

Game On: Diminishing Risks for Depressive Symptoms in Early Adolescence through
Positive Involvement in Team Sports

by

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Abstract

Research shows that low levels of social acceptance, body satisfaction, and athletic competence increase risks for depressive symptoms among both girls and boys (Harter, Marold, & Whitesell, 1992). Little is known, however, about factors that can mediate these risks. To better understand how sports involvement may mediate risks for depressive symptoms, this study uses a multivariate structural model to examine how the qualitative nature of team sports involvement operates to influence risks for depressive symptoms.

Participants were 455 students from a high school in a moderately-sized city. Girls reported lower mean levels of body satisfaction and athletic engagement and tended to have higher levels of depressive symptoms. No sex differences were observed in experiences of positive team sports involvement. Structural equation modeling showed that the mediating model fit the data well. Implications for community- and school-based sports programs are discussed.

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Introduction

In early adolescence, rates of depressive symptoms (e.g., depressed mood, irritability), begin to increase for both girls and boys. However, studies show that by late adolescence, girls' rates of depressive symptoms outnumber boys' by two to one (Nolen-Hoeksema & Girgus, 1994). Understanding gender differences in risk and protective factors for depressive symptoms may help to explain this gender-moderated pattern of distress (Leadbeater, Blatt, & Quinlan, 1995; Leadbeater, Kuperminc, Blatt, & Hertzog, 1999).

Past research shows that perceptions of social acceptance (e.g., feeling popular among peers), body dissatisfaction (e.g., negative feelings about specific aspects of one's body) and athletic competence (e.g., feeling good at sports) are predictors of depressive symptoms for girls and boys (Harter, Marold, & Whitesell, 1992). However, as girls tend to have lower athletic competence and higher body dissatisfaction than do boys, they may be at greater risk for experiencing depressive symptoms (Cole, Maxwell, Martin, Peeke, Seroczynski, Tram, et al., 2001; Leadbeater et al., 1999).

Although studies have shown preliminary support for the protective effects of team sports involvement on depressive symptoms, research to date has generally assessed the frequency of adolescents' involvement without considering the qualitative differences that may exist in adolescents' experiences of team sports involvement (e.g., Gore, Farrell, & Gordon, 2001; Richman & Schaffer, 2000; Steiner, McQuivey, Pavelski, Pitts, & Kraemer, 2000; Vilhjalmsson & Thorlindsson, 1992) or the unique effects of team sports involvement. On one hand, team sports involvement may provide an exciting, challenging environment in which adolescents develop social and athletic skills, build

solid support networks, and establish positive relationships with coaches, fostering self-confidence and positive self-perceptions. On the other hand, team sports involvement that fails to foster skill development, emphasizes unhealthy or extreme competition between team-mates, overlooks peer rejection and exclusion and provides inadequate or derogatory coaching may in fact erode adolescents' self-image and increase risks for depressive symptoms. In light of the potential variability in adolescents' experiences of team sports, there is a need to evaluate the influence of team sports involvement on risks for depressive symptoms using measures which go beyond basic assessments of adolescents' levels of involvement to examine the affective nature of their experiences in team sports.

Using a competency-based model of depression (Cole, 1990, 1991), this study examines whether positive team sports involvement mediates the effects of self-perceived social acceptance, body dissatisfaction and athletic engagement on depressive symptoms in early adolescence.

This study will be among the first to examine how positive and negative experiences in team sports can moderate the mental health benefits typically associated with sports involvement and will contribute to a clearer understanding of how team environments can be enhanced to provide positive experiences to all adolescents.

Trends in Depressive Symptoms During Childhood and Adolescence

Gender differences in depressive symptoms during adolescence have been well-documented. Studies have shown that during childhood, boys and girls tend to experience depressive symptoms at roughly equal rates, with rates of clinical diagnoses ranging from 2% to 4% (Angold & Rutter, 1992; Nolen-Hoeksema & Girgus, 1994). Research also

shows that during early adolescence, the rates of depressive symptoms begin to rise significantly for both boys and girls (Angold & Rutter, 1992; Birmaher, Ryan, Williamson, Brent, Kaufman, Dahl, et al., 1996). However, during this period, gender differences begin to emerge, with girls' rates of depression increasing at a greater rate than do boys' (Angold & Rutter, 1992; Nolen-Hoeksema & Girgus, 1994). One review of literature in this field estimates that 25 to 40 percent of girls and 20 to 35 percent of boys experience depressed mood during adolescence (Petersen, Compas, Brooks-Gunn, Stemmler, Ey, & Grant, 1993).

