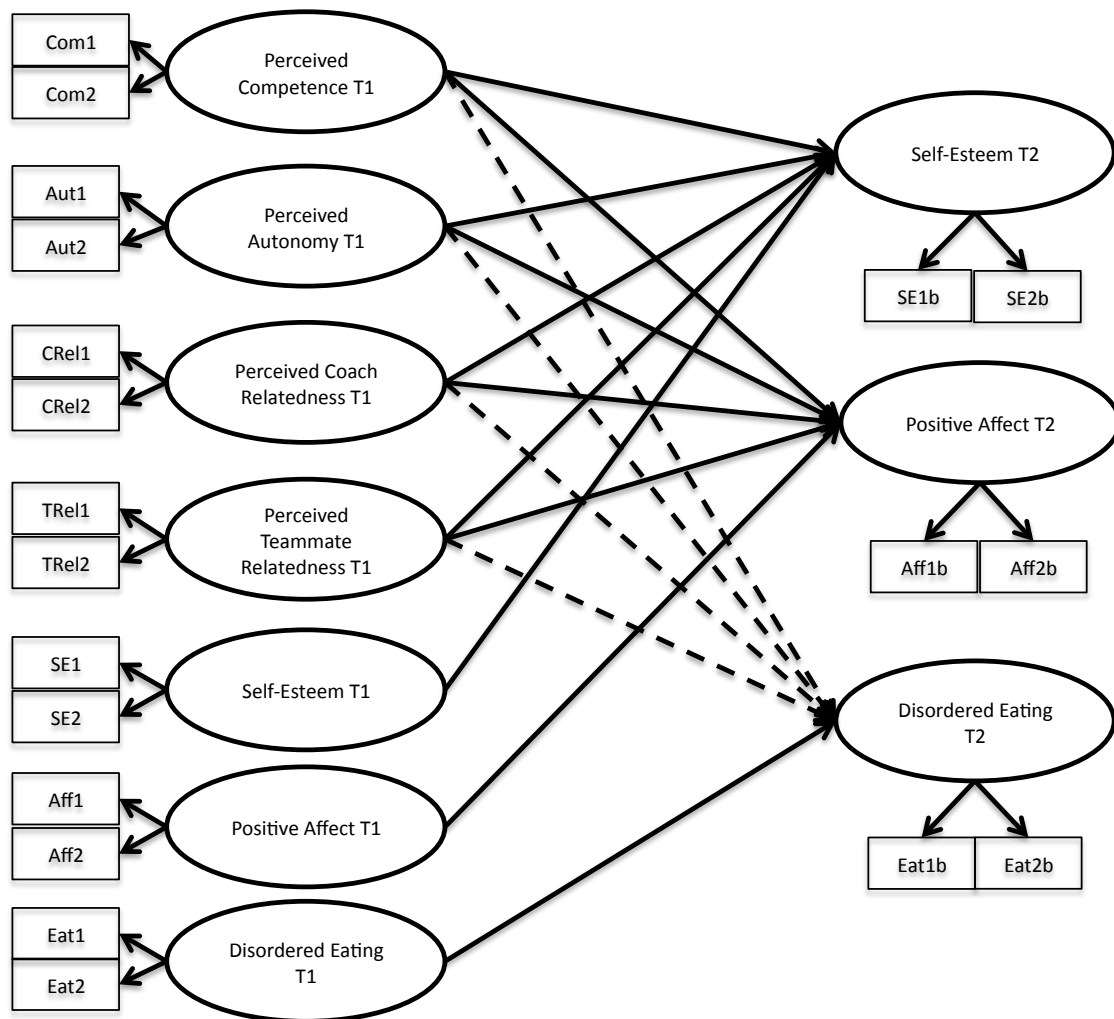


Figure 5. Model B: Psychological Need Satisfaction Predicting Well-Being, Controlling for Well-Being at Time 1

Note. Dashed lines represent hypothesized negative relationships. Correlations among latent variables and error terms are not drawn for clarity.

## Method

### *Participants*

A subsample of gymnasts from Study 1 completed measures 6–8 months later ( $M = 7.0$  months;  $SD = .73$ ). Specifically, 174 (of 303) gymnasts were available and willing to participate at Time 2 for a 57.4% retention rate. Gymnasts were 10 to 18 years-old ( $M = 13.5$ ,  $SD = 2.0$ ) and represented the full range of competitive levels. A majority of the gymnasts (75%) were in competition season during data collection, while the other 25% had recently finished their season within the past 1–2 months (lower competitive levels have an earlier season than higher levels). Gymnasts trained an average of 15.2 hours per week ( $SD = 4.2$ ). Participants described themselves as White (85.5%), Multi-ethnic (5.2%), Asian (4.6%), African American (2.9%), Other (1.2%), and Native American (0.6%).

### *Measures*

Gymnasts completed a survey consisting of developmentally appropriate, valid, and reliable measures to assess social influences, psychological need satisfaction, and psychological and physical well-being. Social influences were assessed at Time 1, and psychological need satisfaction, well-being, and physical maturity were assessed at both Time 1 and Time 2.



### *Social Influences*

*Motivational climate.* Gymnasts completed the Motivational Climate Scale for Youth Sports (MCSYS; R.E. Smith, Cumming, & Smoll, 2008). The scale includes 6 items for mastery and 6 items for performance climate. A sample mastery item is, “The coach tells us that trying our best is the most important thing”; a sample performance item is, “The coach spends less time with the gymnasts who aren’t as good”. Participants responded on a 5-point scale ranging from *not at all true* to *very true*. The MCSYS was validated with 9–14 year-old male and female athletes and showed good reliability (R.E. Smith et al., 2008).

*Coach autonomy-supportive behaviors.* Gymnasts completed the Sport Climate Questionnaire (SCQ; <http://www.selfdeterminationtheory.org/questionnaires>) to rate the extent to which their coach displays an autonomy-supportive style (e.g., “I feel that my coach provides me choices and options”). Responses were given on a 7-point scale ranging from *strongly disagree* to *strongly agree*. The SCQ has shown good reliability with adolescent athletes (e.g., Amorose & Anderson-Butcher, 2007).

*Coach controlling behaviors.* Gymnasts completed the Controlling Coach Behaviors Scale (CCBS; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010). Four subscales constitute the CCBS, but only the *controlling use of rewards* subscale was used because it was the most relevant aspect for my research questions. An example item is, “My coach only rewards/praises me to make me train harder”. Participants responded on a 7-point scale ranging from *strongly disagree* to *strongly agree*. The CCBS was

validated with 12–17 year-old athletes and showed good reliability (Bartholomew et al., 2010).

*Friendship quality.* Gymnasts completed the Sport Friendship Quality Scale (SFQS; M.R. Weiss & Smith, 1999) to assess relationship quality with their best friend in gymnastics. The SFQS contains 6 subscales (*self-esteem enhancement and supportiveness, loyalty and intimacy, things in common, companionship and pleasant play, conflict resolution, and conflict*), but only the first 4 subscales were used to align with my research questions. Participants were asked to identify their best friend in gymnastics and think of that person when answering the questions (e.g., “My friend and I praise each other for doing gymnastics well”). Gymnasts responded on a 5-point scale ranging from *not at all true* to *really true*. Weiss and colleagues validated the SFQS with 8–18 year-old sport participants (e.g., M.R. Weiss & Smith, 1999).

#### *Psychological Need Satisfaction*

*Perceived competence.* Gymnasts completed the athletic competence subscale of Harter’s (1988) Self-Perception Profile for Adolescents. The scale contains 5 items presented in a structured alternative format. Participants were given two statements, asked which one was most like them, and then they decided if that statement was *sort of true* or *really true*. An example item is, “Some teenagers do very well in gymnastics BUT Other teenagers don’t feel they are good when it comes to gymnastics”. Scores ranged from 1–4, with higher scores corresponding to higher perceived competence. Good

psychometric properties have been shown with 8–18 year-old athletes (e.g., W.M. Weiss & Weiss, 2007).

*Perceived autonomy.* Gymnasts responded to a scale developed by Hollembeak and Amorose (2005) to assess perceptions of choice and control in sports. A sample item is, “I help decide what I do when participating in gymnastics”. Gymnasts responded on a 5-point scale ranging from *not at all true for me* to *completely true for me*. The scale has shown good reliability with adolescents in the physical domain (e.g., Amorose & Anderson-Butcher, 2007).

*Perceived relatedness.* Participants completed the relatedness subscale of the Basic Psychological Needs Scale (<http://www.selfdeterminationtheory.org/questionnaires>) to assess perceptions of connectedness in their club. The scale contains 7 items for general feelings of relatedness, but in the sport context gymnasts may experience different levels of relatedness with coaches and teammates. Thus, I used 4 items to assess teammate relatedness (e.g., “I get along with my teammates”) and 4 items for coach relatedness (e.g., “I really like my coaches”). Responses were given on a 5-point scale ranging from *not at all true for me* to *completely true for me*. This scale has shown good reliability with adolescents in the physical domain (e.g., Gagné et al., 2003).

### *Well-Being*

*Self-esteem.* Gymnasts completed the self-worth subscale of Harter’s (1988) Self-Perception Profile for Adolescents. Gymnasts responded to the 5 items in the same structured alternative format as for perceived competence. An example item is, “Some

teenagers are usually happy with themselves as a person BUT Other teenagers are not happy with themselves”. Scores ranged from 1–4, with higher scores corresponding to higher self-esteem. Validity and reliability have been demonstrated with 8–15 year-old sport participants (e.g., Ebbeck & Weiss, 1998).

*Positive affect.* Gymnasts completed a modified version of the Positive and Negative Affect Schedule (Ebbeck & Weiss, 1998; Watson, Clark, & Tellegan, 1988). Ebbeck and Weiss reduced the 10 items to 5 items and used words that are developmentally appropriate for children (e.g., happy, excited). Gymnasts responded to the stem: *Indicate to what extent you have felt this way during the past week (7 days)*. Responses were given on a 5-point scale ranging from *not at all* to *extremely*. The scale showed good psychometrics with 8–13 year-old youth in the physical domain (Ebbeck & Weiss, 1998).

*Disordered eating.* Eating attitudes and behaviors were assessed with the Children’s Eating Attitudes Test (ChEAT; Maloney, McGuire, & Daniels, 1988; Smolak & Levine, 1994). The ChEAT consists of 4 subscales, but participants only responded to items on the *dieting* subscale because it reflects the symptoms of disordered eating relevant to my research questions. An example item is, “I feel very guilty after eating”. Responses were given on a 6-point scale including *never*, *rarely*, *sometimes*, *often*, *very often*, and *always*, where higher scores reflect more symptomatic eating attitudes and behaviors. Good psychometrics have been shown with 8–14 year-olds (Maloney et al., 1988; Smolak & Levine, 1994).

### *Physical Maturity*

Gymnasts responded to one item from the 5-item *Pubertal Development Scale* (PDS; Petersen, Crockett, Richards, & Boxer, 1988): “Have you begun to menstruate (have your period)?” A response of *no* was scored 1 and *yes* was scored 2. Petersen et al. (1988) recommended using the one item if researchers are interested in menarcheal status. Good psychometrics have been shown with adolescents (Petersen et al., 1988).

### *Demographic Items*

At Time 2, gymnasts reported their age, birthday, whether they were in competition season, competitive level, and hours of gymnastics training per week.

### *Procedure*

After approval from the university’s Institutional Review Board, I contacted coaches by phone and e-mail. I requested their club’s participation in a follow-up survey and told them that gymnasts would be entered into a drawing for one of ten \$10 Target gift cards as appreciation for their time. Parent letters and consent forms were mailed to each gym, and coaches distributed to the gymnasts (see Appendix F). Then I visited each gym to administer the survey during the first or last 15 minutes of practice. Gymnasts completed the survey in an area of the gym away from coaches, parents, and non-participating teammates. I gave scripted instructions for the survey and assured gymnasts that their responses would be kept confidential. Only gymnasts with parental consent and who assented themselves were included in the study. Data were collected in February to

April of 2012, which was during or soon after the competitive season. Of the 303 gymnasts who completed surveys at Time 1, 174 participated again at Time 2. Girls who did not participate at Time 2 either dropped out of gymnastics, did not attend practice that day, or belonged to clubs that did not participate in the second round of surveys. The Time 2 survey can be seen in Appendix G.

### *Design and Data Analysis*

This study employed a longitudinal design in which social influences, need satisfaction, and well-being were assessed at Time 1, and then need satisfaction and well-being were assessed again 6–8 months later. The longitudinal design allowed for inferences about strength and reliability of relationships over time as well as the psychological needs as mediators of the relationship between social influences and well-being. Two models were tested using structural equation modeling with LISREL 8.8 (Jöreskog & Sörbom, 2001). In Model A I examined whether social influences at Time 1 predicted need satisfaction at Time 2, controlling for need satisfaction at Time 1 and physical maturity at Time 1. In Model B I assessed whether need satisfaction at Time 1 predicted well-being at Time 2, controlling for well-being at Time 1.

Three steps were used for each model: (a) model specification, (b) model fit, and (c) parameter estimation. First, the model was specified based on theory-driven hypothesized relationships. Second, the fit of the model to observed data was tested with multiple fit indices—chi-square ( $\chi^2$ ), root mean square error of approximation (RMSEA), non-normed fit index (NNFI), comparative fit index (CFI), and goodness of fit index

(GFI) (Hu & Bentler, 1999; Ullman, 2007). A good model fit is indicated by a non-significant  $\chi^2$  value ( $p \geq .05$ ), RMSEA  $\leq .05$ , and NNFI, CFI, and GFI  $\geq .95$ ; a reasonable model fit is indicated by a non-significant  $\chi^2$  value ( $p \geq .05$ ), RMSEA  $< .08$ , and NNFI, CFI, and GFI  $\geq .90$  (Hu & Bentler, 1999). Chi-square is often significant in studies with large sample sizes, but a good-fitting model is likely when the relation of  $\chi^2/df$  is less than 2 (Ullman, 2007). Third, parameter estimates (factor loadings, path coefficients) were examined for significance ( $t > 1.96$ ) and interpreted relative to hypotheses.

Mediation was tested using a method recommended by Cole and Maxwell (2003). With two waves of data, they recommend testing two longitudinal models (as described above) to obtain path coefficients between  $X_1$  and  $M_2$  (path  $a$ ) and  $M_1$  and  $Y_2$  (path  $b$ ), where  $X$  is a social influence variable (e.g., mastery/autonomy-support),  $M$  is a psychological need (e.g., perceived competence),  $Y$  is a well-being indicator (e.g., self-esteem), and 1 and 2 represent the wave of data collection. Assuming stationarity, or an unchanging causal structure, the product  $ab$  is an estimate of the effect of  $X$  on  $Y$  through  $M$  (Cole & Maxwell, 2003).

I determined whether each estimated mediational effect was significant using PRODCLIN (distribution of the PRODuct Confidence Limits for the INDirect effect) (MacKinnon, Fritz, Williams, & Lockwood, 2007). PRODCLIN is a computer program that uses the distribution of the product of two variables to compute confidence intervals for the mediated effect. Using PRODCLIN, I entered each  $a$  and  $b$  path along with their standard errors (provided by the LISREL output), and the program provided the 95% confidence interval (CI) of the indirect effect (see Appendix H for calculations). For each

indirect effect tested, if the range of numbers in the confidence interval did not include zero (e.g., .05–.20), the effect was significant; if the range included zero, the indirect effect was nonsignificant.

## Results

### *Scale Reliabilities and Descriptive Statistics*

Scale reliabilities and descriptive statistics are presented in Tables 16 and 17. All scales achieved adequate reliability using alpha coefficients. To be consistent, the measures in Study 2 did not include the unreliable items from Study 1 (i.e., 3 performance climate items, 1 friendship quality item, and 1 perceived autonomy item). Gymnasts reported relatively high scores for mastery climate and friendship quality at Time 1 and for coach relatedness, teammate relatedness, and self-esteem at Time 1 and 2. Girls reported scores above the midpoint for coach autonomy-supportive behaviors at Time 1 and for perceived competence, perceived autonomy, and positive affect at Time 1 and 2. Gymnasts reported relatively low scores for performance climate and coach controlling behaviors at Time 1 and for disordered eating at both time periods. For physical maturity, 103 girls were pre-pubertal at both waves of data collection, 51 girls were post-pubertal at both waves, and 20 girls changed menarcheal status from Time 1 to Time 2. Correlations among variables were in the expected direction. Correlations between social influences at Time 1 and psychological needs at Time 2 were low to



Table 16

*Descriptive Statistics for Variables in Model A*

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Mastery Climate T1	.68												
2. Autonomy-Support T1	.65	.78											
3. Performance Climate T1	-.36	-.35	.67										
4. Controlling Behaviors T1	.05	.07	.08	.79									
5. Friendship Quality T1	.22	.11	.03	.01	.89								
6. Perceived Competence T1	.08	.03	-.10	-.06	.10	.67							
7. Perceived Autonomy T1	.33	.59	-.12	-.06	.19	.12	.82						
8. Perceived Coach Relatedness T1	.59	.65	-.38	.05	.11	.12	.37	.80					
9. Perceived Teammate Relatedness T1	.32	.29	-.19	-.09	.36	.06	.18	.36	.85				
10. Perceived Competence T2	.08	.11	.01	-.04	.09	.68	.18	.16	.08	.77			
11. Perceived Autonomy T2	.15	.32	-.11	-.05	.04	.11	.48	.22	.08	.28	.80		
12. Perceived Coach Relatedness T2	.40	.37	-.28	.03	.05	.22	.19	.52	.17	.36	.42	.84	
13. Perceived Teammate Relatedness T2	.25	.20	-.09	-.06	.25	.04	.16	.23	.53	.15	.24	.38	.84
<i>M</i>	4.26	5.16	1.59	3.28	4.28	2.81	3.44	4.39	4.48	2.74	3.59	4.44	4.49
<i>SD</i>	.55	1.08	.70	1.38	.53	.52	.70	.57	.56	.56	.61	.55	.55
Scale Range	1-5	1-7	1-5	1-7	1-5	1-4	1-5	1-5	1-5	1-4	1-5	1-5	1-5

*Note.* Alpha coefficients are presented on the diagonal.  $r > |.14|$  denote significant relationships ( $p < .05$ ).