Research also suggests that gender differences in rates of clinical depression begin to emerge between the ages of 13 and 15 (Hankin, Abramson, Moffitt, Silva, McGee, & Angell, 1998). Although the gender differences in rates of clinical depression are relatively small during early adolescence, they continue to diverge through middle and late adolescence (Hankin et al., 1998) suggesting that the preponderance of depressive symptoms emerging among early adolescent girls eventually leads to significant differences in rates of clinical diagnoses. Estimates of lifetime prevalence rates (up to age 18) of clinical depression in adolescence range from 27-28% for girls and 13-14% for boys (Hankin et al., 1998; Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993).

A better understanding of the gender-linked changes in vulnerability to depressive symptoms appears to be needed, particularly during the transition to early adolescence, when gender differences first emerge.

Transitions in Early Adolescence

During the transition from late childhood to early adolescence, children encounter a number of developmental challenges, including pubertal changes and school transitions. Research suggests that most children cope relatively well with these transitions. However, research indicates that when multiple transitions occur simultaneously (e.g., pubertal and school transitions), children tend to have greater difficulty coping with these developmental challenges (Graber, Brooks-Gunn, & Petersen, 1996).

School Transitions

For most children, the transition from elementary school to middle or secondary schools occurs between the ages of 11 and 13. This transition is accompanied by a host of new challenges, including changing academic expectations, more distant relationships with teachers, novel opportunities for extracurricular participation and changes in peer relationships and social networks (Graber, Brooks-Gunn, et al., 1996; Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991). Many researchers have explored the ways in which these changes impact adolescents' development, particularly in terms of self-perceptions, self-esteem, psychological distress and overall adjustment (e.g., Cole, Maxwell, et al., 2001; Eccles, Wigfield, Flanagan, Miller, Reuman, & Yee, 1989; Nottelman, 1987; Wigfield et al., 1991). Most research indicates that children experience declining self-perceptions and increased psychological distress during the initial transitional period but tend to show more positive adjustment shortly thereafter (e.g., Eccles et al., 1989; Wigfield et al., 1991).

Pubertal Transitions

Recent research on North American populations shows that the average age for pubertal change is commonly measured in terms of either pubertal status or pubertal timing. Pubertal status describes an individual's level of pubertal development at a given point in time, whereas pubertal timing describes an individual's pubertal development in relation to that of same sex peers (Graber, Petersen, & Brooks-Gunn, 1996). Recent research suggests that pubertal timing is more important than pubertal status for understanding risks for psychological distress in adolescence (Ge, Conger, & Elder, 1996; Ge, Conger, & Elder, 2001a; Ge, Conger, & Elder, 2001b). The groups generally considered to be at greatest risk are those who develop off-time; particularly those who mature earlier than the majority of their peers (Ge et al., 2001a; Ge et al., 2001b; Siegel, Yancey, Aneshensel, & Schuler, 1999).

Research has shown that early maturing girls experience significantly higher levels of psychological distress (Ge et al., 1996), body dissatisfaction (Siegel et al., 1999; Williams & Currie, 2000), and depressive symptoms than on-time or late maturing peers (Ge et al., 2001a; Siegel et al., 1999) and are more likely to attempt suicide (Graber, Lewinsohn, Seeley, & Brooks-Gunn, 1997). They are also more likely to report low self-esteem (Williams & Currie, 2000), have future emotional problems, associate with deviant peers (Ge et al., 1996) and are at increased risk for externalizing behaviors, eating disorders, and other forms of psychopathology (Graber et al., 1997). Increased vulnerability to these problems appears to be further exacerbated by concurrent experiences of stressful life events, such that early maturing girls who experience high levels of stressful life events are at greatest risk for a variety of psychosocial problems

(Ge et al., 2001a). In contrast, on-time and late maturing girls tend to report healthy self-esteem and body image (Siegel, 1999; Williams & Currie, 2000), and fewer depressive symptoms (Ge et al., 1996, Ge et al., 2001a) than their early maturing peers.

Although some research indicates that early maturation is advantageous for boys (see Graber, Petersen, et al., 1996), other studies have found that early maturing boys are not at a particular advantage, nor they are they especially vulnerable to the developmental risks encountered by early maturing girls (Siegel et al., 1999). However, recent data suggests that early maturing boys are more likely to show internalizing and externalizing symptoms (Ge et al., 2001b), depressive tendencies (Alsaker, 1992), and have more subsequent adjustment problems than peers who mature on-time (Ge et al., 2001b; Graber et al., 1997). Similar to the patterns observed in early maturing girls, early maturing boys also appear to have increasing difficulty coping with pubertal change when simultaneously experiencing high levels of stressful life events (Ge et al., 2001b). Other research suggests that late maturing boys may also be at risk for maladjustment (Alsaker, 1992; Graber et al., 1997), poor body image, and elevated levels of depressive symptoms (Siegel et al., 1999), when compared to boys who mature on-time.

Although the findings described above clearly suggest that early maturing boys and girls may experience similar developmental risks for psychosocial problems, including depression, research indicates that the magnitude of these risks is substantially larger for girls (e.g., Ge et al., 2001b; Graber et al., 1997).

To better understand gender differences in vulnerability to depressive symptoms during adolescence, research needs to focus on constructing profiles of both risk and protective factors and on investigating how these factors interact to moderate or mediate

overall vulnerability to depressive symptoms. Attention has been focused on understanding how adolescents' perceptions of high levels of self-competence can act as protective factors, or conversely, how perceptions of low self-competence may increase risks for depressive symptoms. Harter's (1982, 1988) theory of self-concept suggests that self-perceptions are based on evaluations of self-worth in multiple, independent domains of self-concept, including academic competence, behavioral conduct, social acceptance, athletic competence and physical appearance.

A Competency-Based Model of Depression

Drawing on Harter's (1982, 1988) multidimensional theory of competence, a competency-based model of depression has been widely used to assess risks for depressive symptoms from childhood through adolescence (Cole, 1990, 1991). Negative perceptions of self-competence have been widely linked to depressive symptoms throughout childhood and adolescence (Cole, 1990, 1991; Seroczynski, Cole & Maxwell, 1997). Studies confirm that self-perceived deficits in various domains of competence detract from a positive self-image and contribute to the development of depressive symptoms over time (Cole, 1990, 1991; Cole, Jacquez, & Maschman, 2001). Although both competencies and incompetencies are cumulatively related to depressive symptoms (Cole, Jacquez, et al., 2001; Seroczynski et al., 1997), perceived incompetencies are more strongly related, particularly for girls (Cole, 1991). However, research also shows that having at least one domain of competence can help counterbalance the increased risk for depression associated with multiple incompetencies (Seroczynski et al., 1997). For example, an adolescent who excels in sports and has strong athletic competence may be

able to overcome the cumulative effects of low social and academic competence and high levels of body dissatisfaction on risks for depressive symptoms.

In efforts to better understand increases in depressive symptoms among girls during early adolescence, recent studies have focused on documenting accompanying changes in perceived competence. Findings suggest that, with the exception of physical appearance, boys and girls report similar mean levels of self-perceived competence throughout childhood and adolescence, although girls tend to report lower mean levels of athletic competence and physical appearance (Cole, Maxwell, et al., 2001).

Research shows that the stability of self-perceived competence increases steadily throughout adolescence, with the exception of a sharp decline during the transition to middle school in all domains except behavioral conduct (Cole, Maxwell, et al., 2001). This period of decline is considered to reflect challenges and readjustment associated with the middle school transition, including, for example, changing academic expectations, disruption and reorganization of social groups and concurrent pubertal change (Cole, Maxwell, et al., 2001). These findings show that self-perceived competence is more likely to fluctuate on a regular basis during this transitional period, suggesting that during early adolescence, a larger proportion of children may be susceptible to periods of perceived incompetency and are subsequently at greater risk for depressive symptoms. To better understand how perceived competencies and incompetencies interact to increase or diminish risks for depressive symptoms, the current study focuses on identifying the domains of competence that tend to best predict subsequent rates of depressive symptoms.

Social Acceptance, Body Dissatisfaction, and Athletic Engagement as Predictors of Depressive Symptoms

Research indicates that the cluster of low perceived athletic competence (e.g., feeling good at sports) and social acceptance (e.g., feeling popular among peers) and high levels of body dissatisfaction (e.g., negative feelings about specific aspects of one's body) is a particularly strong predictor of both negative affect (e.g., depressed mood; Cole, Peeke, Dolezal, Murray, & Canzoniero, 1999) and depressive symptoms (Harter et al., 1992). On the contrary, athletic involvement is negatively associated with depressive symptoms (Biddle & Mutrie, 2001). Given the higher mean levels of body dissatisfaction and lower levels of athletic engagement typically observed among adolescent girls, a better understanding of the mechanisms through which these predictors operate may help to explain increased rates of depression among adolescent girls.

Social Acceptance and Depressive Symptoms

Research indicates that depressed children are less socially competent than non-depressed peers in middle childhood (Benford, 1998; Renouf, Kovacs, & Mukerji, 1997) and early adolescence (Renouf et al., 1997). In fact, studies examining multiple components of perceived social acceptance show that children and early adolescents with high levels of depressive symptoms are more likely to have problematic peer relationships, be rejected by peers, and exhibit social deficits (Rudolph & Clark, 2001; Rudolph, Hammen, & Burge, 1994; Stanchfield, 2000). Indeed, in a longitudinal study of 6th graders, low levels of perceived social acceptance predicted depressive symptoms at Time 2, over and above Time 1 levels of depression (Cole, Martin, Powers, & Truglio, 1996). Moreover, depressive symptoms did not predict changes in perceived social

acceptance over time (Cole et al., 1996), suggesting that involvement in activities that promote social acceptance may play an important role in diminishing risks for depressive symptoms in early adolescence.