Table 17  
*Descriptive Statistics for Variables in Model B*

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Perceived Competence T1	.67									
2. Perceived Autonomy T1	.12	.82								
3. Perceived Coach Relatedness T1	.12	.37	.80							
4. Perceived Teammate Relatedness T1	.06	.18	.36	.85						
5. Self-Esteem T1	.32	.03	.01	.13	.69					
6. Positive Affect T1	.50	.12	.27	.14	.27	.81				
7. Disordered Eating T1	-.08	-.16	-.06	-.20	-.17	-.14	.85			
8. Self-Esteem T2	.41	.07	.12	.18	.51	.33	-.21	.74		
9. Positive Affect T2	.32	.06	.19	.18	.25	.46	-.17	.60	.84	
10. Disordered Eating T2	-.23	-.02	-.01	-.20	-.17	-.21	.72	-.35	-.29	.89
<i>M</i>	2.81	3.44	4.39	4.48	3.46	3.65	2.01	3.43	3.67	1.98
<i>SD</i>	.52	.70	.57	.56	.49	.72	.89	.51	.76	.99
Scale Range	1-4	1-5	1-5	1-5	1-4	1-5	1-6	1-4	1-5	1-6

*Note.* Alpha coefficients are presented on the diagonal.  $r > |.14|$  denote significant relationships ( $p < .05$ ).

moderate, ranging from  $|.01-.40|$ . Correlations between psychological needs at Time 1 and well-being at Time 2 were also low to moderate, ranging from  $|.01-.41|$ .

Autocorrelations (e.g., perceived competence at Time 1 and Time 2) were moderate to high, ranging from  $.46-.72$ .

#### *Longitudinal Predictors of Psychological Need Satisfaction and Well-Being*

Structural equation modeling was used to test two models of hypothesized relationships. Subscale scores and random item parcels served as indicators for most latent variables. (Coffman & MacCallum, 2005; Little, Cunningham, Shahar, & Widaman, 2002). Subscale scores were used as observed indicators for friendship quality, while random item parcels were used as indicators for controlling behaviors, psychological needs, and well-being. For these constructs, items were placed in random order, the first half of the items were averaged into one parcel, and the second half were averaged into another parcel. Equations for all created item parcels are presented in Appendix E. The three items for performance climate and the single item assessing menarcheal status were used as indicators for respective latent variables. Finally, to be consistent with Study 1 mastery climate and autonomy-support were combined into one latent variable, with the average score for each scale used as indicators.

#### *Model A*

Model A included social influences at Time 1 predicting psychological need satisfaction at Time 2, controlling for need satisfaction at Time 1. Several independent

variables were specified to correlate with each other based on Study 1 findings. Social variables were specified to correlate with each other, and coach and teammate relatedness were specified to correlate. Based on significant paths from Study 1, I specified mastery/autonomy-support to correlate with perceived autonomy and coach relatedness; controlling behaviors with autonomy; friendship quality with perceived competence and teammate relatedness; and physical maturity with perceived competence. For the dependent variables, the errors of coach and teammate relatedness at Time 2 were specified to correlate.

The first run of the model resulted in a non-admissible solution due to a non-positive definite theta-delta matrix. Diagnostics showed that controlling behaviors was the problematic construct with large and negative variances. Thus, controlling behaviors was removed from further analysis. The second run of the model showed a reasonable fit to the data  $\chi^2(278) = 540.03, p < .05$  ( $\chi^2/df = 1.94$ ); RMSEA = .07 (90% CI = .0604–.0794); NNFI = .91; CFI = .92; GFI = .81. Modification indices revealed large decreases in chi-square if the psychological needs at Time 1 and the errors of the psychological needs at Time 2 were specified to correlate. This is conceptually defensible because they share the broad construct of psychological need satisfaction, and most of these variables showed moderate correlations in the descriptive analyses. Modification indices showed substantial decreases in chi-square for each correlation, so these correlations were added to the model in one step. The third run showed a reasonable fit of the model to the data  $\chi^2(268) = 450.59, p < .05$  ( $\chi^2/df = 1.68$ ); RMSEA = .06 (90% CI = .0481–.0689); NNFI = .93; CFI = .95; GFI = .84. Modification indices did not reveal any other theoretically

justified changes, so this was deemed the final model for interpretation. Factor loadings and uniquenesses can be seen in Table 18.

Two paths were significant after controlling for Time 1 psychological needs (see Table 19). Mastery/autonomy-support at Time 1 positively predicted perceived competence at Time 2. When coaches were perceived as emphasizing self-referenced criteria for success and acknowledging gymnasts' feelings, girls reported higher gymnastics ability 7 months later. Performance climate at Time 1 was also a positive predictor of Time 2 perceived competence. When coaches were perceived as using norm-referenced criteria to define success, girls reported higher gymnastics ability at Time 2. As expected, each of the autocorrelations was significant. Perceived competence, autonomy, coach relatedness, and teammate relatedness at Time 1 were strongly predictive of their corresponding need at Time 2. The variables in Model A explained a large amount of variance in psychological needs—82.4% for perceived competence, 30.6% for perceived autonomy, 35.4% for coach relatedness, and 39.4% for teammate relatedness (Cohen, 1988).

#### *Model B*

Model B included psychological need satisfaction at Time 1 predicting well-being at Time 2, controlling for well-being at Time 1. Several independent variables were specified to correlate with each other based on significant paths found in Study 1. Perceived competence was specified to correlate with self-esteem, positive affect, and

Table 18  
*Completely Standardized Factor Loadings for Model A*

Subscale/Parcel/Item	Latent Variable	Factor Loading	Uniqueness
Mastery	Mastery/Autonomy-Support T1	.70*	.51
AutSupp	Mastery/Autonomy-Support T1	.91	.17
PC1	Performance Climate T1	.58*	.66
PC2	Performance Climate T1	.42	.82
PC3	Performance Climate T1	.94	.13
FQ1	Friendship Quality T1	.68*	.54
FQ2	Friendship Quality T1	.97	.07
FQ3	Friendship Quality T1	.63	.61
FQ4	Friendship Quality T1	.62	.62
Com1	Perceived Competence T1	.75*	.43
Com2	Perceived Competence T1	.74	.45
Aut1	Perceived Autonomy T1	.90*	.20
Aut2	Perceived Autonomy T1	.84	.30
CRel1	Coach Relatedness T1	.78*	.40
CRel2	Coach Relatedness T1	.85	.29
TRel1	Teammate Relatedness T1	.96*	.09
TRel2	Teammate Relatedness T1	.78	.39
Menarcheal status	Physical Maturity T2	1.0*	--
Com1b	Perceived Competence T2	.83*	.31
Com2b	Perceived Competence T2	.75	.43
Aut1b	Perceived Autonomy T2	.87*	.24
Aut2b	Perceived Autonomy T2	.82	.33
CRel1b	Coach Relatedness T2	.80*	.36
CRel2b	Coach Relatedness T2	.91	.17
TRel1b	Teammate Relatedness T2	.89*	.21
TRel2b	Teammate Relatedness T2	.82	.32

*Note.* \* Parameter estimate was fixed to 1.0. All loadings were significant,  $t > |1.96|$ . T1 and T2 refer to time of data collection.

Table 19  
*Completely Standardized Path Coefficients for Model A*

Path	Coefficient	<i>t</i> value
<b>Mastery/Autonomy-Support T1 → Perceived Competence T2</b>	<b>.14</b>	<b>2.07</b>
Mastery/Autonomy-Support T1 → Perceived Autonomy T2	-.03	-.26
Mastery/Autonomy-Support T1 → Coach Relatedness T2	-.21	-1.48
<b>Performance Climate T1 → Perceived Competence T2</b>	<b>.19</b>	<b>2.66</b>
Performance Climate T1 → Perceived Coach Relatedness T2	-.09	-1.28
Friendship Quality T1 → Perceived Competence T2	-.02	-.33
Friendship Quality T1 → Teammate Relatedness T2	.07	.88
<b>Perceived Competence T1 → Perceived Competence T2</b>	<b>.89</b>	<b>7.92</b>
<b>Perceived Autonomy T1 → Perceived Autonomy T2</b>	<b>.57</b>	<b>5.10</b>
<b>Coach Relatedness T1 → Coach Relatedness T2</b>	<b>.73</b>	<b>4.83</b>
<b>Teammate Relatedness T1 → Teammate Relatedness T2</b>	<b>.60</b>	<b>6.77</b>
Physical Maturity T1 → Perceived Competence T2	.03	.43

*Note.* *t* values > |1.96| are significant ( $p < .05$ ) and in boldface. T1 and T2 denote time of data collection.

disordered eating; coach relatedness with positive affect; and teammate relatedness with self-esteem and disordered eating. The psychological needs at Time 1 were specified to correlate with each other, as were well-being indices at Time 1 and errors of well-being at Time 2. The model showed a good fit to the data,  $\chi^2(137) = 149.11, p > .05$  ( $\chi^2/df = 1.09$ ); RMSEA = .01 (90% CI = .0000–.0381); NNFI = .993; CFI = .995; GFI = .93. Modification indices did not reveal any theoretically justified changes, so this was the final model for interpretation. Factor loadings and uniquenesses are presented in Table 20.

Table 20  
*Completely Standardized Factor Loadings for Model B*

Subscale/Parcel/Item	Latent Variable	Factor Loading	Uniqueness
Com1	Perceived Competence T1	.76*	.43
Com2	Perceived Competence T1	.74	.46
Aut1	Perceived Autonomy T1	.91*	.18
Aut2	Perceived Autonomy T1	.83	.32
CRel1	Coach Relatedness T1	.81*	.34
CRel2	Coach Relatedness T1	.81	.34
TRel1	Teammate Relatedness T1	1.03*	-.06
TRel2	Teammate Relatedness T1	.73	.47
SE1	Self-Esteem T1	.96*	.08
SE2	Self-Esteem T1	.52	.73
Aff1	Positive Affect T1	.81*	.35
Aff2	Positive Affect T1	.80	.36
Eat1	Disordered Eating T1	.93*	.13
Eat2	Disordered Eating T1	.91	.17
SE1b	Self-Esteem T2	.88*	.23
SE2b	Self-Esteem T2	.56	.68
Aff1b	Positive Affect T2	.88*	.23
Aff2b	Positive Affect T2	.84	.30
Eat1b	Disordered Eating T2	.93*	.15
Eat2b	Disordered Eating T2	.94	.11

*Note.* \* Parameter estimate was fixed to 1.0. All loadings were significant,  $t > |1.96|$ . T1 and T2 refer to time of data collection.

Three paths were significant after controlling for well-being at Time 1 (see Table 21). Perceived competence positively predicted self-esteem over time. When gymnasts felt good about their gymnastics ability, they reported higher self-esteem 6 to 8 months later. Perceived competence also negatively predicted disordered eating over time. Greater feelings of ability at Time 1 predicted fewer unhealthy eating habits at Time 2. Teammate relatedness was a negative predictor of disordered eating, meaning that gymnasts who felt a sense of belongingness with their teammates reported lower



symptoms of disordered eating over time. All of the autocorrelations were significant—the well-being indicators at Time 1 were strongly predictive of well-being 7 months later. The variables in Model B explained a large amount of variance in Time 2 well-being indices—50.7% for self-esteem, 34.0% for positive affect, and 67.4% for disordered eating (Cohen, 1988).

Table 21  
*Completely Standardized Path Coefficients for Model B*

Path	Coefficient	<i>t</i> value
<b>Perceived Competence T1 → Self-Esteem T2</b>	<b>.38</b>	<b>3.68</b>
Perceived Competence T1 → Positive Affect T2	.09	.66
<b>Perceived Competence T1 → Disordered Eating T2</b>	<b>-.22</b>	<b>-3.50</b>
Perceived Autonomy T1 → Self-Esteem T2	-.05	-.54
Perceived Autonomy T1 → Positive Affect T2	-.03	-.29
Perceived Autonomy T1 → Disordered Eating T2	.11	1.72
Coach Relatedness T1 → Self-Esteem T2	.05	.48
Coach Relatedness T1 → Positive Affect T2	.02	.18
Coach Relatedness T1 → Disordered Eating T2	.07	.94
Teammate Relatedness T1 → Self-Esteem T2	.11	1.43
Teammate Relatedness T1 → Positive Affect T2	.12	1.49
<b>Teammate Relatedness T1 → Disordered Eating T2</b>	<b>-.12</b>	<b>-1.98</b>
<b>Self-Esteem T1 → Self-Esteem T2</b>	<b>.44</b>	<b>3.98</b>
<b>Positive Affect T1 → Positive Affect T2</b>	<b>.50</b>	<b>3.80</b>
<b>Disordered Eating T1 → Disordered Eating T2</b>	<b>.74</b>	<b>11.84</b>

*Note.* *t* values > |1.96| are significant ( $p < .05$ ) and in boldface. T1 and T2 denote time of data collection.

### *Mediation Analysis*

Several significant indirect effects emerged, showing partial support for the psychological needs as mediators of the relationship between social influences and well-being. Mastery/autonomy support positively predicted self-esteem through perceived competence ( $\beta = .054$ , 95% CI = .003 to .185) and negatively predicted disordered eating through perceived competence ( $\beta = -.032$ , 95% CI = -.213 to -.004). Performance climate positively predicted self-esteem through perceived competence ( $\beta = .071$ , 95% CI = .017 to .165) and negatively predicted disordered eating through perceived competence ( $\beta = -.042$ , 95% CI = -.191 to -.019). Taken together, when gymnasts perceived coaches as emphasizing effort and improvement, providing choices and encouragement, *and* spending more time with the best gymnasts, girls reported greater gymnastics ability and, in turn, more positive global self-evaluations and fewer symptoms of unhealthy eating habits.

### Discussion

The purpose of Study 2 was to examine longitudinal relationships among social influences, psychological need satisfaction, and psychological and physical well-being. In line with self-determination theory, the present study also tested whether the psychological needs mediated the relationship between social influences and well-being. Results extend the knowledge base by assessing strength and stability of relationships over time and longitudinal mediation. In particular, this study highlighted coaches as important predictors of adolescent gymnasts' self-perceptions.

After controlling for psychological need satisfaction at Time 1, perceived mastery/autonomy-support was associated with greater perceived competence 7 months later. Cross-sectional and longitudinal studies have shown positive associations between mastery climate and athletes' perceived competence (e.g., Quested & Duda, 2010; Reinboth & Duda, 2006; Reinboth et al., 2004) as well as autonomy-support and perceived competence (Adie et al., 2012; Amorose & Anderson-Butcher, 2007; Coatsworth & Conroy, 2009). The present study extends cross-sectional findings and adds to the longitudinal literature by showing that behaviors such as emphasizing self-referenced definitions of success, providing cooperative learning activities, offering decision-making opportunities, and acknowledging athletes' ideas were stable predictors of perceived gymnastics ability over time.

In addition to mastery/autonomy-support, performance climate predicted higher perceived competence. When gymnasts perceived a higher performance climate at pre-season, they reported greater gymnastics ability during competition season after accounting for previous levels of perceived competence. On average, gymnasts in the present study did not perceive high levels of a performance climate ( $M = 1.59$ ,  $SD = .70$ ), but the full range of scores was reported (1–5). Gymnasts did perceive high levels of a mastery climate ( $M = 4.26$  on a 5-point scale;  $SD = .55$ ) and reported scores above the midpoint for autonomy-support ( $M = 5.16$  on a 7-point scale;  $SD = 1.08$ ). Thus, higher perceptions of a performance climate *in combination* with higher perceived mastery/autonomy-support was positively related to gymnasts' perceptions of ability over time. In cross-sectional and longitudinal studies, performance climate has been negatively

related to or has shown no relationship with perceived competence (e.g., Kipp & Amorose, 2008; Quested & Duda, 2010; Reinboth & Duda, 2006; Sarrazin et al., 2002).