Although girls and boys typically show similar levels of and patterns of change in perceived social acceptance throughout adolescence (Cole, Maxwell, et al., 2001), research suggests that girls tend to demonstrate greater intimacy with peers than do boys (Leadbeater et al., 1999). These higher levels of intimacy may in turn contribute to girls' affective experiences in team sports. For example, a team environment that strengthens social networks, emphasizes supportive behavior among players and facilitates prosocial interactions among peers may encourage girls to begin or maintain involvement. Alternately, team environments that overlook peer rejection, victimization and promote negative interactions with peers may increase girls' vulnerability to depression as a function of unhealthy intimacy with peers.

Body Dissatisfaction and Depressive Symptoms

Body image, and more specifically, body dissatisfaction (i.e., discomfort with specific features of one's body; feeling unattractive) have received a great deal of attention in recent studies of adolescent depression. Interestingly, research with adolescent girls suggests that it is the evaluative component of body image (e.g., body dissatisfaction) that matters most in the association with depression, rather than actual body weight (Rierdan & Koff, 1997). Indeed, body dissatisfaction has been implicated as a key risk factor for depression for both boys and girls, consistently predicting depressive symptoms (e.g., McCabe, Ricciardelli, & Banfield, 2001; Siegel, 2002; Siegel et al., 1999), even when controlling for other well-established risks such as low levels of social

support and elevated levels of negative affect (Stice & Bearman, 2001). Increases in mean levels of body dissatisfaction over time have been implicated as particularly strong predictors of subsequent depression (Siegel, 2002; Stice & Bearman, 2001). Furthermore, studies indicate that while body dissatisfaction predicts depressive symptoms, depressive symptoms do not predict body dissatisfaction, providing evidence that body dissatisfaction is causally related to the development of depressive symptoms and not vice versa (Siegel, 2002; Siegel et al., 1999).

Gender differences in levels of body dissatisfaction indicate that adolescent girls report significantly higher levels of dissatisfaction than do boys (McCabe & Ricciardelli, 2001; McCabe et al., 2001; Siegel, 2002; Siegel et al., 1999). For girls, the physical changes that accompany pubertal development tend to create increasing divergence between actual appearance and culturally endorsed ideals of thinness, whereas boys experience physical changes that are more consistent with cultural expectations for slim, muscular bodies (McCabe, Ricciardelli, & Finemore, 2002; Rierdan & Koff, 1997). Among girls, elevated levels of body dissatisfaction are associated with higher levels of concurrent depressive symptoms and increased risk for persistent depression throughout adolescence (Ohring, Graber, & Brooks-Gunn, 2002). Girls who report recurrent dissatisfaction throughout adolescence are more likely to have matured early and appear to be particularly vulnerable to depressive symptoms in early adulthood (Ohring, et al., 2002).

Despite striking differences between boys and girls in both physical ideals and rates of body dissatisfaction, research shows that dissatisfaction is strongly associated with elevated depressive symptoms among both boys and girls. However, gender

differences in rates of depressive symptoms are largely eliminated when levels of body dissatisfaction are statistically controlled (Siegel et al., 1999; Siegel, 2002), suggesting that intervention and prevention programs that target body dissatisfaction may be particularly important in reducing girls' elevated vulnerability to depressive symptoms.

Using a four item scale to assess satisfaction with weight, physical development/maturation, figure/build and overall appearance in combination with the Children's Depression Inventory (CDI; Kovacs & Beck, 1977), Siegel (2002) examined whether mean levels of body dissatisfaction and changes in body dissatisfaction over time contribute differently to levels of depressive symptoms. The findings showed that for girls, increases in mean levels of body dissatisfaction over time, as assessed using difference scores (T2-T1), predicted depressive symptoms better than Time 1 levels of body dissatisfaction. In contrast, for boys, increases in mean levels of body dissatisfaction over time and Time 1 levels of dissatisfaction contributed equally to predictions of depressive symptomatology.

Similarly, another study of adolescent girls found that high mean levels of body dissatisfaction and increases in body dissatisfaction over time predicted subsequent increases in depressive symptoms, over and above other known risk factors common to both boys and girls (i.e., poor social support and negative emotionality) (Stice & Bearman, 2001).

These findings clearly indicate that body dissatisfaction is a particularly salient risk for depressive symptoms among girls, who consistently report elevated levels of body dissatisfaction in comparison to male peers (Cole, Jacquez, et al., 2001; Cole,

Maxwell, et al., 2001; Leadbeater et al., 1999; McCabe & Ricciardelli, 2001; Siegel, 2002).

Moreover, in addition to directly increasing risks for depressive symptoms, body dissatisfaction has also been shown to increase risks for engaging in body change strategies (McCabe et al., 2001; McCabe et al., 2002; McCabe & Ricciardelli, 2001). In a study of 1185 Australian adolescents (grades 7-9, mean age = 13.2 years) McCabe et al. (2001) found that high levels of body dissatisfaction led to engagement of body change strategies, which in turn [depending on the specific strategy (e.g., dietary supplements, exercise)], were related to both positive and negative affect. For example, body change strategies that focused on building muscle tone were related to increased levels of both positive and negative affect for both boys and girls. This finding suggests that adolescents' motivations for engaging these strategies may play a central role in determining whether these strategies increase or diminish subsequent risks (e.g., negative affect) for depression. For example, engaging in sport or physical activity as a means of increasing muscle tone in order to enhance overall physical fitness or improve performance of sport-specific skills may be very different from trying to increase muscle tone with the purpose of appearing leaner and more attractive. For some, engaging in sports may be viewed as a means to generally improve physical fitness (rather than improving appearance or changing specific aspects of physical features), reduce stress, and interact with peers, and, as such, may be more strongly related to positive affect. In contrast, those adolescents who engage in sports for the sole purpose of attaining an ideal body may be much more focused on physical changes and less likely to receive other

associated benefits (e.g., prosocial interactions with peers, enhanced athletic competence).

Gender differences in the types of body change strategies adolescents adopt show that girls are more likely to engage strategies to lose weight, whereas boys are more likely to engage strategies to gain weight and improve muscle tone (McCabe & Ricciardelli, 2001; McCabe et al., 2002). Interestingly, however, McCabe et al. (2001) found that both high levels of body dissatisfaction among adolescent girls and use of weight change strategies were unrelated to girls' actual weight (as measured by Body Mass Index), suggesting that risks for body dissatisfaction, and indirectly for depression, are likely related to other factors, such as pressure from mass media, peers and family and increases in body fat associated with pubertal development. The finding that body mass index was unrelated to dissatisfaction conflicts with other studies that have generally reported that having a higher body mass index tends to be associated with a higher level of dissatisfaction (McCabe & Ricciardelli, 2001; Rierdan & Koff, 1997). However, further research has confirmed that sociocultural pressures play an important role in predicting body dissatisfaction (McCabe & Ricciardelli, 2001).

Further research suggests that for girls, perceived social support may interact with body dissatisfaction, such that low levels of perceived social support predict increases in body dissatisfaction (Stice & Whitenton, 2002), potentially increasing risks for depressive symptoms. Moreover, research examining the influence of sociocultural variables on levels of body dissatisfaction shows that, compared to boys, girls report higher pressure from mothers (but not fathers) and from both same- and opposite-sex peers to conform to societal stereotypes of the ideal female body (i.e., thinness; McCabe

& Ricciardelli, 2001), showing that social support (or lack thereof) plays an important role in determining levels of body dissatisfaction, setting girls up to be more vulnerable to the risks (e.g., depressive symptoms) associated with high levels of dissatisfaction.

In order to understand the increases in girls' rates of depressive symptoms during early adolescence, research is clearly needed to examine processes that enhance or maintain girls' satisfaction with their bodies during this period. More specifically, interventions that diminish body dissatisfaction, strengthen social support networks and promote positive feedback regarding girls' bodies may be particularly important in buffering their risks for depressive symptoms. Research also indicates that adolescent girls would likely benefit from programs that teach them how to make distinctions between being underweight and of normal weight, as girls tend to encourage each other to lose weight regardless of their body mass index (McCabe & Ricciardelli, 2001). The current study will address these issues by examining whether positive involvement in team sports can diminish levels of body dissatisfaction by helping girls to appreciate the strengths and capacities of their bodies in sports settings and by providing opportunities to build strong social support networks that may help buffer other pervasive risks (e.g., sociocultural pressures) for elevated body dissatisfaction.

Athletic Engagement and Depressive Symptoms

Clustered with self-perceived social acceptance and physical appearance, athletic competence been directly implicated as a predictor of adolescent depression (Harter et al., 1992). Some research shows that children's perceptions of athletic competence begin to decline as early as first grade (Fredricks & Eccles, 2002), while other findings show that prior to the middle school transition, athletic competence actually increases (Cole,

Maxwell, et al., 2001). However, findings converge in illustrating an accelerated period of decline in perceptions of athletic competence following the middle school transition (Cole, Maxwell, et al., 2001; Fredricks & Eccles, 2002).

Gender differences in athletic competence have been observed throughout childhood and adolescence, with girls reporting significantly lower levels of competence than boys (Cole et al., 1999; Fredricks & Eccles, 2002; Leadbeater et al., 1999). Evidence is mixed regarding whether these gender differences are increased (Cole et al., 2001; Leadbeater et al., 1999) or diminished (Fredricks & Eccles, 2002) by late adolescence.