The present study extends these findings by showing that performance climate significantly predicted higher perceived competence in combination with mastery/autonomy-support and previous levels of perceived competence.

Several factors may explain the positive relationship found between performance climate and perceived competence. First, the performance climate scale consisted of three items that all tapped into the “unequal recognition” dimension, where coaches are perceived to give more attention to better gymnasts and make it clear to athletes which gymnasts are the best. Items tapping punishment for mistakes and a focus on winning were not reliable and were removed. Thus, it was the unequal recognition aspect of performance climate that positively predicted gymnasts’ perceptions of ability. This idea makes sense in light of norms in the sport of gymnastics. When coaches recognize the best gymnasts for their accomplishments and spend more time with them, gymnasts strive to improve and feel good about their ability. For these gymnasts, striving to be the best would have been particularly important during Time 2 because most were in competition season where they were evaluated by judges, scored for performances, and ranked according to ability. The competitive atmosphere, combined with coaches who give more attention to the best gymnasts, is normative and may explain the positive association with self-perceptions over time.

Perceived competence significantly predicted self-esteem over time. When gymnasts reported higher ability at Time 1, they reported higher global self-evaluations 7

months later. The link between domain-specific and global self-evaluations is a robust one (e.g., Harter, 1999, Horn, 2004). Several studies support perceived sport competence as a predictor of self-esteem among adolescents (Amorose, Anderson-Butcher, & Cooper, 2009; Coatsworth & Conroy, 2009; Gagné et al., 2003). Amorose et al. and Coatsworth and Conroy found that perceived competence at the end of the season was positively related to end-of-season self-esteem, controlling for early-season levels. Gagné et al. found that perceived competence during practice predicted within-person increases in self-esteem from pre- to post-practice during a 4-week period. The present study extends past research by showing that greater perceived competence predicted higher self-esteem 7 months later, controlling for earlier levels of self-esteem.

Perceived competence and teammate relatedness predicted lower disordered eating over time. When gymnasts felt good about their ability and felt a sense of belonging with their teammates during preseason, they reported fewer unhealthy eating patterns during competition season. In past studies, perceived competence and relatedness have significantly predicted lower levels of physical ill-being, such as burnout (Amorose et al., 2009; Quested & Duda, 2011). Other studies showed no relationship between psychological needs and physical ill-being (Adie et al., 2012; Quested & Duda, 2010; Reinboth & Duda, 2006). The present study extends these findings by showing that disordered eating, an ill-being indicator relevant for female adolescent gymnasts, was predicted by lower perceived ability and relatedness with teammates.

Results provide strong support for perceived competence as a mediator of the relationship between social influences and well-being. Specifically, mastery/autonomy-

support and performance climate predicted higher self-esteem and lower disordered eating through perceived competence. Past research has shown that coach autonomy-support and mastery climate predict well-being (i.e., greater positive affect and subjective vitality and lower negative affect and burnout) through perceived competence (Adie et al., 2012; Quested & Duda, 2010, 2011). Quested and Duda (2010) also showed that performance climate was negatively associated with well-being (i.e., lower positive affect and higher negative affect) through mediation of perceived competence. In the present study, perceived competence mediated the positive relationship between performance climate with self-esteem and disordered eating. This study extends the knowledge base by employing a different meditational approach to draw precise conclusions about relationships over time and by highlighting predictors of well-being relevant for competitive female adolescent gymnasts. Coaches who spent more time with the best gymnasts *and* emphasized effort, improvement, and choices were adaptive for this sample in terms of perceived competence, self-esteem, and healthy eating attitudes and behaviors.

Several social influences did not predict the psychological needs, contrary to hypotheses. First, mastery/autonomy-support was not significantly related to perceived autonomy or coach relatedness, and performance climate was not associated with coach relatedness. After accounting for Time 1 levels of these needs, coach behaviors did not explain any additional variance. Second, friendship quality was not significantly related to perceived competence or teammate relatedness. Cross-sectional research has shown positive associations between sport friendship quality and perceived competence (A.L.

Smith et al., 2006; Ullrich-French & Smith, 2006) and between friendship quality in physical education and perceived competence or relatedness (Cox et al., 2009; Cox & Ullrich-French, 2010). In the present study, friendship quality showed a significant positive bivariate correlation with teammate relatedness at Time 2, but when Time 1 need satisfaction and coach influence were accounted for in the model, friendship quality was not a significant predictor. Third, perceived autonomy and coach relatedness were not significant predictors of well-being. For this sample, perceived competence and teammate relatedness were the needs that held stable predictive power over time, after controlling for previous levels of well-being. Also, no predictors of positive affect emerged. Positive affect represented a hedonic indicator of well-being, or a more short-term depiction of happiness and pride. The lack of longitudinal predictors reinforces the idea that hedonic well-being is less stable than eudaimonic well-being (e.g., self-esteem).

In conclusion, the present study provides partial support for self-determination theory and highlights the social and psychological processes related to female adolescent gymnasts' well-being over time. When coaches emphasized self- *and* norm-referenced definitions of success and provided opportunities for decision-making, gymnasts reported greater perceived competence 7 months later. In turn, higher perceived competence and teammate relatedness predicted more adaptive well-being over time, including higher self-esteem and lower disordered eating. Thus, coaches have the potential to optimize gymnasts' long-term psychological and physical health and well-being.

## CHAPTER 4

### STUDIES 1 AND 2: INTEGRATED DISCUSSION

Together, the purposes of Studies 1 and 2 were to examine concurrent and longitudinal relationships among social influences, psychological need satisfaction, and psychological and physical well-being with female adolescent gymnasts, using self-determination theory (SDT) as a framework. Self-determination theory was chosen because it is an appropriate framework to study adolescents' well-being in the physical domain (Gagné & Blanchard, 2007; R.M. Ryan & Deci, 2007). I chose female adolescent gymnasts because they are at risk for declining well-being, such as low self-esteem, negative emotions, and disordered eating, due to expectations of leanness and the evaluative nature of the sport (e.g., Horn, 2004; Krane et al., 1997). According to SDT, significant adults and peers can promote these indices of well-being by influencing adolescents' perceived competence, autonomy, and relatedness. Thus, coaches' interpersonal style and motivational climate and friendship quality were included as key sources of social influence in relation to psychological and physical well-being (Amorose, 2007; Horn & Amorose, 1998; Weiss & Stuntz, 2004).

Studies 1 and 2 provide information about how multiple socializers, through varying behaviors and styles, are related to psychological need satisfaction (i.e., perceived competence, autonomy, and relatedness) and well-being (i.e., self-esteem, positive affect, and disordered eating). In this chapter, I integrate findings from both studies, discuss findings relative to the existing literature, and explain how they extend



the knowledge base on adolescents' well-being in the physical domain. Then I provide theoretical implications, translate findings to offer best practices for coaching young athletes, identify limitations and directions for future research, and conclude with take-home messages of these studies.

In Studies 1 and 2, coaches and teammates were differentially related to gymnasts' psychological need satisfaction. Study 1 showed that perceptions of coaches exhibiting a greater mastery climate and more frequent autonomy-supportive behaviors were associated with higher perceived autonomy and coach relatedness, while greater friendship quality was associated with higher perceived competence and teammate relatedness. Study 2, a longitudinal analysis of gymnasts' experiences 7 months later, showed that higher ratings of coaches' mastery climate, autonomy-support, *and* performance climate predicted greater perceived competence over time, controlling for perceived competence at Time 1. Together, findings show that during preseason, friendship quality was important for gymnasts' perceptions of ability, but that relationship was not apparent 7 months later during competition season. Rather, coaches' interpersonal style and climate emphasis were important for gymnasts' perceived competence over time. Interestingly, performance climate did not show concurrent relationships with need satisfaction but was associated with higher perceived competence 7 months later.

The positive longitudinal relationship between performance climate and perceived competence may seem counterintuitive, but it makes sense based on norms in the sport of gymnastics. In a performance climate, emphasis is placed on social comparison and

outperforming others. During competition, one gymnast at a time performs her routine with the possibility of all eyes on her. With each gymnast who performs, the crowd has the opportunity to judge one performance against another and determine who the best gymnasts are. The judges for each event inevitably use social comparison to help determine each gymnast's score. After each performance, the score is displayed to the public, providing an immediate opportunity for the gymnast, coach, teammates, and spectators to judge her performance against previous performances. Thus, social comparison is pervasive in gymnastics competitions. It is often the *combination* of norm- and self-referenced sources of information (e.g., a place standing *and* a personal best score) that gymnasts use to judge their ability. Thus, when coaches emphasize both mastery and performance climates, gymnasts glean information about their competence. The social comparison evident in the sport of gymnastics helps explain the positive relationship between performance climate and perceived competence.

While it is intuitive that a performance climate would predict higher perceived ability for the best gymnasts (they are the ones receiving the highest scores and the most attention from the coach), it is questionable whether gymnasts who are not receiving attention would benefit from a performance climate. One explanation may be that these gymnasts are motivated to improve, and the social comparison emphasis drives them to strive for improvement, which they do over time. Another explanation may be that the combination of a performance climate with greater mastery emphasis and autonomy-support is most adaptive for all gymnasts. In Study 2, higher perceived performance climate *in combination with* higher perceptions of a mastery climate and autonomy-

support were indeed adaptive for gymnasts' self-perceptions. On average, gymnasts reported relatively high mastery/autonomy-support and a relatively low performance climate. Thus, higher perceptions a performance climate *in the presence of* higher mastery/autonomy-support was associated with greater perceived competence over time.

Across Studies 1 and 2, perceived competence and teammate relatedness were important psychological needs for optimizing gymnasts' well-being. Competence beliefs were significantly associated with self-esteem and disordered eating concurrently and over time. In particular, higher levels of perceived gymnastics ability were associated with greater global self-evaluations. This relationship has been robust with adolescents in various sports and physical activities (e.g., Amorose et al., 2009; Ebbeck & Weiss, 1998; Gagné et al., 2003; Standage & Gillison, 2007). Study 2 extends past cross-sectional and longitudinal research by showing that perceived sport competence contributes to higher self-esteem 7 months later. Higher perceived competence was also associated with fewer symptoms of disordered eating, meaning that when girls felt good about their gymnastics ability, they reported fewer thoughts about their body and dieting behaviors. Thus, perceived competence is an important individual difference factor related to more adaptive psychological and physical well-being for female adolescent gymnasts.

Teammate relatedness was also associated with disordered eating concurrently and over time. When gymnasts felt a sense of connection and belonging with their teammates, they reported healthier eating attitudes and behaviors. This finding supports relatedness as a contributor to physical health. Because the relatedness concept was deconstructed into coach and teammate forms, results extend past research that has

shown non-significant or weak relationships between relatedness and well-being indices (Amorose et al., 2009; Reinboth et al., 2004).

The present studies provide support for the psychological needs as mediators of the relationship between social influences and well-being. First, perceived competence drove indirect relationships both concurrently and longitudinally. In Study 1, a quality friendship with a best friend on the team was associated with greater self-esteem, higher positive affect, and lower disordered eating through perceived competence. In Study 2, mastery/autonomy-support and performance climate predicted higher perceived competence, which in turn predicted greater self-esteem and lower disordered eating. Thus, perceived gymnastics ability is an important psychological factor that plays a part in how multiple socializers relate to gymnasts' well-being. Second, Study 1 also provided support for coach and teammate relatedness as mediators. Greater friendship quality was associated with higher self-esteem and lower disordered eating through teammate relatedness, and perceptions of mastery/autonomy-support by the coach were associated with positive affect through coach relatedness. Thus, coaches were distinctly important for gymnasts' positive emotions, and teammates were characterized as sources for their peers' feelings of self-worth and healthy eating attitudes and behaviors.

While perceived competence and teammate relatedness were important mediators, the indirect relationships differed from Study 1 to Study 2. In Study 1, friendship quality was indirectly associated with higher self-esteem and lower disordered eating, but in Study 2, coach mastery/autonomy-support and performance climate predicted these well-being indices. These findings highlight the dynamic quality of the gymnastics

environment. When examining relationships at one point in time, friendship quality emerged as the strongest social mechanism for promoting gymnasts' eudaimonic and physical well-being. However, coach climate and autonomy-support were the processes that predicted gymnasts' well-being 7 months later. Thus, it is important for coaches to provide opportunities for positive teammate interactions, and in the long run it is important that coaches emphasize self- and norm-referenced performance and provide opportunities for decision-making.

Most studies have not considered physical or cognitive developmental factors as correlates of psychological need satisfaction and well-being. For gymnasts, physical maturity is a critical variable that may be related to self-perceptions, affect, and behaviors (e.g., Iversen, 1990; Krane et al., 1997). Previous research has shown associations between physical maturity and self-perceptions (Hunter Smart et al., 2012; Malina, 2002; Monsma et al., 2006). Hunter Smart et al. found that physical maturity was negatively related to perceived sport competence and, in turn, lower physical self-worth for female adolescents. Physical maturity was indeed an important addition to the model in Study 1—post-pubertal gymnasts reported lower perceived competence, self-esteem, and positive affect, and higher disordered eating, compared to pre-pubertal gymnasts. In Study 2, physical maturity was not significantly related to perceived competence over time, controlling for Time 1 perceived competence. While physical maturity was associated with lower self-perceptions concurrently, it is important to note that having a quality relationship with a best friend on the team was associated with more positive self-perceptions and may buffer the negative outcomes associated with puberty. For example,

gymnasts who have a friend that provides praise and conveys confidence in their ability should experience more positive competence beliefs, which may counter the negative influence of physical maturity on perceived competence.

In sum, several robust findings emerged across both studies, such as perceived competence as an important mediator of the relationship between multiple social influences with self-esteem and disordered eating. Next, I discuss study findings in relation to the tenets of self-determination theory (SDT) and previous SDT research.

### Theoretical Implications

The present studies provide partial support for self-determination theory (SDT; R.M. Ryan & Deci, 2000, 2007). According to SDT, the social context (i.e., coaches and teammates) can enhance or suppress youths' perceptions of competence, autonomy, and relatedness. Satisfaction of these basic psychological needs, in turn, can promote optimal health and well-being. In this section I discuss how my findings support the relationships outlined by SDT and extend the SDT knowledge base on social influence, psychological need satisfaction, and well-being among adolescents in the physical domain.

Studies 1 and 2 highlight predictors of psychological and physical well-being that are consistent with SDT. Well-being is defined within SDT as optimal functioning and health, which includes eudaimonic, hedonic, and physical health indicators (Deci & Ryan, 2008; R.M. Ryan & Deci, 2001). Across *both* studies, perceived competence was associated with eudaimonic well-being (i.e., self-esteem). The socializers that promoted

self-esteem differed across studies. Concurrently, a quality relationship with a best friend on the team was associated with higher self-esteem through perceived competence and teammate relatedness. Over time, self-esteem was predicted by coach climate and interpersonal style. When coaches emphasized self- and norm-referenced criteria for success and provided gymnasts with choices and input, girls reported higher gymnastics ability and in, turn, greater self-worth. Consistent with SDT, the present studies highlight coaches and teammates as predictors of eudaimonic well-being through perceived competence and teammate relatedness.

Correlates of hedonic well-being (i.e., positive affect) were shown in Study 1. Higher perceptions of coach mastery/autonomy-support were associated with coach relatedness and in turn greater positive affect. A quality friendship on the team was associated with greater positive affect through perceived competence. However, longitudinal relationships with positive affect were not significant. Thus, coach and peer behaviors and perceived competence and coach relatedness were associated with concurrent positive emotions, but they did not predict positive affect 7 months later. Quested and Duda (2010) showed concurrent relationships between the psychological needs and positive affect, and Gagné et al. (2003) showed that psychological need satisfaction was associated with increases in positive affect over 4 weeks. The present studies reinforce *short-term* relationships between aspects of the social context and need satisfaction with positive emotions. The differing findings in Studies 1 and 2 make sense in light of the hedonic quality of positive affect—it is a less stable indicator of well-being compared to self-esteem.

Predictors of the physical health aspect of well-being (i.e., disordered eating) included teammates in Study 1 and coaches in Study 2. In particular, higher friendship quality was associated with higher perceived competence and teammate relatedness and, in turn, fewer dieting thoughts and behaviors at Time 1. Coach behaviors predicted disordered eating 7 months later—greater perceived mastery/autonomy-support and performance climate were associated with greater perceived ability and, in turn, healthier eating attitudes and behaviors over time. In line with SDT, predictors of physical health included coach and teammate behaviors and competence and relatedness need satisfaction.