This pattern of declining athletic competence may be related, in part, to the impact of pubertal changes on physical performance (e.g., motor co-ordination; Fredricks & Eccles, 2002), however, it is unclear whether this is true for all adolescents or whether pubertal changes (e.g., increased size in comparison to peers) may provide competitive advantages that lead to increases in athletic competence for some adolescents.

Perceptions of athletic competence may also be impacted by school transitions, as opportunities to maintain competence through participation in school and community sports teams tend to become increasingly competitive in middle and secondary school, with increasing numbers of students competing for a limited number of spaces (Fredricks & Eccles, 2002).

Additionally, a recent Canadian survey shows that girls engage in sports and physical activity at significantly lower rates than do boys throughout childhood (44% vs. 53% respectively) and adolescence (30% vs. 40% respectively; Craig, Cameron, Russell, & Beaulieu, 2001). These statistics indicate that, proportionately, girls engage in far fewer activities that offer opportunities to enhance athletic competence. For both boys

and girls, there is also a clear pattern of declining participation from childhood to adolescence (Craig et al., 2001). This suggests that across adolescence, both boys and girls are increasingly less likely to receive the mental health benefits typically associated with sports involvement (Steiner et al., 2000) and, in addition, are dropping out of activities that offer opportunities to enhance athletic competence.

Team Sports Involvement: A Protective Factor?

Involvement in team sports may provide adolescents with ongoing skill development and feedback from peers and coaches, thus increasing opportunities to enhance athletic and social competence and feel good about physical features and strengths of their bodies. Experiencing feelings of success in performing sport-related skills and gaining physical fitness may help adolescents feel proud of their bodies and help to diminish feelings of body dissatisfaction.

Involvement in team sports can also offer adolescents opportunities to become positively engaged in social interactions with a consistent group of peers, throughout at least one sport season. Success in team sports requires effective collaboration among team members and requires participants to build competence in interacting with peers (some of whom may be drawn from outside adolescents' dominant peer groups) and resolving conflicts constructively. Interaction with peers and coaches provides ongoing competency-based feedback, which aids in forming self-perceptions of both athletic and social competence.

Interestingly, among active Canadian adolescents, boys are more likely to participate in team sports (e.g., soccer, baseball, basketball) than girls, although girls rate a variety of group fitness activities (e.g., aerobics classes, social dancing) as popular

pursuits (Craig et al., 2001), suggesting that for both boys and girls, social interaction may play an important role in adolescents' decisions regarding involvement in sports and other forms of physical activity.

Studies of both adult and adolescent populations have consistently noted that participation in physical activity is positively associated with psychosocial well-being (e.g., positive self-esteem, positive mood) and negatively associated with various forms of psychopathology, including depression (Biddle & Mutrie, 2001). Indeed, a recent meta-analysis exploring the physiological effects of exercise on depression concluded that involvement in moderate and vigorous exercise can reduce rates of depressive symptoms among adults (Dunn, Trivedi, & O'Neal, 2001).

Although research shows that adolescents' sports involvement is positively associated with mental health benefits (Gore, Farrell, & Gordon, 2001; Steiner et al., 2000), the mechanisms through which sports involvement diminishes risks for poor mental health have not been well investigated. Some research shows that adolescent sports involvement leads to enhanced body image and athletic competence in college-aged women (Richman & Schaffer, 2000), however, these relationships have not been examined in an adolescent population or in terms of their contribution to depressive symptoms.

Using a risk and protective framework, Gore et al. (2001) examined the direct effects of team sports involvement on depressive symptoms in a large sample (N=1037) of ninth, tenth and eleventh grade students. Protective factors included team sports involvement (measured using a 5 point Likert scale to rate frequency of involvement in various activities) and parental and peer support, which were assessed using 6 items

adapted from Procidano & Heller's (1983) scale which asks adolescents to rate perceived support from their mother, father, and peers on a 4 point scale. Risk factors included poor school performance (assessed using self-reported grade point average) and parent- and peer-related stress, which was measured using items drawn from an inventory of stressful life events (Adolescent Perceived Events Scale; Compas, Davis, Forsythe & Wagner, 1987). Girls reported significantly lower rates of involvement in team sports and significantly higher rates of depression. Findings indicated that higher levels of involvement in team sports predicted lower levels of depression for both girls and boys, however these effects were reduced to insignificance ($p < .10$) when other protective factors (i.e., parental and peer support) were controlled. Interestingly, for girls, an interaction of team sports involvement and poor school performance was observed, such that girls who reported low grade point averages but were highly involved in team sports were less likely to report depressive symptoms than girls who were less involved in team sports.

These findings suggest that team sports involvement may be an important protective factor for depression and may moderate other well-established risk factors. However, further research that looks beyond the level of involvement to examine the qualitative nature of team sports experiences is desperately needed in order to better understand the mechanisms through which team sports involvement may mediate or moderate risk factors for depression.