Perceived competence and relatedness (but not autonomy) were important psychological needs contributing to gymnasts' well-being. This finding partially supports the tenets of SDT, which proposes that people strive to satisfy all three psychological needs (R.M. Ryan & Deci, 2000). In contrast to theoretical predictions, perceived autonomy was not significantly related to well-being, perhaps due to the few opportunities for input and decision-making inherent in the sport of gymnastics. For example, coaches often dictate which events and skills and how many repetitions gymnasts are to perform each day. For female adolescent gymnasts, higher perceptions of ability and connection with teammates were most adaptive for their psychological and physical well-being.

Coaches and teammates have the potential to impact gymnasts' eudaimonic, hedonic, and physical well-being at different points in time. First, coaches were associated with (a) concurrent hedonic well-being and (b) long-term eudaimonic well-



being and physical health. Second, friendship quality was indirectly associated with all three well-being indices concurrently but not over time. During preseason, higher friendship quality was associated with greater teammate relatedness and more adaptive well-being. Few studies have examined coaches and peers together with athlete outcomes (Blanchard et al., 2009; Price & Weiss, 2012; Stuntz & Spearance, 2010). Blanchard et al. used self-determination theory to simultaneously examine coach controlling behaviors and task cohesion and found that both variables predicted adolescent basketball players' need satisfaction, self-determined motivation, and positive emotions. The present studies extend past SDT research by determining how coaches' interpersonal style, motivational climate, and friendship quality simultaneously relate to gymnasts' need satisfaction and eudaimonic, hedonic, and physical well-being concurrently and over time.

The present studies add to the few longitudinal studies on social influences, need satisfaction, and well-being among athletes, using SDT as a framework (Adie, Duda, & Ntoumanis, 2012; Gagné et al., 2003; Quested & Duda, 2011; Reinboth & Duda, 2006). Study 2 employed a longitudinal test of mediation whereby Time 1 social influences predicted Time 2 psychological need satisfaction, and Time 1 need satisfaction predicted Time 2 well-being. This approach provided a more accurate test of the mediational effects specified by SDT compared to past longitudinal studies (Cole & Maxwell, 2003). The pattern of concurrent relationships differed from the pattern of longitudinal relationships, providing insight into the dynamics of social processes for adolescent gymnasts. Results are in line with the processes outlined by SDT—social contexts that

promote the needs for competence, autonomy, and relatedness can optimize health and well-being.

In addition to providing support for relationships specified by SDT, the present studies also *extend* SDT by *contextualizing theoretical tenets* to female adolescents in gymnastics. First, the social mechanisms were carefully chosen based on the sample. Coaches and peers are important sources of competence information for female adolescent athletes (e.g., Horn & Amorose, 1998; Horn, Glenn, & Wentzell, 1993). Second, well-being indicators were also chosen based on context—female adolescent gymnasts are at risk for low self-esteem, low positive affect, and disordered eating (e.g., Krane et al., 1997). Third, the present studies also considered developmental factors in the relationships among social influence, need satisfaction, and well-being. The model controlled for physical maturity, an important developmental marker for adolescents that is associated with lower self-perceptions for girls (Hunter Smart et al., 2012; Malina, 2002; Monsma et al., 2006). Although R.M. Ryan and Deci (2000) state that aspects of SDT are “universal and developmentally persistent,” they also state that the relative importance of each psychological need and the mechanisms for satisfying the needs may change over time (p. 75). Study findings support this claim and demonstrate that social mechanisms, developmental markers, and need salience may be specific to the context in which SDT relationships are examined. My dissertation studies tailored SDT to the context of interest by including constructs unique to female adolescents participating in gymnastics.

In sum, my dissertation studies provide partial support for SDT, such as perceived competence and teammate relatedness as mediators of the relationships between coach and teammate behaviors with eudaimonic, hedonic, and physical well-being. Findings also extend the knowledge base of SDT research in the physical domain. First, psychological *and* physical well-being indicators were examined, in line with SDT's definition of well-being as health and optimal functioning. Second, the present studies simultaneously assessed coach and peer influences, contributing to the knowledge base on social mechanisms related to adolescents' need satisfaction and well-being. Third, concurrent *and* longitudinal analyses allowed for an examination of strength of relationships over time. Finally, the present studies took a contextual, developmental approach by studying the pattern of SDT-specified relationships with a population at risk for declining well-being.

### Practical Implications

Based on the collective findings, suggestions are apparent for optimizing adolescents' well-being. First, perceptions of coach behaviors were associated with positive emotions at preseason and self-esteem and disordered eating 7 months later during competition season. Coaches should emphasize self-referenced criteria for success and provide opportunities for choice and initiative to positively affect gymnasts' emotions, self-evaluations, and thoughts about their body. In addition, coaches recognizing the best gymnasts may not be a negative behavior as long as gymnasts also

perceive a high mastery climate and opportunities for autonomy. This aspect of a performance climate (i.e., unequal recognition) may help gymnasts feel more competent during competition season when social comparison is ubiquitous.

Second, friendship quality was associated with all three well-being indicators during preseason. Coaches are in a position to create opportunities for positive teammate interactions, such as partner activities for warm-up and conditioning, games that require teamwork, mock meets that focus on team performance, and team-building activities outside of practice. Thus, coaches can create an environment to foster quality relationships among teammates.

Third, perceived gymnastics ability and connectedness with coaches and teammates were related to maximal well-being. Thus, coaches should behave in ways to promote gymnasts' feelings of competence and relatedness, such as emphasizing the importance of effort, providing opportunities for cooperative learning, and acknowledging gymnasts' thoughts and feelings.

The present studies highlight processes by which coaches can *promote* well-being, but one should also remember that relationships point to potential maladaptive outcomes. For example, lower perceptions of mastery/autonomy-support were related to lower perceived competence and in turn lower self-esteem and higher disordered eating. Lower teammate relatedness was also associated with more frequent symptoms of disordered eating. Low self-worth and unhealthy eating habits are a reality in the sport of gymnastics. For example, former Olympic gymnast Shawn Johnson commented on self-worth and her recent 25-pound weight loss:

We're taught at such a young age that you can always be better and that you're never perfect and that you're never good enough... You find your worth in someone else and what they say just from having looked at you... Girls should be taught different than that. (Whiteside, 2012)

More than 15 years after Joan Ryan's (1995) plea for awareness about eating disorders in gymnastics, gymnasts today may still experience low self-worth because of their perceived weight and appearance. Coaches should stay informed about the processes that promote well-being (e.g., mastery climate, autonomy-support, friendship quality) and provide opportunities for gymnasts to demonstrate competence and connection with others in the gym. Using these mechanisms, coaches can enhance gymnasts' long-term well-being and physical health.

### Study Limitations and Future Research Directions

While the present studies were theory-driven and extend past research conceptually and methodologically, some limitations are noted. First, the present studies tapped into one main aspect of performance climate—unequal recognition. The original measure—the Motivational Climate Scale for Youth Sports (MCSYS; R.E. Smith, Cumming, & Smoll, 2008)—was designed to assess three aspects of performance climate (intra-team rivalry, punishment for mistakes, and unequal recognition), but only the unequal recognition subscale was reliable and used in the structural model. This sample reported relatively low levels of performance climate. Tapping into samples that report

higher levels of performance climate may further contribute to understanding how this construct relates to the psychological needs and well-being. However, these samples may be difficult to recruit—in the present study, for example, two gyms with reputations as producing the best athletes declined participation in the study due to “lack of time,” thus reducing potential variability in the performance climate construct.

Second, social influences besides the ones included in the present study may have explained more variance in the psychological needs and well-being indices. For example, variables such as feedback and reinforcement by the coach, social support, and peer acceptance have been associated with psychosocial outcomes for youth in the physical domain (Amorose, 2007; Weiss & Stuntz, 2004).

Several ideas for future research may contribute to the knowledge base on social influences and well-being among adolescent athletes. First, assessing developmentally appropriate indicators of holistic well-being is important for future research. In the present study, the eudaimonic, hedonic, and physical aspects of well-being that were most relevant for female adolescent gymnasts were self-esteem, positive affect, and disordered eating. More theory-based research on predictors of disordered eating is needed to inform coaches of how to prevent unhealthy eating habits. de Bruin and colleagues (2007, 2009) showed that gymnasts’ dieting behaviors were associated with pressure from coaches, perceptions of a performance climate, and ego orientation. Future research should continue to study the social and psychological factors that impact girls’ eating attitudes and behaviors.

Second, future studies should continue to control for developmental differences with youth athletes, such as physical maturity for adolescent girls. In addition to a “yes/no” measure of menarcheal status, assessing early-, average-, or late-maturation may help explain self-perceptions and well-being in other studies of female adolescent athletes. Early maturing girls are at risk for low self-perceptions and dropout of sport (Malina, 2002), but late-maturing gymnasts may have negative experiences as well, including pressure to maintain a lean physique and unhealthy eating habits (Iversen, 1990).

Third, more longitudinal support for theoretical processes could inform intervention studies to promote self-perceptions and other forms of well-being (see Kipp & Weiss, in press). A few intervention studies have provided insight into how coaches and teammates influence youths’ self-perceptions and anxiety levels (i.e., aspects of well-being) (Ebbeck & Gibbons, 1998; Gibbons et al., 2010; Smith et al., 1995; Smith et al., 2007; Smoll et al., 1993). For example, physical education teachers who were trained to include team-building activities that included group interdependence and cooperation improved adolescents’ global and domain-specific self-perceptions (Ebbeck & Gibbons, 1998; Gibbons et al., 2010). These interventions highlight the processes that can be employed to promote adolescent athletes’ well-being. Using results from Study 2, for example, coaches who are trained to offer autonomy-support, emphasize a mastery climate, and provide opportunities for positive teammate interactions should promote greater need satisfaction and more adaptive well-being for adolescents. Evaluating

interventions with these constructs would be key in determining the causal effect of the social environment on gymnasts' well-being.

### Conclusion

The present studies contribute to understanding social, psychological, and developmental processes related to higher and lower well-being among female adolescent gymnasts. Past research and anecdotal reports have shown that gymnasts are at risk for negative experiences in their sport, such as low self-worth, poor body image, symptoms of disordered eating, and lack of enjoyment (Iversen, 1990; Krane et al., 1997; J. Ryan, 1995; Whiteside, 2012). Self-determination theory and research, including the present studies, highlight ways in which coaches can create positive experiences for gymnasts. Emphasizing self-improvement, acknowledging gymnasts' thoughts and feelings, providing opportunities for choice and initiative, and creating activities involving positive teammate interactions are ways that coaches can optimize gymnasts' self-esteem, positive emotions, and healthy eating patterns. These social influences were associated with concurrent *and* long-term well-being; thus, coaches' leadership style and climate emphasis have the potential to influence gymnasts' well-being over time. As J. Ryan (1995) reported, the coach of former elite gymnast, Kristie Phillips, said things that Kristie will never forget, like how she will fail in life because of her weight. Instead of having a negative impact on gymnasts, coaches can engage in behavioral mechanisms to



promote *positive* experiences that gymnasts will never forget. Those social processes are the keys to optimizing psychological and physical well-being in youth sport.

## References

- Adie, J.W., Duda, J.L., Ntoumanis, N. (2012). Perceived coach-autonomy support, basic need satisfaction and the well- and ill-being of elite youth soccer players: A longitudinal investigation. *Psychology of Sport and Exercise, 13*, 51–59.
- Allen, J.B., & Howe, B.L. (1998). Player ability, coach feedback, and female adolescent athletes' perceived competence and satisfaction. *Journal of Sport & Exercise Psychology, 20*, 280-299.
- Ames, C. (1992). Achievement goals, motivational climate, and motivational processes. In G.C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 161-176). Champaign, IL: Human Kinetics.
- Amorose, A.J. (2001). Intraindividual variability of self-evaluations in the physical domain: Prevalence, consequences, and antecedents. *Journal of Sport & Exercise Psychology, 23*, 222-244.
- Amorose, A.J. (2007). Coaching effectiveness: Exploring the relationship between coaching behavior and motivation from a self-determination theory perspective. In M.S. Hagger & N.L.D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 209-227). Champaign, IL: Human Kinetics.
- Amorose, A. J., & Anderson-Butcher, D. (2007). Autonomy-supportive coaching and self-determined motivation in high school and college athletes: A test of self-determination theory. *Psychology of Sport & Exercise, 8*, 654-670.

- Amorose, A.J., Anderson-Butcher, D., & Cooper, J. (2009). Predicting changes in athletes' well-being from change in need satisfaction over the course of a competitive season. *Research Quarterly for Exercise and Sport*, *80*, 386-392.
- Amorose, A.J., & Horn, T.S. (2000). Intrinsic motivation: Relationships with collegiate athletes' gender, scholarship status, and perceptions of their coaches' behavior. *Journal of Sport & Exercise Psychology*, *22*, 63-84.
- Amorose, A.J., & Horn, T.S. (2001). Pre- to post-season changes in the intrinsic motivation of first year college athletes: Relationships with coaching behavior and scholarship status. *Journal of Applied Sport Psychology*, *13*, 355-373.
- Baard, P.P., Deci, E.L., & Ryan, R.M. (2000). Intrinsic need satisfaction: A motivational basis of performance and well-being in two work settings. *Journal of Applied Social Psychology*, *34*, 2045-2068.
- Barnett, N.P., Smoll, F.L., & Smith, R.E. (1992). Effects of enhancing coach-athlete relationships on youth sport attrition. *The Sport Psychologist*, *6*, 111-127.
- Bartholomew, K.J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2009). A review of controlling motivation strategies from a self-determination theory perspective: Implications for coaches. *International Review of Sport and Exercise Psychology*, *2*, 215-233.
- Bartholomew, K.J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2010). The controlling interpersonal style in a coaching context: Development and initial validation of a psychometric scale. *Journal of Sport & Exercise Psychology*, *32*, 193-216.

- Black, S.J., & Weiss, M.R. (1992). The relationship among perceived coaching behaviors, perceptions of ability, and motivation in competitive age-group swimmers. *Journal of Sport and Exercise Psychology, 14*, 309-325.
- Blanchard, C.M., Amiot, C.E., Perreault, S., Vallerand, R.J., & Provencher, P. (2009). Cohesiveness, coach's interpersonal style and psychological needs: Their effects on self-determination and athletes' subjective well-being. *Psychology of Sport and Exercise, 10*, 545-551.
- Brown, K.W., & Ryan, R.M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822-848.
- Bruening, J.E., Dover, K.M., & Clark, B.S. (2009). Preadolescent female development through sport and physical activity: A case study of an urban after-school program. *Research Quarterly for Exercise and Sport, 80*, 87-101.
- Catalano, R.F., Berglund, M.L., Ryan, J.A.M., Lonczak, H.S., & Hawkins, J.D. (2004). Positive youth development in the United States: Research findings on evaluations of positive youth development programs. *Annals of the American Academy of Political and Social Science, 591*, 98-124.
- Catalano, R.F., Hawkins, J.D., Berglund, M.L., Pollard, J.A., Arthur, M.W. (2002). Prevention science and positive youth development: Competitive or cooperative frameworks? *Journal of Adolescent Health, 31*, 230-239.

- Chelladurai, P. (2007). Leadership in sports. In G. Tenenbaum & R.C. Eklund (Eds.), *Handbook of sport psychology* (3<sup>rd</sup> ed.; pp. 113–135). Morgantown, WV: Fitness Information Technology.
- Coakley, J. (1992). Burnout among adolescent athletes: A personal failure or social problem? *Sociology of Sport Journal*, *9*, 271-285.
- Coatsworth, J.D., & Conroy, D.E. (2006). Enhancing self-esteem of youth swimmers through coach training: Gender and age effects. *Psychology of Sport and Exercise*, *7*, 173-192.
- Coatsworth, J.D., & Conroy, D.E. (2009). The effect of autonomy-supportive coaching, need satisfaction, and self-perceptions on initiative and identity in youth swimmers. *Developmental Psychology*, *45*, 320-328.
- Coffman, D.L., & MacCallum, R.C. (2005). Using parcels to convert path analysis models into latent variable models. *Multivariate Behavioral Research*, *40*, 235–259.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup> ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Coie, J.D., Watt, N.F., West, S.G., Hawkins, J.D., Asarnow, J.R., Markman, H.J., ...Long, B. (1993). The science of prevention: A conceptual framework and some directions for a national research program. *American Psychologist*, *48*, 1013-1022.

- Cole, D.A., & Maxwell, S.E. (2003). Testing meditational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology, 112*, 558–577.
- Corbin, C.B., Pangrazi, R.P., & Le Masurier, G.C. (2004). Physical activity for children: Current patterns and guidelines. *Journal of Physical Activity and Health, 1*, 281.
- Cox, A., Duncheon, N., & McDavid, L. (2009). Teachers as sources of relatedness perceptions, motivation, and affective responses in physical education. *Research Quarterly for Exercise and Sport, 80*, 765-773.
- Cox, A., & Ullrich-French, S. (2010). The motivational relevance of peer and teacher relationship profiles in physical education. *Psychology of Sport and Exercise, 11*, 337-344.
- Crocker, P.R.E., Hoar, S.D., McDonough, M.H., Kowalski, K.C., & Niefer, C.B. (2004). Emotional experience in youth sport. In M.R. Weiss (Ed.), *Developmental sport and exercise psychology: A lifespan perspective* (pp. 197-221). Morgantown, WV: Fitness Information Technology.
- Damon, W. (2004). What is positive youth development? *Annals of the American Academy of Political and Social Science, 591*, 13-24.
- de Bruin, A.P., Bakker, F.C., & Oudejans, R.R.D. (2009). Achievement goal theory and disordered eating: Relationships of disordered eating with goal orientations and motivational climate in female gymnasts and dancers. *Psychology of Sport and Exercise, 10*, 72–79.

- de Bruin, A.P., Oudejans, R.R.D., & Bakker, F.C. (2007). Dieting and body image in aesthetic sports: A comparison of Dutch female gymnasts and non-aesthetic sport participants. *Psychology of Sport and Exercise, 8*, 507-520.
- Deci, E.L., & Ryan, R.M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum Publishing Corporation.
- Deci, E.L., & Ryan, R.M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology, 53*, 1024-1037.
- Deci, E.L., & Ryan, R.M. (2008). Hedonia, eudaimonia, and well-being: An introduction. *Journal of Happiness Studies, 9*, 1-11.
- Deci, E.L., Ryan, R.M., Gagné, M., Leone, D.R., Usunov, J., & Kornazheva, B.P. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former eastern bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin, 27*, 930-942.
- Diener, E. (1994). Subjective well-being. *Psychological Bulletin, 95*, 542-575.
- Duncan, S.C. (1993). The role of cognitive appraisal and friendship provisions in adolescents' affect and motivation toward activity in physical education. *Research Quarterly for Exercise and Sport, 63*, 314-323.
- Ebbeck, V., & Gibbons, S.L. (1998). The effect of a team building program on the self-conceptions of grade 6 and 7 physical education students. *Journal of Sport & Exercise Psychology, 20*, 300-310.

- Ebbeck, V., & Weiss, M.R. (1998). Determinants of children's self-esteem: An examination of perceived competence and affect in sport. *Pediatric Exercise Science, 10*, 285–298.
- Ferrer Caja, E., & Weiss, M.R. (2000). Predictors of intrinsic motivation among adolescent students in physical education. *Research Quarterly for Exercise and Sport, 71*, 267-279.
- Ferrer Caja, E., & Weiss, M.R. (2002). Cross-validation of a model of intrinsic motivation with students enrolled in high school elective courses. *The Journal of Experimental Education, 71*, 41-65.
- Fraser-Thomas, J., & Côté, J. (2009). Understanding adolescents' positive and negative developmental experiences in sport. *The Sport Psychologist, 23*, 3-23.
- Gagné, M., & Blanchard, C. (2007). Self-determination theory and well-being in athletes: It's the situation that counts. In M.S. Hagger & N.L.D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 243-254). Champaign, IL: Human Kinetics.
- Gagné, M., Ryan, R.M., & Bargmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology, 15*, 372-389.
- Gano-Overway, L.A., Newton, M., Magyar, T.M., Fry, M.D., Kim, M., & Guivernau, M.R. (2009). Influence of caring youth sport contexts on efficacy-related beliefs and social behaviors. *Developmental Psychology, 45*, 329-340.



- Garcia Bengoechea, E., & Streat, W. B. (2007). On the interpersonal context of adolescents' sport motivation. *Psychology of Sport and Exercise, 8*, 195–217.
- Gibbons, S.L., Ebbeck, V., Concepcion, R.Y., & Li, K. (2010). The impact of an experiential education program on the self-perceptions and perceived social regard of physical education students. *Journal of Sport & Exercise Psychology, 32*, 786–804.
- Godin, G., & Shephard, R.J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences, 10*, 141-146.
- Gould, D. (1993). Intensive sport participation and the pre-pubescent athlete: Competitive stress and burnout. In B.R. Cahill & A.J. Pearl (Eds.), *Intensive participation in children's sports* (pp. 19-38). Champaign, IL: Human Kinetics.
- Harter, S. (1988). *Manual for the Self-Perception Profile for Adolescents*. Denver, CO: University of Denver.
- Harter, S. (1999). *The construction of the self: A developmental perspective*. New York: The Guilford Press.
- Harwood, C., Spray, C.M., & Keegan, R. (2008). Achievement goal theories in sport. In T. S. Horn (Ed.), *Advances in sport psychology* (3<sup>rd</sup> ed., pp. 157-185). Champaign, IL: Human Kinetics.
- Hausenblas, H.A., & Carron, A.V. (1999). Eating disorder indices and athletes: An integration. *Journal of Sport & Exercise Psychology, 21*, 230–258.

- Hollembek, J., & Amorose, A. J. (2005). Perceived coaching behaviors and college athletes' intrinsic motivation: A test of self-determination theory. *Journal of Applied Sport Psychology*, *17*, 20-36.
- Horn, T.S. (1985). Coaches' feedback and changes in children's perceptions of their physical competence. *Journal of Educational Psychology*, *77*, 174-186.
- Horn, T.S. (2004). Developmental perspectives on self-perceptions in children and adolescents. In M. R. Weiss (Ed.), *Developmental sport and exercise psychology: A lifespan perspective* (pp. 101-143). Morgantown, WV: Fitness Information Technology.
- Horn, T.S. (2008). Coaching effectiveness in the sport domain. In T. S. Horn (Ed.), *Advances in sport psychology* (3<sup>rd</sup> ed., pp. 240-267). Champaign, IL: Human Kinetics.
- Horn, T.S., & Amorose, A.J. (1998). Sources of competence information. In J.L. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 49-64). Morgantown, WV: Fitness Information Technology.
- Horn, T.S., Glenn, S.D., & Wentzell, A.B. (1993). Sources of information underlying personal ability judgments in high school athletes. *Pediatric Exercise Science*, *5*, 263-274.
- Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1-55.

- Hunter Smart, J.E., Cumming, S.P., Sherar, L.B., Standage, M., Neville, H., & Malina, R.M. (2012). Maturity associated variance in physical activity and health-related quality of life in adolescent females: A mediated effects model. *Journal of Physical Activity and Health, 9*, 86–95.
- Huta, V., & Ryan, R.M. (2010). Pursuing pleasure or virtue: The differential and overlapping well-being benefits of hedonic and eudaimonic motives. *Journal of Happiness Studies, 11*, 735–762.
- Inchley, J., Kirby, J., & Currie, C. (2011). Longitudinal changes in physical self-perceptions and associations with physical activity during adolescence. *Pediatric Exercise Science, 23*, 237-249.
- Iversen, G.E. (1990). Behind schedule: Psychosocial aspects of delayed puberty in the competitive female gymnast. *The Sport Psychologist, 4*, 155-167.
- Jöreskog, K. & Sörbom, D. (2001). *LISREL 8: User's reference guide*. SSI Inc.: Chicago.
- Keyes, C.L.M., Shmotkin, D., & Ryff, C.D. (2002). Optimizing well-being: The empirical encounter of two traditions. *Journal of Personality and Social Psychology, 82*, 1007-1022.
- Kipp, L.E., & Amorose, A.J. (2008). Perceived motivational climate and self-determined motivation in female high-school athletes. *Journal of Sport Behavior, 31*, 108-129.
- Kipp, L.E., & Weiss, M.R. (in press). Physical activity and self-perceptions among children and adolescents. In P. Ekkekakis (Ed.), *Handbook of physical activity and mental health*. London, UK: Routledge.

- Klint, K.A., & Weiss, M.R. (1986). Dropping in and dropping out: Participation motives of current and former youth gymnasts. *Canadian Journal of Applied Sport Sciences, 11*, 106-114.
- Koka, A., & Hagger, M. (2010). Perceived teaching behaviors and self-determined motivation in physical education: A test of self-determination theory. *Research Quarterly for Exercise and Sport, 81*, 74-86.
- Krane, V., Greenleaf, C. A., & Snow, J. (1997). Reaching for gold and the practice of glory: A motivational case study of an elite gymnast. *The Sport Psychologist, 11*, 53–71.
- Krentz, E.M., & Warschburger, P. (2011). Sports-related correlates of disordered eating in aesthetic sports. *Psychology of Sport and Exercise, 12*, 375–382.
- La Guardia, J.G., Ryan, R.M., Couchman, C.E., & Deci, E.L. (2000). Within-person variation in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology, 79*, 367-384.
- Lerner, R.M., Almerigi, J.B., Theokas, C., & Lerner, J.V. (2005). Positive youth development: A view of the issues, *Journal of Early Adolescence, 25*, 10-16.
- Lim, B.S.C., & Wang, C.K.J. (2009). Perceived autonomy support, behavioural regulations in physical education and physical activity intention. *Psychology of Sport and Exercise, 10*, 52–60.

- Little, T.D., Cunningham, W.A., Shahar, G., & Widaman, K.F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling: A Multidisciplinary Journal*, *9*, 151–173.
- Lox, C.L., Martin-Ginis, K.A., & Petruzzello, S.J. (2010). Social influences on exercise. In *The psychology of exercise: Integrating theory and practice* (2nd ed.; pp. 101-137). Scottsdale, AZ: Holcomb Hathway Publishers.
- MacKinnon, D.P., Fritz, M.S., Williams, J., & Lockwood, C.M. (2007). Distribution of the product confidence limits for the indirect effect: Program PRODCLIN. *Behavior Research Methods*, *39*, 384–389.
- Mageau, G.A., & Vallerand, R.J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, *21*, 883-904.
- Malina, R.M. (2002). The young athlete: Biological growth and maturation in a biocultural context. In F.L. Smoll & R.E. Smith (Eds.), *Children and youth in sport: A biopsychosocial perspective* (2<sup>nd</sup> ed., pp. 261-292). Dubuque, IA: Kendall/Hunt.
- Maloney, M.J., McGuire, J.B., & Daniels, S.R. (1988). Reliability testing of a children's version of the eating attitude test. *Journal of the American Academy of Child and Adolescent Psychiatry*, *27*, 541-543.
- Masten, A.S., Burt, K., & Coatsworth, J.D. (2006). Competence and psychopathology in development. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology, Vol. 3, Risk, disorder and psychopathology* (2<sup>nd</sup> ed., pp. 696-738). New York: Wiley.

- Masten, A.S., & Coatsworth, J.D. (1998). The development of competence in favorable and unfavorable environments: Lessons from successful children. *American Psychologist, 53*, 205-220.
- Masten, A.S., Coatsworth, J.D., Neemann, J., Gest, S.D., Tellegen, A., & Garmezy, N. (1995). The structure and coherence of competence from childhood through adolescence. *Child Development, 66*, 1635-1659.
- McDonough, M.H., & Crocker, P.R.E. (2005). Sport participation motivation in young adolescent girls: The role of friendship quality and self-concept. *Research Quarterly for Exercise and Sport, 76*, 456–467.
- McGuire, M.T., Neumark-Stzainer, D., & Story, M. (2002). Correlates of time spent in physical activity and television viewing in a multiracial sample of adolescents. *Pediatric Exercise Science, 14*, 75–86.
- Monsma, E.V., Malina, R.M., & Feltz, D.L. (2006). Puberty and physical self-perceptions of competitive female figure skaters: An interdisciplinary approach. *Research Quarterly for Exercise and Sport, 77*, 158–166.
- Nation, M., Crusto, C., Wandersman, A., Kumpfer, K. L., Seybold, D., Morrissey-Kane, E., Davino, K. (2003). What works in prevention: Principles of effective prevention programs. *American Psychologist, 58*, 449-456.
- Nichols, J.F., Rauh, M.J., Lawson, M.J., Ji, M., & Barkai, H. (2006). Prevalence of the female athlete triad syndrome among high school athletes. *Archives of Pediatric and Adolescent Medicine, 160*, 137–142.

- Ntoumanis, N. (2001). A self-determination approach to the understanding of motivation in physical education. *British Journal of Educational Psychology, 71*, 225-242.
- Ntoumanis, N. (2005). A prospective study of participation in optional school physical education using a self-determination theory framework. *Journal of Educational Psychology, 97*, 444-453.
- O'Connell, M.E., Boat, T., & Warner, K.E. (Eds.). (2009). *Preventing mental, emotional, and behavioral disorders among young people: Progress and possibilities*. National Research Council. Washington, DC: National Academy Press.
- Parish, L.E., & Treasure, D.C. (2003). Physical activity and situational motivation in physical education: Influence of the motivational climate and perceived ability. *Research Quarterly for Exercise and Sport, 2*, 173-182.
- Passer, M.W. (1988). Determinants and consequences of children's competitive stress. In F. Smoll, R.A Magill, & M.A. Ash (Eds.), *Children in sport* (2<sup>nd</sup> ed., pp. 203-227). Champaign, IL: Human Kinetics.
- Pate, R.R., Stevens, J., Webber, L.S., Dowda, M., Murray, D.M., Young, D.R., & Going, S. (2009). Age-related change in physical activity in adolescent girls. *Journal of Adolescent Health, 44*, 275-282.
- Pelletier, L.G., Fortier, M.S., Vallerand, R.J., & Brière, N.M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion, 25*, 279-306.

- Petersen, A.C., Crockett, L., Richards, M., & Boxer, A. (1988). A self-report measure of pubertal status: Reliability, validity, and initial norms. *Journal of Youth and Adolescence, 17*, 117-133.
- Petitpas, A.J., Cornelius, A.E., Van Raalte, J.L., & Jones, T. (2005). A framework for planning youth sport programs that foster psychosocial development. *The Sport Psychologist, 19*, 63-80.
- Petitpas, A.J., Van Raalte, J.L., Cornelius, A.E., & Presbrey, J. (2004). A life skills development program for high school student-athletes. *The Journal of Primary Prevention, 24*, 325-334.
- Price, M.S., & Weiss, M.R. (2000). Relationships among coach burnout, coach behaviors, and athletes' psychological responses. *The Sport Psychologist, 14*, 391-409.
- Price, M.S., & Weiss, M.R. (2012). Relationships among coach leadership, peer leadership, and adolescent athletes' psychosocial and team outcomes: A test of transformational leadership theory. Manuscript submitted for publication.
- 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*, 39-60.
- Quested, E., & Duda, J.L. (2011). Antecedents of burnout among elite dancers: A longitudinal test of basic needs theory. *Psychology of Sport and Exercise, 12*, 159-167.



- Reinboth, M., & Duda, J.L. (2004). The motivational climate, perceived ability, and athletes' psychological and physical well-being. *The Sport Psychologist, 18*, 237–251.
- Reinboth, M. & Duda, J.L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: A longitudinal perspective. *Psychology of Sport and Exercise, 7*, p. 269-286.
- Reinboth, M., Duda, J. L., & Ntoumanis, N. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *Motivation and Emotion, 28*, 297-313.
- Roth, J.L., & Brooks-Gunn, J. (2003). What exactly is a youth development program? Answers from research and practice, *Applied Developmental Science, 7*, 94-111.
- Ryan, J. (1995). *Little girls in pretty boxes: The making and breaking of elite gymnasts and figure skaters*. New York: Warner Books.
- Ryan, R.M., Bernstein, J.H., & Brown, K.W. (2010). Weekends, work, and well-being: Psychological need satisfactions and day of the week effects on mood, vitality, and physical symptoms. *Journal of Social and Clinical Psychology, 29*, 95–122.
- Ryan, R.M., & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78.
- Ryan, R.M., & Deci, E.L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*, 141-166.

- Ryan, R.M., & Deci, E.L. (2007). Active human nature: Self-determination theory and the promotion and maintenance of sport, exercise, and health. In M.S. Hagger & N.L.D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 1-20). Champaign, IL: Human Kinetics.
- Ryff, C.D., & Singer, B. (1998). The contours of positive human health. *Psychological Inquiry, 9*, 1-28.
- Ryff, C.D., & Singer, B. (2008). Know thyself and become what you are: A eudaimonic approach to psychological well-being. *Journal of Happiness Studies, 9*, 13-39.
- Sabiston, C.M., & Crocker, P.R.E. (2008). Exploring self-perceptions and social influences as correlates of adolescent leisure-time physical activity. *Journal of Sport & Exercise Psychology, 30*, 3-22.
- Sarrazin, P., Vallerand, R., Guillet, E., Pelletier, L., & Cury, F. (2002). Motivation and dropout in female handballers: A 21-month prospective study. *European Journal of Social Psychology, 32*, 395-418.
- Shen, B., McCaughtry, N., Martin, J., & Fahlman, M. (2009). Effects of teacher autonomy support and students' autonomous motivation on learning in physical education. *Research Quarterly for Exercise and Sport, 80*, 44-53.
- Smith, A.L. (1999). Perceptions of peer relationships and physical activity participation in early adolescence. *Journal of Sport & Exercise Psychology, 21*, 329-350.
- Smith, A.L. (2003). Peer relationships in physical activity contexts: A road less traveled in youth sport and exercise psychology research. *Psychology of Sport and Exercise, 4*, 25-39.