The Current Study

Building upon research that highlights social acceptance, body satisfaction, and athletic engagement as key predictors of adolescent depression (Harter et al., 1992), this

study examines team sports involvement as a potential mediator of these risks. Past research has shown preliminary support for the protective effects of team sports involvement on depressive symptoms (e.g., Richman & Schaffer, 2000; Vilhjalmsson & Thorlindsson, 1992) but has tended to rely on objective measures of activity levels rather than exploring the nature of team sports environments. This study moves beyond basic assessments of team sports activity levels to ask how the type of experience youth have in team sports environments matters for mental health outcomes. Drawing upon a competency-based model of depression (Cole, 1991), this study explores whether positive team sports involvement mediates the risks posed by low social acceptance, body satisfaction, and athletic engagement for depressive symptoms in early adolescence (see Figure 1).

Hypotheses

Based on past research, boys are expected to report lower mean levels of depressive symptoms and higher mean levels of body satisfaction and athletic engagement, compared to girls. Early-maturing girls are expected to report higher mean levels of depressive symptoms than on-time or late-maturing peers. The prediction for boys is less clear, since studies have shown that both early and late maturing boys may be at increased risk for depression (e.g., Alsaker, 1992; Ge et al., 2001b; Graber et al., 1997).

Positive team sports involvement is expected to mediate the associations of social acceptance, body satisfaction, and athletic engagement with depressive symptoms. Gender is expected to moderate the proposed mediational model.

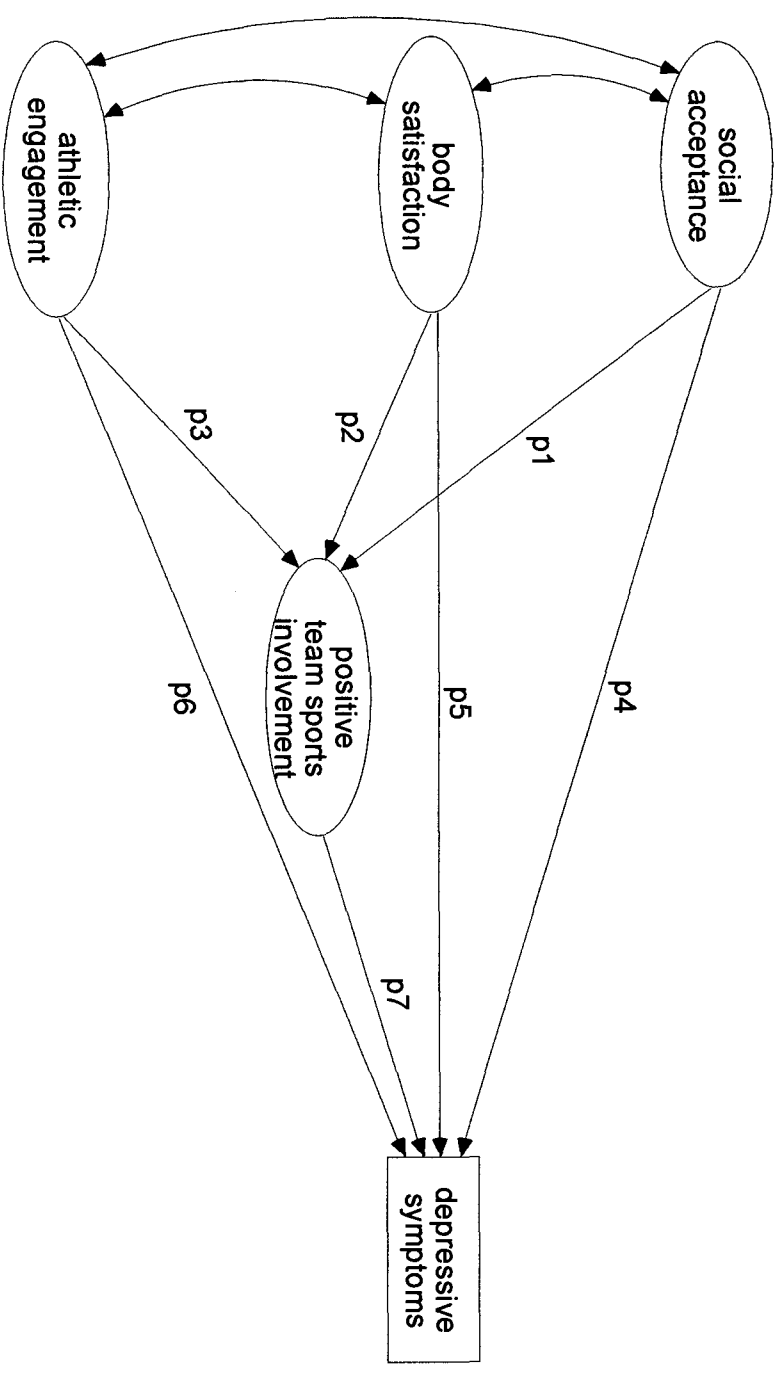


Figure 1. Proposed model for the mediating effects of positive team sports involvement on pathways to depressive symptoms.