- Smith, A.L. (2007). Youth peer relationships in sport. In S. Jowett & D. Lavallee (Eds.), *Social psychology in sport* (pp. 41-54). Champaign, IL: Human Kinetics.
- Smith, A.L., Ullrich-French, S., Walker, E., & Hurley, K.S. (2006). Peer relationship profiles and motivation in youth sport. *Journal of Sport & Exercise Psychology*, *28*, 362-382.
- Smith, R.E., Cumming, S.P., & Smoll, F. (2008). Development and validation of the motivational climate scale for youth sports. *Journal of Applied Sport Psychology*, *20*, 116-136.
- Smith, R.E., Smoll, F.L., & Barnett, N.P. (1995). Reduction of children's sport performance anxiety through social support and stress-reduction training for coaches. *Journal of Applied Developmental Psychology*, *16*, 125-142.
- Smith, R.E., Smoll, F.L., & Cumming, S.P. (2007). Effects of a motivational climate intervention for coaches on young athletes' sport performance anxiety. *Journal of Sport & Exercise Psychology*, *29*, 39-59.
- Smith, R.E., Smoll, F.L., & Curtis, B. (1978). Coaching behaviors in little league baseball. In F.L. Smoll and R.E. Smith (Eds.), *Psychological perspectives in youth sports* (pp. 173-201). Washington, DC: Hemisphere.
- Smith, R.E., Smoll, F.L., & Curtis, B. (1979). Coach Effectiveness Training: A cognitive-behavioral approach to enhancing relationship skills in youth sport coaches. *Journal of Sport Psychology*, *1*, 59-75.
- Smith, R.E., Smoll, F.L., & Hunt, E. (1977). A system for the behavioral assessment of athletic coaches. *Research Quarterly*, *48*, 401-407.

- Smith, R.E., Zane, N.W.S., Smoll, F.L., & Coppel, D.B. (1983). Behavioral assessment in youth sports: Coaching behaviors and children's attitudes. *Medicine and Science in Sports and Exercise, 15*, 208-214.
- Smolak, L., & Levine, M.P. (1994). Psychometric properties of the Children's Eating Attitudes Test. *International Journal of Eating Disorders, 16*, 275-282.
- Smoll, F.L., & Smith, R.E. (2002). Coaching behavior research and intervention in youth sports. In F.L. Smoll & R.E. Smith (Eds.), *Children and youth in sport: A biopsychosocial perspective* (2<sup>nd</sup> ed., pp. 211-231). Dubuque, IA: Kendall/Hunt.
- Smoll, F.L., Smith, R.E., Barnett, N.P., & Everett, J.J. (1993). Enhancement of children's self-esteem through social support training for youth sport coaches. *Journal of Applied Psychology, 78*, 602-610.
- Smoll, F.L., Smith, R.E., Curtis, B., & Hunt, E. (1978). Toward a meditational model of coach-player relationships. *Research Quarterly, 49*, 528-541.
- Standage, M., Duda, J.L., & Ntoumanis, N. (2003). A model of contextual motivation in physical education: Using constructs from self-determination and achievement goal theories to predict physical activity intentions. *Journal of Educational Psychology, 95*, 97-110.
- Standage, M., Duda, J.L., & Ntoumanis, N. (2006). Students' motivational processes and their relationship to teacher ratings in school physical education: A self-determination theory approach. *Research Quarterly for Exercise and Sport, 77*, 100-110.

- Standage, M., & Gillison, F. (2007). Students' motivational responses toward school physical education and their relationship to general self-esteem and health-related quality of life. *Psychology of Sport and Exercise, 8*, 704-721.
- Standage, M., Gillison, F.B., Ntoumanis, N., & Treasure, D.C. (2012). Predicting students' physical activity and health-related well-being: A prospective cross-domain investigation of motivation across school physical education and exercise settings. *Journal of Sport & Exercise Psychology, 34*, 37-60.
- Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin, 128*, 825-848.
- Stuntz, C.P., & Spearance, A.L. (2010). Cross-domain relationships in two sport populations: Measurement validation including prediction of motivation-related variables. *Psychology of Sport and Exercise, 11*, 267-274.
- Sundgot-Borgen, J., & Torstveit, M.K. (2010). Aspects of disordered eating continuum in elite high-intensity sports. *Scandinavian Journal of Medicine & Science in Sports, 20 (Suppl. 2)*, 112-121.
- Taylor, I.M., & Lonsdale, C. (2010). Cultural differences in the relationships among autonomy support, psychological need satisfaction, subjective vitality, and effort in British and Chinese physical education. *Journal of Sport & Exercise Psychology, 32*, 655-673.
- Theeboom, M., De Knop, P., & Weiss, M.R. (1995). Motivational climate, psychosocial responses, and motor skill development in children's sport: A field-based intervention study. *Journal of Sport and Exercise Psychology, 17*, 294-311.

- Ullman, J. (2007). Structural equation modeling. In B.G. Tabachnick & L.S. Fidell, *Using multivariate statistics* (5<sup>th</sup> ed., pp. 676–780). Boston, MA: Pearson.
- Ullrich-French, S., & Smith, A.L. (2006). Perceptions of relationships with parents and peers in youth sport: Independent and combined prediction of motivational outcomes. *Psychology of Sport and Exercise, 7*, 193-214.
- Ullrich-French, S., & Smith, A.L. (2009). Social and motivational predictors of continued youth sport participation. *Psychology of Sport and Exercise, 10*, 87-95.
- Waterman, A.S. (1993). Two conceptions of happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of Personality and Social Psychology, 64*, 678-691.
- Waterman, A.S., Schwartz, S.J., & Conti, R. (2008). The implications of two conceptions of happiness (hedonic enjoyment and eudaimonia) for the understanding of intrinsic motivation. *Journal of Happiness Studies, 9*, 41-79.
- Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063-1070.
- Weiss, M.R. (2008). "Field of dreams:" Sport as a context for youth development. *Research Quarterly for Exercise and Sport, 79*, 434-449.
- Weiss, M.R., Amorose, A.J., & Allen, J.B. (2000). The young elite athlete: The good, the bad and the ugly. In B.L. Drinkwater (Ed.), *Women in sport* (pp. 409-429). Malden, MA: Blackwell Science.

- Weiss, M.R., Amorose, A.J., & Kipp, L.E. (2012). Youth motivation and participation in sport and physical activity. In R.M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 520–553). New York: Oxford University Press.
- Weiss, M.R., Amorose, A.J., & Wilko, A.M. (2009). Coaching behaviors, motivational climate, and psychosocial outcomes among female adolescent athletes. *Pediatric Exercise Science, 21*, 475-492.
- Weiss, M.R., & Duncan, S.C. (1992). The relation between physical competence and peer acceptance in the context of children's sport participation. *Journal of Sport & Exercise Psychology, 14*, 177–191.
- Weiss, M.R., Ebbeck, V., & Horn, T.S. (1997). Children's self-perceptions and sources of competence information: A cluster analysis. *Journal of Sport & Exercise Psychology, 19*, 52-70.
- Weiss, M.R., Kipp, L.E., & Bolter, N.D. (2012). Training for life: Optimizing positive youth development through sport and physical activity. In S.M. Murphy (Ed.), *The Oxford handbook of sport and performance psychology* (pp. 448–475). New York: Oxford University Press.
- Weiss, M.R., & Smith, A.L. (1999). Quality of youth sport friendships: Measurement development and validation. *Journal of Sport & Exercise Psychology, 21*, 145-166.
- Weiss, M.R., & Smith, A.L. (2002). Friendship quality in youth sport: Relationship to age, gender, and motivation variables. *Journal of Sport & Exercise Psychology, 24*, 420-437.

- Weiss, M.R., Smith, A.L., & Stuntz, C.P. (2008). Moral development in sport and physical activity: Theory, research, and intervention. In T.S. Horn (Ed.), *Advances in sport psychology* (3rd ed., pp. 187-210). Champaign, IL: Human Kinetics.
- Weiss, M.R., & Stuntz, C.P. (2004). A little friendly competition: Peer relationships and psychosocial development in youth sport and physical contexts. In M.R. Weiss (Ed.), *Developmental sport and exercise psychology: A lifespan perspective* (pp. 165-196). Morgantown, WV: Fitness Information Technology.
- Weiss, M.R., & Wiese-Bjornstal, D.M. (2009). Promoting positive youth development through physical activity. *President's Council on Physical Fitness and Sports: Research Digest*, 10(3).
- Weiss, M.R., & Williams, L. (2004). The *why* of youth sport involvement: A developmental perspective on motivational processes. In M.R. Weiss (Ed.), *Developmental sport and exercise psychology: A lifespan perspective* (pp. 223-268). Morgantown, WV: Fitness Information Technology.
- Weiss, W.M., & Weiss, M.R. (2003). Attraction- and entrapment- based commitment among competitive female gymnasts. *Journal of Sport & Exercise Psychology*, 25, 229-247.
- Weiss, W.M., & Weiss, M.R. (2006). A longitudinal analysis of sport commitment among competitive female gymnasts. *Psychology of Sport and Exercise*, 7, 309-323.



- Weiss, W.M., & Weiss, M.R. (2007). Sport commitment among competitive female gymnasts: A developmental perspective. *Research Quarterly for Exercise and Sport*, 78, 90-102.
- Weissberg, R.P., Kumpfer, K.L., & Seligman, M.E.P. (2003). Prevention that works for children and youth. *American Psychologist*, 58, 425-432.
- Whitehead, J., & Corbin, C. (1991). Youth fitness testing: The effect of percentile-based evaluative feedback on intrinsic motivation. *Research Quarterly for Exercise and Sport*, 62, 225-231.
- Whiteside, K. (2012, May). Shawn Johnson sheds light on her weight. *USA Today*. Retrieved from: <http://www.usatoday.com/sports/olympics/london/gymnastics/story/2012-05-14/shawn-johnson-loses-weight-speaks-out-bodyimage/54959326/1>

**Appendix A**

IRB Approval Form

## UNIVERSITY OF MINNESOTA

*Twin Cities Campus**Human Research Protection Program  
Office of the Vice President for Research**D528 Mayo Memorial Building  
420 Delaware Street S.E.  
MMC 820  
Minneapolis, MN 55455  
Office: 612-626-5654  
Fax: 612-626-6061  
E-mail: [irb@umn.edu](mailto:irb@umn.edu) or [ibc@umn.edu](mailto:ibc@umn.edu)  
Website: <http://research.umn.edu/subjects/>*

01/27/2011

Lindsay Kipp

RE: "Experiences in Gymnastics"  
IRB Code Number: **1012P93597**

Dear Dr. Kipp:

The Institutional Review Board (IRB) received your response to its stipulations. Since this information satisfies the federal criteria for approval at 45CFR46.111 and the requirements set by the IRB, final approval for the project is noted in our files. Upon receipt of this letter, you may begin your research.

IRB approval of this study includes the consent form time 1, consent form time 2, and assent form, all received January 24, 2011.

The IRB would like to stress that subjects who go through the consent process are considered enrolled participants and are counted toward the total number of subjects, even if they have no further participation in the study. Please keep this in mind when calculating the number of subjects you request. This study is currently approved for 400 subjects. If you desire an increase in the number of approved subjects, you will need to make a formal request to the IRB.

For your records and for grant certification purposes, the approval date for the referenced project is December 15, 2010 and the Assurance of Compliance number is FWA00000312 (Fairview Health Systems Research FWA00000325, Gillette Children's Specialty Healthcare FWA00004003). Research projects are subject to continuing review and renewal; approval will expire one year from that date. You will receive a report form two months before the expiration date. If you would like us to send certification of approval to a funding agency, please tell us the name and address of your contact person at the agency.

As Principal Investigator of this project, you are required by federal regulations to inform the IRB of any proposed changes in your research that will affect human subjects. Changes should not be initiated until written IRB approval is received. Unanticipated problems or serious unexpected adverse events should be reported to the IRB as they occur.

The IRB wishes you success with this research. If you have questions, please call the IRB office at 612-626-5654.

Sincerely,



Christina Dobrovolny, CIP  
Research Compliance Supervisor  
CD/ks

CC: Maureen Weiss

**Appendix B**

Coach Letter

## UNIVERSITY OF MINNESOTA

*Twin Cities Campus*

*School of Kinesiology  
College of Education and Human  
Development*

*Cooke Hall  
1900 University Ave. S.E.  
Minneapolis, MN 55455  
Office: 612-625-5300  
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<http://education.umn.edu/kin/>  
Email: [kin@umn.edu](mailto:kin@umn.edu)*

June 6, 2011

Dear Girls' Team Head Coach,

My name is Lindsay Kipp. I am a graduate student in the School of Kinesiology at the University of Minnesota studying with Dr. Maureen R. Weiss as my advisor. I am writing to seek your cooperation for having your gymnasts participate in my dissertation study.

As a former competitive gymnast, I am interested in the sport experiences of adolescent female gymnasts. The goal of my project is to understand gymnasts' thoughts and feelings about their experiences in gymnastics. Specifically, I am interested in how gymnasts' experiences contribute to their sense of well-being.

To address these topics, I am requesting that competitive gymnasts (Level 4–10) who are 10 to 16 years-old complete a questionnaire before or after one scheduled practice, whichever is more convenient for you and your gymnasts. I am aware of the many time demands that coaches and gymnasts must juggle, so, I want to ensure that your gymnasts' involvement is as brief as possible. Your gymnasts will need about 30 minutes to complete the questionnaire. **Code numbers will be used to ensure confidentiality of each gymnast's responses. Results from the questionnaire will be reported for the sample as a whole, not for specific teams or individuals.**

Your cooperation in this project is sincerely appreciated. The information gathered through this project will help coaches understand how athletes think and feel about their experiences in gymnastics.

I will be calling you in the next week to answer any questions you might have and to find out if you are interested in participating in this study. If you wish to contact me first or my advisor, please feel free to do so. Thank you for your consideration.

Sincerely,



Lindsay E. Kipp  
Doctoral Student, Kinesiology  
(309) 269-9462  
[kippx031@umn.edu](mailto:kippx031@umn.edu)



Maureen R. Weiss, Ph.D.  
Professor, Kinesiology  
(612) 625-4155  
[mrweiss@umn.edu](mailto:mrweiss@umn.edu)

**Appendix C**

Parent Letter and Consent Form

## UNIVERSITY OF MINNESOTA

*Twin Cities Campus*

*School of Kinesiology*

*College of Education and Human  
Development*

*Cooke Hall*

*1900 University Ave. S.E.  
Minneapolis, MN 55455*

*Office: 612-625-5300*

*Fax: 612-626-7700*

*<http://education.umn.edu/kin/>*

*Email: [kin@umn.edu](mailto:kin@umn.edu)*

June 20, 2011

Dear Parents,

My name is Lindsay Kipp. I am a graduate student in the School of Kinesiology at the University of Minnesota studying with Dr. Maureen R. Weiss as my advisor. I am writing to seek your cooperation for your daughter to participate in my dissertation study.

As a former competitive gymnast, I am interested in the sport experiences of adolescent female gymnasts. The goal of my project is to understand gymnasts' thoughts and feelings about their experiences in gymnastics. Specifically, I am interested in how gymnasts' experiences contribute to their sense of well-being.

To address these topics, I am requesting your permission for your daughter to complete a questionnaire during one scheduled practice. I am aware of the many time demands that coaches and gymnasts must juggle, so I want to ensure that your daughter's involvement is as brief as possible. Your daughter will need about 30 minutes to complete the questionnaire. **Code numbers will be used on the questionnaire, ensuring confidentiality of your daughter's responses.**

Your cooperation in this project is sincerely appreciated. The information gathered through this project will help coaches understand how athletes think and feel about their experiences in gymnastics.

Enclosed with this letter is a parent consent form. **Please read it and sign it if you will allow your daughter to take part in this study. Please have your daughter bring this form to practice tomorrow or as soon as possible. Keep the other copy for your records.** If you have any questions or wish to contact me or my advisor, please feel free to do so. Thank you for your consideration.

Sincerely,



Lindsay E. Kipp  
Doctoral Student, Kinesiology  
(612) 624-2887  
[kippx031@umn.edu](mailto:kippx031@umn.edu)



Maureen R. Weiss, Ph.D.  
Professor, Kinesiology  
(612) 625-4155  
[mrweiss@umn.edu](mailto:mrweiss@umn.edu)



**Informed Consent Agreement**  
**University of Minnesota**  
**Project Title: Experiences in Gymnastics**

Your daughter is invited to be in a research study about her experiences in gymnastics. Your daughter was selected because she is between the ages of 10-16 and competes at a gymnastics club. We ask that you read this form and ask any questions you may have before agreeing for your child to be in the study. This study is being conducted by researchers in the School of Kinesiology at the University of Minnesota.

**Background Information:**

The purpose of this study is to understand female adolescent gymnasts' thoughts and feelings about their gymnastics participation.

**Procedures:**

Before, during, or after a practice, your daughter will complete a questionnaire asking her about her participation in gymnastics. Your daughter will spend about 30 minutes completing the questionnaire.

**Risks and Benefits of Being in the Study:**

There are no direct risks to your daughter for completing the questions. There may be a minor risk of discomfort caused by sharing personal thoughts and experiences about participating in competitive gymnastics. There are no direct benefits to your daughter for participating in this study. The study should help us understand how to improve the experiences of young competitive gymnasts.

**Compensation:**

Your daughter will receive no compensation for participating in the study.

**Confidentiality:**

The information that your daughter gives in the study will be handled confidentially. Your daughter's information will be assigned a code number. The list connecting her name to this number will be kept in a locked file. When the study is completed and the data have been analyzed, this list will be destroyed. Her name will not be used in any report. Only the primary researchers will see or have access to your daughter's answers and data.

**Voluntary Nature of the Study:**

Your daughter's participation in this study is completely voluntary. Your decision whether or not to participate will not affect your or your daughter's current or future relations with the University of Minnesota. If you decide to participate, your daughter is free to not answer any question or withdraw at any time without affecting those relationships.

**Right to withdraw from the study:**

Your daughter may stop answering questions at any time. There is no penalty for doing so. She will be told to give her blank survey to Lindsay who will dispose of it immediately. You may

also withdraw your permission at any time by contacting Lindsay Kipp or Dr. Maureen Weiss (phone numbers are below).

**How to withdraw from the study:**

If your daughter wants to discontinue completing the questionnaire she should stop writing and sit quietly until the remainder of the gymnasts have finished. There is no penalty for withdrawing from the study.

**Contacts and Questions:**

The researchers conducting this study are Lindsay Kipp and Dr. Maureen Weiss. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact the researchers:

Lindsay E. Kipp, School of Kinesiology  
210 Cooke Hall, 1900 University Ave S. E.  
Minneapolis, MN 55455  
Telephone: (309) 269-9462  
e-mail: [kippx031@umn.edu](mailto:kippx031@umn.edu)

Dr. Maureen R. Weiss, School of Kinesiology  
203A Cooke Hall, 1900 University Ave S. E.  
Minneapolis, MN 55455  
Telephone: (612) 625-4155  
e-mail: [mrweiss@umn.edu](mailto:mrweiss@umn.edu)

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455  
Telephone: (612) 625-1650.

To read information about the topics of this study, please visit the following websites:

- <http://www.girlshealth.gov/fitness/> (*Office on Women's Health*, provides girls with reliable health information on physical activity, nutrition, self-esteem, etc.)
- <http://www.presidentschallenge.org/informed/digest/docs/september2009digest.pdf> (*President's Council on Fitness, Sports, & Nutrition*, Research Digest on positive youth development through physical activity, September 2009 issue)

**You will be given a copy of this information to keep for your records.**

**Statement of Consent:**

I have read the above information. I have asked questions and have received answers. I consent for my child to participate in the study.

**Your daughter's name:** \_\_\_\_\_

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Signature of Investigator:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Appendix D**

Time 1 Survey



# **Gymnastics**



# **Survey**



**Experiences in Gymnastics Study  
University of Minnesota  
Gymnast Assent Form**

We are asking if you are willing to participate in this study because we are trying to learn about gymnasts' experiences on their team. We are interested in your thoughts and feelings about your participation in gymnastics. We hope to gain a better understanding of how to create positive sport experiences for gymnasts.

If you agree to be in this study, we will ask you to fill out a survey. You will answer questions about your experiences in gymnastics. The survey should take about 30 minutes to complete.

If you change your mind during the survey and do not want to continue, you can stop at any time. Being in this study is totally up to you, and no one will be mad at you if you don't want to do it.

You can ask any questions that you may have about this study. If you have a question later that you didn't think of now, you can ask us later.

Signing here means that you have read this paper and that you are willing to be in this study. If you don't want to be in this study, don't sign. Remember, being in this study is up to you, and no one will be mad at you if you don't sign or even if you change your mind later.

To read information about the topics of this study, please visit the following website:

- <http://www.girlshealth.gov/fitness/> (*Office on Women's Health*, provides girls with reliable health information on physical activity, nutrition, self-esteem, etc.)

Name of Participant (print name) \_\_\_\_\_

Signature of Participant \_\_\_\_\_ Date: \_\_\_\_\_

Signature of person explaining the study \_\_\_\_\_ Date: \_\_\_\_\_



**PLEASE WAIT FOR FURTHER INSTRUCTIONS**

### My Physical Activity Outside of Gymnastics

**Physical activity**...is any type of activity where you make physical movements. Some physical activities make your heart beat rapidly or make you sweat. Other physical activities require less effort. Sports, physical education activities, exercise, working in the yard, doing chores, playing, riding a bike, or walking to school are good examples of physical activities.

Physical activity can be **strenuous, moderate, or mild**...

#### STRENUOUS PHYSICAL ACTIVITY IS WHEN YOUR **HEART BEATS RAPIDLY**

Examples: fast biking, aerobic dancing, running, jogging, swimming laps, rollerblading, skating, tennis, cross-country skiing, soccer, basketball

#### MODERATE PHYSICAL ACTIVITY IS WHEN IT TAKES **EFFORT, BUT NOT EXHAUSTING**

Examples: fast walking, dancing, easy swimming, baseball/softball, easy bicycling, volleyball, badminton, strength training, skiing, snowboarding, skateboarding

#### MILD PHYSICAL ACTIVITY IS WHEN IT TAKES **LITTLE EFFORT**

Examples: easy walking, bowling, horseshoes, golf, fishing, yoga, stretching muscles, household chores, snowmobiling

### My Physical Activity Outside of Gymnastics

Considering a typical week (7 days) in the past month, **how many hours** do you do the following kinds of physical activity **outside of gymnastics practice and meets**? Examples of activities appear in each category, but you may think of activities that are not listed. The key is to decide whether the activity makes your heart beat rapidly, requires effort but is not exhausting, or requires minimal effort.

Use the grid on the left to tally the number of hours each day in each category. Then mark your total under the questions on the right.

	Strenuous Activity (# hours)	Moderate Activity (# hours)	Mild Activity (# hours)
Mon			
Tues			
Wed			
Thurs			
Fri			
Sat			
Sun			
TOTAL			

a) STRENUOUS PHYSICAL ACTIVITY (**HEART BEATS RAPIDLY**)

Examples: fast biking, aerobic dancing, running, jogging, swimming laps, rollerblading, skating, tennis, cross-country skiing, soccer, basketball

- None
- Less than ½ hour per week
- ½ to 2 hours per week
- 2¼ to 4 hours per week
- 4¼ to 6 hours per week
- More than 6 hours per week

b) MODERATE PHYSICAL ACTIVITY (**EFFORT, BUT NOT EXHAUSTING**)

Examples: fast walking, dancing, easy swimming, baseball/softball, easy bicycling, volleyball, badminton, strength training, skiing, snowboarding, skateboarding

- None
- Less than ½ hour per week
- ½ to 2 hours per week
- 2¼ to 4 hours per week
- 4¼ to 6 hours per week
- More than 6 hours per week

c) MILD PHYSICAL ACTIVITY (**LITTLE EFFORT**)

Examples: easy walking, bowling, horseshoes, golf, fishing, yoga, stretching muscles, household chores, snowmobiling

- None
- Less than ½ hour per week
- ½ to 2 hours per week
- 2¼ to 4 hours per week
- 4¼ to 6 hours per week
- More than 6 hours per week



PLEASE WAIT FOR FURTHER INSTRUCTIONS

### What I Am Like

Really True for Me	Sort of True for Me	Sample Item:	Sort of True for Me	Really True for Me
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers like dogs better than cats.	<b>BUT</b> Other teenagers like cats better than dogs.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers are often disappointed with themselves	<b>BUT</b> Other teenagers are pretty pleased with themselves.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers do very well in gymnastics	<b>BUT</b> Other teenagers don't feel they are good when it comes to gymnastics.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers don't like the way they are leading their life	<b>BUT</b> Other teenagers do like the way they are leading their life.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers think they could do well at just about any gymnastics skill	<b>BUT</b> Other teenagers are afraid they might not do well at a gymnastics skill.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers are usually happy with themselves as a person	<b>BUT</b> Other teenagers are not happy with themselves.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers feel that they are better than others their age at gymnastics	<b>BUT</b> Other teenagers don't feel they can do gymnastics as well as others their age.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers like the kind of person they are	<b>BUT</b> Other teenagers often wish they were someone else.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers don't do well at new gymnastics skills	<b>BUT</b> Other teenagers are good at new gymnastics skills right away.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers are very happy being the way they are	<b>BUT</b> Other teenagers wish they were different.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers do not feel that that they are good gymnasts	<b>BUT</b> Other teenagers feel that they <i>are</i> good gymnasts.	<input type="checkbox"/>



PLEASE WAIT FOR FURTHER INSTRUCTIONS



### Friendship in Gymnastics

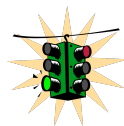
The items below have to do with you and a person you consider to be your best friend in gymnastics. We would like you to think about this friend as you answer the questions. The questions are about what you and your friend in gymnastics may do or say with each other. Think of your best friend in gymnastics. Write that person's name below.

**My best friend in gymnastics is:** \_\_\_\_\_

Circle the response below each statement that best indicates how you feel about you and your best friend in gymnastics.

- |  |                 |               |               |             |             |
|--|-----------------|---------------|---------------|-------------|-------------|
| 1. My friend gives me a second chance to perform a skill       | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 2. My friend and I can talk about anything                     | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 3. My friend and I have common interests                       | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 4. My friend and I do fun things                               | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 5. My friend and I stick up for each other in gymnastics       | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 6. My friend and I praise each other for doing gymnastics well | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 7. I like to spend time with my friend                         | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 8. My friend and I do similar things                           | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 9. My friend looks out for me                                  | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 10. After I make mistakes, my friend encourages me             | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 11. My friend and I have the same values                       | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 12. My friend and I work well together                         | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 13. My friend and I think the same way                         | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 14. My friend and I tell each other secrets                    | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 15. My friend and I spend time together                        | Not at all true | A little true | Somewhat true | Pretty true | Really true |
| 16. My friend has confidence in me during gymnastics           | Not at all true | A little true | Somewhat true | Pretty true | Really true |

GO TO THE NEXT PAGE →




---

PLEASE CONTINUE AND COMPLETE THE REST OF THE SURVEY ON YOUR OWN.

---

### In My Gym (part 1)

Please think about what it is usually like to be a gymnast in your gym. **If there is more than one coach on your team, the questions are about the coach you spend most of your time with. Circle the response that describes how true each of the following statements is for you.**

- |   |                 |               |               |             |           |
|---|-----------------|---------------|---------------|-------------|-----------|
| 1. The coach makes gymnasts feel good when they improve a skill.              | Not at all true | A little true | Somewhat true | Pretty true | Very true |
| 2. Winning meets is the most important thing for the coach.                   | Not at all true | A little true | Somewhat true | Pretty true | Very true |
| 3. The coach encourages us to learn new skills.                               | Not at all true | A little true | Somewhat true | Pretty true | Very true |
| 4. The coach spends less time with the gymnasts who aren't as good.           | Not at all true | A little true | Somewhat true | Pretty true | Very true |
| 5. The coach tells gymnasts to help each other get better.                    | Not at all true | A little true | Somewhat true | Pretty true | Very true |
| 6. The coach tells us which gymnasts on the team are the best.                | Not at all true | A little true | Somewhat true | Pretty true | Very true |
| 7. The coach tells us that trying our best is the most important thing.       | Not at all true | A little true | Somewhat true | Pretty true | Very true |
| 8. The coach pays most attention to the best gymnasts.                        | Not at all true | A little true | Somewhat true | Pretty true | Very true |
| 9. The coach says that teammates should help each other improve their skills. | Not at all true | A little true | Somewhat true | Pretty true | Very true |
| 10. Gymnasts are taken out of meets if they make a mistake.                   | Not at all true | A little true | Somewhat true | Pretty true | Very true |
| 11. The coach says that all of us are important to the team's success.        | Not at all true | A little true | Somewhat true | Pretty true | Very true |
| 12. The coach tells us to try to be better than our teammates.                | Not at all true | A little true | Somewhat true | Pretty true | Very true |

GO TO THE NEXT PAGE →

### In My Gym (part 2)

Consider your general experiences **with your current coach** (the one you spend most of your time with). Each coach has a different coaching style, and no one style is necessarily better than another. **Please indicate how much you agree or disagree with each statement. Circle your response for each item.**

	Strongly Disagree				Neutral				Strongly Agree
1. My coach tries to motivate me by promising to reward me if I do well.	1	2	3	4	5	6	7		
2. I feel that my coach provides me choices and options.	1	2	3	4	5	6	7		
3. I feel understood by my coach.	1	2	3	4	5	6	7		
4. My coach only rewards/praises me to make me train harder.	1	2	3	4	5	6	7		
5. My coach conveys confidence in my ability to do well at gymnastics.	1	2	3	4	5	6	7		
6. My coach encourages me to ask questions.	1	2	3	4	5	6	7		
7. My coach only uses rewards/praise so that I stay focused on tasks during training.	1	2	3	4	5	6	7		
8. My coach listens to how I would like to do things.	1	2	3	4	5	6	7		
9. My coach tries to understand how I see things before suggesting a new way to do things.	1	2	3	4	5	6	7		
10. My coach only uses rewards/praise so that I complete all the tasks he/she sets in training.	1	2	3	4	5	6	7		

KEEP GOING PLEASE →



### In My Gym (part 3)

Gymnasts vary in the amount of choice they feel they have when it comes to their gymnastics participation and how connected they feel with their teammates and coaches. **Please circle the response that best reflects how you feel while participating in gymnastics.**

1. I have a say in what I do when participating in gymnastics.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

2. I get along with my teammates.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

3. I feel forced to do things in gymnastics, even when I don't really want to do them.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

4. I get along with my coaches.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

5. My teammates are generally pretty friendly towards me.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

6. I help decide what I do when participating in gymnastics.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

7. I really like my coaches.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

8. I consider my teammates to be my friends.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

9. I get to do the things I want to do when participating in gymnastics.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

10. My coaches care about me.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

11. I do not have a say in what I do when participating in gymnastics.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

12. My teammates care about me.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

13. I do not get to make decisions about what I do when I am participating in gymnastics.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

14. My coaches are generally pretty friendly towards me.

Not at all true for me      Not true for me      Sort of true for me      True for me      Completely true for me

GO TO THE NEXT PAGE →



### My Experiences

Teenagers differ in how they think about food choices and eating behaviors. For each item, please place an X in the box that best describes you.

	Never	Rarely	Some- times	Often	Very Often	Always
1. I think a lot about wanting to be thinner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I think about burning up calories when I exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I think a lot about having fat on my body.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I am scared about being overweight.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I have been dieting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I feel very guilty after eating.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I am aware of the calorie content in foods that I eat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



This section contains a number of words that describe different feelings and emotions. Read each item and then **circle your response** that indicates to what extent you have felt this way **during the past week (7 days)**.

<b>Proud:</b>	Not at all	A little	Moderately	Quite a bit	Extremely
<b>Satisfied:</b>	Not at all	A little	Moderately	Quite a bit	Extremely
<b>Happy:</b>	Not at all	A little	Moderately	Quite a bit	Extremely
<b>Excited:</b>	Not at all	A little	Moderately	Quite a bit	Extremely
<b>Relaxed:</b>	Not at all	A little	Moderately	Quite a bit	Extremely

GO TO THE LAST PAGE →

**Tell Us About You!**

1. How old are you? \_\_\_\_\_
2. When is your birthday (month/day/year)? \_\_\_\_\_
3. How do you describe yourself? (circle any that apply)
 

African-American	White	Native American
Asian	Hispanic	Other _____
4. Have you begun to menstruate (have your period)? (circle one)    YES    or    NO
5. At what gymnastics level did you compete last season? \_\_\_\_\_
6. How long have you been competing at this level? \_\_\_\_\_ years
7. How long have you been training with your current coach? \_\_\_\_\_ years
8. At what age did you start gymnastics? \_\_\_\_\_
9. At what age did you start *competing* in gymnastics? \_\_\_\_\_
10. How many hours per week do you train? \_\_\_\_\_
11. What is your favorite event in gymnastics? \_\_\_\_\_

---

**PLEASE GO BACK THROUGH THE SURVEY AND CHECK THAT YOU ANSWERED EVERY QUESTION.**

THANK YOU FOR PARTICIPATING!  
RAISE YOUR HAND AND WE WILL COLLECT YOUR SURVEY.

---



**Appendix E**

## Equations for Random Item Parcels

**MASTERY CLIMATE**

```
COMPUTE mc1 = MEAN(m7, m9, m11).  
VARIABLE LABELS mc1 'mc1'.  
EXECUTE .
```

```
COMPUTE mc2 = MEAN(m1, m3, m5).  
VARIABLE LABELS mc2 'mc2'.  
EXECUTE .
```

**AUTONOMY-SUPPORTIVE BEHAVIORS**

```
COMPUTE as1=mean(i8, i6, i5).  
VARIABLE LABELS as1 'as1'.  
EXECUTE .
```

```
COMPUTE as2=mean(i2, i9, i3).  
VARIABLE LABELS as2 'as2'.  
EXECUTE .
```

**CONTROLLING BEHAVIORS**

```
COMPUTE cb1=mean(i1, i4).  
VARIABLE LABELS cb1 'cb1'.  
EXECUTE .
```

```
COMPUTE cb2=mean(i7, i10).  
VARIABLE LABELS cb2 'cb2'.  
EXECUTE .
```

**PERCEIVED COMPETENCE**

```
COMPUTE comp1=mean(h4, h8, h2).  
VARIABLE LABELS comp1 'comp1'.  
EXECUTE .
```

```
COMPUTE comp2=mean(h6, h10).  
VARIABLE LABELS comp2 'comp2'.  
EXECUTE .
```

**PERCEIVED AUTONOMY**

```
COMPUTE auto1=mean(n1, n6, n13).  
VARIABLE LABELS auto1 'auto1'.  
EXECUTE .
```

```
COMPUTE auto2=mean(n9, n11).  
VARIABLE LABELS auto2 'auto2'.  
EXECUTE .
```

**COACH RELATEDNESS**

```
COMPUTE CRel1=mean(n14, n4).  
VARIABLE LABELS CRel1 'CRel1'.  
EXECUTE .
```

```
COMPUTE CRel2=mean(n7, n10).  
VARIABLE LABELS CRel2 'CRel2'.  
EXECUTE .
```



**TEAMMATE RELATEDNESS**

```
COMPUTE TRel1=mean(n2, n12).  
VARIABLE LABELS TRel1 'TRel1'.  
EXECUTE .
```

```
COMPUTE TRel2=mean(n5, n8).  
VARIABLE LABELS TRel2 'TRel2'.  
EXECUTE .
```

**SELF-ESTEEM**

```
COMPUTE se1=mean(h9, h5, h1).  
VARIABLE LABELS se1 'se1'.  
EXECUTE.
```

```
COMPUTE se2=mean(h3, h7).  
VARIABLE LABELS se2 'se2'.  
EXECUTE.
```

**POSITIVE AFFECT**

```
COMPUTE affect1=mean(a3, a2, a5).  
VARIABLE LABELS affect1 'affect1'.  
EXECUTE.
```

```
COMPUTE affect2=mean(a4, a1).  
VARIABLE LABELS affect2 'affect2'.  
EXECUTE.
```

**DISORDERED EATING**

```
COMPUTE eat1=mean(e1, e7, e4, e6).  
VARIABLE LABELS eat1 'eat1'.  
EXECUTE.
```

```
COMPUTE eat2=mean(e5, e2, e3).  
VARIABLE LABELS eat2 'eat2'.  
EXECUTE.
```

**Appendix F**

Time 2 Parent Letter and Consent

## UNIVERSITY OF MINNESOTA

*Twin Cities Campus*

*School of Kinesiology*

*College of Education and Human  
Development*

*Cooke Hall*

*1900 University Ave. S.E.  
Minneapolis, MN 55455*

*Office: 612-625-5300  
Fax: 612-626-7700  
<http://education.umn.edu/kin/>  
Email: [kin@umn.edu](mailto:kin@umn.edu)*

January 15, 2012

Dear Parents,

My name is Lindsay Kipp. Your daughter participated in a survey for my dissertation study last summer, and I'm doing a follow-up survey to look at gymnasts' well-being over time. Collecting information at two time points will give more confidence in study results and help us better understand how to make gymnastics participation as positive as possible. I am writing to seek your cooperation in allowing your daughter to complete a second, much shorter survey during a 15 minute period at the beginning or end of gymnastics practice. To show my appreciation, your daughter will be entered into a drawing for one of ten \$10 gift cards at Target as compensation for her time.

As a former competitive gymnast, I am interested in the sport experiences of adolescent female gymnasts. The goal of my project is to understand gymnasts' thoughts and feelings about their experiences in gymnastics. Specifically, I am interested in how gymnasts' experiences contribute to their sense of well-being.

I am aware of the many time demands that coaches and gymnasts must juggle, so I want to ensure that your daughter's involvement is as brief as possible. Your daughter will need about 15 minutes to complete the survey. **Code numbers will be used on the questionnaire, ensuring confidentiality of your daughter's responses.**

Enclosed with this letter is a parent consent form. **Please read it and sign it if you will allow your daughter to take part in this study. Please have your daughter bring this form to practice tomorrow or as soon as possible. Keep the other copy for your records.** If you have any questions or wish to contact me or my advisor, please feel free to do so. Thank you for your consideration.

Sincerely,



Lindsay E. Kipp  
Doctoral Student, Kinesiology  
(612) 624-2887  
[kippx031@umn.edu](mailto:kippx031@umn.edu)



Maureen R. Weiss, Ph.D.  
Professor, Kinesiology  
(612) 625-4155  
[mrweiss@umn.edu](mailto:mrweiss@umn.edu)

**Informed Consent Agreement**  
**University of Minnesota**  
**Project Title: Experiences in Gymnastics**

Your daughter is invited to be in a research study about her experiences in gymnastics. Your daughter was selected because she is between the ages of 10-17, competes at a gymnastics club, and completed a survey last summer. We ask that you read this form and ask any questions you may have before agreeing for your child to be in the study. This study is being conducted by researchers in the School of Kinesiology at the University of Minnesota.

**Background Information:**

The purpose of this study is to understand female adolescent gymnasts' thoughts and feelings about their gymnastics participation.

**Procedures:**

Before, during, or after a practice, your daughter will complete a questionnaire asking her about her participation in gymnastics. Your daughter will spend about 15 minutes completing the questionnaire.

**Risks and Benefits of Being in the Study:**

There are no direct risks to your daughter for completing the questions. There may be a minor risk of discomfort caused by sharing personal thoughts and experiences about participating in competitive gymnastics. There are no direct benefits to your daughter for participating in this study. The study should help us understand how to improve the experiences of young competitive gymnasts.

**Compensation:**

Your daughter will be entered into a drawing for one of ten \$10 Target gift cards as compensation for her time.

**Confidentiality:**

The information that your daughter gives in the study will be handled confidentially. Your daughter's information will be assigned a code number. The list connecting her name to this number will be kept in a locked file. When the study is completed and the data have been analyzed, this list will be destroyed. Her name will not be used in any report. Only the primary researchers will see or have access to your daughter's answers and data.

**Voluntary Nature of the Study:**

Your daughter's participation in this study is completely voluntary. Your decision whether or not to participate will not affect your or your daughter's current or future relations with the University of Minnesota. If you decide to participate, your daughter is free to not answer any question or withdraw at any time without affecting those relationships.

**Right to withdraw from the study:**

Your daughter may stop answering questions at any time. There is no penalty for doing so. She will be told to give her blank survey to Lindsay who will dispose of it immediately. You may

also withdraw your permission at any time by contacting Lindsay Kipp or Dr. Maureen Weiss (phone numbers are below).

**How to withdraw from the study:**

If your daughter wants to discontinue completing the questionnaire she should stop writing and sit quietly until the remainder of the gymnasts have finished. There is no penalty for withdrawing from the study.

**Contacts and Questions:**

The researchers conducting this study are Lindsay Kipp and Dr. Maureen Weiss. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact the researchers:

Lindsay E. Kipp, School of Kinesiology  
210 Cooke Hall, 1900 University Ave S. E.  
Minneapolis, MN 55455  
Telephone: (309) 269-9462  
e-mail: [kippx031@umn.edu](mailto:kippx031@umn.edu)

Dr. Maureen R. Weiss, School of Kinesiology  
203A Cooke Hall, 1900 University Ave S. E.  
Minneapolis, MN 55455  
Telephone: (612) 625-4155  
e-mail: [mrweiss@umn.edu](mailto:mrweiss@umn.edu)

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455  
Telephone: (612) 625-1650.

To read information about the topics of this study, please visit the following websites:

- <http://www.girlshealth.gov/fitness/> (*Office on Women's Health*, provides girls with reliable health information on physical activity, nutrition, self-esteem, etc.)
- <http://www.presidentschallenge.org/informed/digest/docs/september2009digest.pdf> (*President's Council on Fitness, Sports, & Nutrition*, Research Digest on positive youth development through physical activity, September 2009 issue)

**You will be given a copy of this information to keep for your records.**

**Statement of Consent:**

I have read the above information. I have asked questions and have received answers. I consent for my child to participate in the study.

**Your daughter's name:** \_\_\_\_\_

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

Signature of Investigator: \_\_\_\_\_ Date: \_\_\_\_\_

**Appendix G**

Time 2 Survey



# **Gymnastics Survey 2012**



**Experiences in Gymnastics Study  
University of Minnesota  
Gymnast Assent Form**

We are asking if you are willing to participate in this study because we are trying to learn about gymnasts' experiences on their team. We are interested in your thoughts and feelings about your participation in gymnastics. We hope to gain a better understanding of how to create positive sport experiences for gymnasts.

If you agree to be in this study, we will ask you to fill out a survey. You will answer questions about your experiences in gymnastics. The survey should take about 15 minutes to complete.

If you change your mind during the survey and do not want to continue, you can stop at any time. Being in this study is totally up to you, and no one will be mad at you if you don't want to do it.

You can ask any questions that you may have about this study. If you have a question later that you didn't think of now, you can ask us later.

Signing here means that you have read this paper and that you are willing to be in this study. If you don't want to be in this study, don't sign. Remember, being in this study is up to you, and no one will be mad at you if you don't sign or even if you change your mind later.

To read information about the topics of this study, please visit the following website:

- <http://www.girlshealth.gov/fitness/> (*Office on Women's Health*, provides girls with reliable health information on physical activity, nutrition, self-esteem, etc.)

Name of Participant (print name) \_\_\_\_\_

Signature of Participant \_\_\_\_\_ Date: \_\_\_\_\_

Signature of person explaining the study \_\_\_\_\_ Date: \_\_\_\_\_

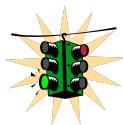


PLEASE WAIT FOR FURTHER INSTRUCTIONS



### What I Am Like

Really True for Me	Sort of True for Me	Sample Items:		Sort of True for Me	Really True for Me
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers like dogs better than cats.	<b>BUT</b>	Other teenagers like cats better than dogs.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers like vanilla ice cream	<b>BUT</b>	Other teenagers like chocolate ice cream.	<input type="checkbox"/>
Really True for Me	Sort of True for Me			Sort of True for Me	Really True for Me
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers are often disappointed with themselves	<b>BUT</b>	Other teenagers are pretty pleased with themselves.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers do very well in gymnastics	<b>BUT</b>	Other teenagers don't feel they are good when it comes to gymnastics.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers don't like the way they are leading their life	<b>BUT</b>	Other teenagers do like the way they are leading their life.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers think they could do well at just about any gymnastics skill	<b>BUT</b>	Other teenagers are afraid they might not do well at a gymnastics skill.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers are usually happy with themselves as a person	<b>BUT</b>	Other teenagers are not happy with themselves.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers feel that they are better than others their age at gymnastics	<b>BUT</b>	Other teenagers don't feel they can do gymnastics as well as others their age.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers like the kind of person they are	<b>BUT</b>	Other teenagers often wish they were someone else.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers don't do well at new gymnastics skills	<b>BUT</b>	Other teenagers are good at new gymnastics skills right away.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers are very happy being the way they are	<b>BUT</b>	Other teenagers wish they were different.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Some teenagers do not feel that they are good gymnasts	<b>BUT</b>	Other teenagers feel that they <i>are</i> good gymnasts.	<input type="checkbox"/>




---

PLEASE CONTINUE AND COMPLETE THE REST OF THE SURVEY ON YOUR OWN.

---

### In My Gym

Gymnasts vary in the amount of choice they feel they have when it comes to their gymnastics participation and how connected they feel with their teammates and coaches. **Please circle the response that best reflects how you feel while participating in gymnastics.**

- |   |                        |                 |                     |             |                        |
|---|------------------------|-----------------|---------------------|-------------|------------------------|
| 1. I have a say in what I do when participating in gymnastics.                            | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 2. I get along with my teammates.   | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 3. I feel forced to do things in gymnastics, even when I don't really want to do them.    | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 4. I get along with my coaches.   | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 5. My teammates are generally pretty friendly towards me.                                 | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 6. I help decide what I do when participating in gymnastics.                              | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 7. I really like my coaches.  | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 8. I consider my teammates to be my friends.  | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 9. I get to do the things I want to do when participating in gymnastics.                  | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 10. My coaches care about me.   | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 11. I do not have a say in what I do when participating in gymnastics.                    | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 12. My teammates care about me.   | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 13. I do not get to make decisions about what I do when I am participating in gymnastics. | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |
| 14. My coaches are generally pretty friendly towards me.                                  | Not at all true for me | Not true for me | Sort of true for me | True for me | Completely true for me |

GO TO THE NEXT PAGE →



### My Experiences

Teenagers differ in how they think about food choices and eating behaviors. For each item, please place an X in the box that best describes you.

	Never	Rarely	Sometimes	Often	Very Often	Always
1. I think a lot about wanting to be thinner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I think about burning up calories when I exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I think a lot about having fat on my body.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I am scared about being overweight.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I have been dieting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I feel very guilty after eating.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I am aware of the calorie content in foods that I eat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



This section contains a number of words that describe different feelings and emotions. Read each item and then **circle your response** that indicates to what extent you have felt this way **during the past week (7 days)**.

<b>Proud:</b>	Not at all	A little	Moderately	Quite a bit	Extremely
<b>Satisfied:</b>	Not at all	A little	Moderately	Quite a bit	Extremely
<b>Happy:</b>	Not at all	A little	Moderately	Quite a bit	Extremely
<b>Excited:</b>	Not at all	A little	Moderately	Quite a bit	Extremely
<b>Relaxed:</b>	Not at all	A little	Moderately	Quite a bit	Extremely

GO TO THE LAST PAGE →

**Tell Us About You!**

1. How old are you? \_\_\_\_\_
2. When is your birthday (month/day/year)? \_\_\_\_\_
3. Have you begun to menstruate (have your period)? (circle one)    YES    or    NO
4. Are you in competition season right now? (circle one)    YES    or    NO
5. At what gymnastics level do you compete? \_\_\_\_\_
6. How many hours per week do you train? \_\_\_\_\_
7. What is your favorite event in gymnastics? \_\_\_\_\_

---

**PLEASE GO BACK THROUGH THE SURVEY AND CHECK THAT YOU ANSWERED EVERY QUESTION.**

THANK YOU FOR PARTICIPATING!  
RAISE YOUR HAND AND WE WILL COLLECT YOUR SURVEY.

---



**APPENDIX H**

## Calculations for Mediation Analysis

For each indirect effect, the following steps were used:

Step 1: Find the indirect effect by calculating the product of the standardized path coefficients ( $\beta$ )  $a$  and  $b$ .

Step 2: Use PRODCLIN to determine if the indirect effect is significant.

- i. Enter the unstandardized path coefficient ( $B$ ) and standard error ( $\sigma$ ) of  $a$ .
- ii. Enter the unstandardized path coefficient ( $B$ ) and standard error ( $\sigma$ ) of  $b$ .
- iii. Enter the correlation between  $a$  and  $b$  (assumed to be 0).
- iv. Enter the Type 1 error rate (.05).
- v. Obtain the 95% confidence interval.
- vi. Determine significance: if the range of numbers in the confidence interval did not include zero, the effect was significant; if the range included zero, the indirect effect was nonsignificant.

The table below presents information for the significant indirect effects in Study 2.

Relationship	$\beta_a$	$\beta_b$	Indirect effect ( $\beta_a\beta_b$ )	$B_a(\sigma_a)$	$B_b(\sigma_b)$	95% CI
Mastery/Autonomy-Support → Perceived Competence → Self-Esteem	.142	.378	.054	.181 (.088)	.449 (.122)	.003 to .185
Mastery/Autonomy-Support → Perceived Competence → Disordered Eating	.189	-.223	-.032	.181 (.088)	-.512 (.147)	-.213 to -.004
Performance Climate → Perceived Competence → Self-Esteem	.249	.378	.071	.179 (.067)	.449 (.122)	.017 to .165
Performance Climate → Perceived Competence → Disordered Eating	.189	-.223	-.042	.179 (.067)	-.512 (.147)	-.191 to -.019