Methods

Participants

Data were collected from 455 participants in required physical education classes at a public high school in a moderately-sized Canadian city. The school serves approximately 1400 students in grades 8 through 12, has a strong commitment to athletic programs, and tends to produce highly successful school sports teams.

Six surveys contained spoiled data and were excluded from subsequent analyses, leaving a total of 449 participants (49.7% girls). The overall participation rate was 75.5%. Participants included 199 grade 8 students (50.8% girls), 121 grade 9 students (52.1% girls) and 120 grade 10 students (48.3% girls). Eight boys and one girl did not report their grade. The sample was largely Caucasian (73.1%) with the remaining minority (26.9%) representing mainly East Indian, Asian, Middle Eastern or mixed ethnicities. Twenty-five participants did not report their ethnicity.

Participants reported their parents' level of education, showing that 65.7% of mothers and 63.3% of fathers had completed post-secondary education, 10.9% of mothers and 11.1% of fathers had received some post-secondary education, 11.6% of mothers and 13.1% of fathers had completed high school, and 3.8% of mothers and 3.8% of fathers had not completed high school. The school neighbourhood typically reflects families of moderate to high socio-economic status.

Procedure

All data were collected anonymously. An oral description of the study was provided to students approximately one week prior to data collection. At that time, a letter was sent home to parents, explaining the study and requesting that they inform the

research team if they did not want their child to participate. Instructions were received from one parent requesting that his child be excluded from the study. Prior to data collection, students were reminded of the objectives of the study and signed a consent form in order to participate. Students who chose not to participate completed their physical education class in another area of the school grounds.

Following the data collection, participants received an oral debriefing regarding the content of the survey as well as a handout that provided further information, directed them to local counselling resources, and provided contact information for the principal investigator. All students (participating and non-participating) received snacks at the end of the hour. In addition, the school received a \$100 gift certificate to a local sports supplier.

Measures

Social acceptance was measured via self-report on Harter's (1988) Self-Perception Profile for Adolescents (SPPA). The response format was modified from the original version to simplify the administration of the measure (Leadbeater et al., 1999). For each item, two contrasting stems were listed (e.g., Some teenagers find it hard to make friends, but for other teenagers it's pretty easy) and participants were asked to 1) circle the stem that best describes them, and then 2) rate whether the statement they selected is 'sort of true' or 'really true'. Internal consistency (α) was .77.

Social inclusion was assessed via self-report on three items of the Children's Social Behavior Scale (CSBS; Crick & Grotpeter, 1995). Items were reworded to be appropriate for adolescents (e.g., 'kids' was replaced with 'teens') and were rated on a 5-point Likert scale. Items included: "Some teens have a lot of friends. How often do you

have a lot of friends?”, “Some teens wish they had more friends. How often do you do this?”, and “Some teens have a lot of friends who like to hang out with them. How often do others like to hang out with you?”. Internal consistency was .70.

Body satisfaction was assessed using the body dissatisfaction subscale of the Self-Image Questionnaire for Young Adolescents (SIQYA; Petersen, Schulenberg, Abramowitz, Offer, & Jarcho, 1984). The SIQYA subscale includes 11 items that assess positive feelings about one’s body (e.g., I am not satisfied with my body; I am proud of my body). Five of these items are positively worded, the remaining 6 are negatively worded. Each item was rated on a 6-point Likert scale ranging from “describes me very well” to “does not describe me at all”. Items were scored such that high scores indicate high levels of body satisfaction (i.e., low dissatisfaction). Two dimensions were created to represent perceived attractiveness (6 items; e.g., I frequently feel ugly and unattractive; I am proud of my body) and physical satisfaction (5 items; e.g., I am not satisfied with my weight; My body is growing about as quickly as I would like it to). Internal consistencies were .85 for attractiveness and .55 for physical satisfaction. The attractiveness and physical satisfaction dimensions were considered to better represent the potential variability in adolescents’ physical self-perceptions. While we would not be surprised to observe that feelings of physical satisfaction are closely associated with higher levels of attractiveness, it is likely that there are other combinations of these dimensions. For example, an adolescent girl who is heavier than her peers and whose shape does not conform to cultural stereotypes of thinness might not feel particularly attractive but may be relatively satisfied with her physical appearance and report feeling comfortable in her own skin. In fact, many programs that aim to improve body image

encourage acceptance of the features of your body, regardless of the congruence or incongruence with culturally mandated stereotypes of beauty.

Physical appearance was measured using the SPPA (Harter, 1988). The response format was modified as described above and included items such as “Some teenagers are happy with the way they look...” and “some teenagers wish their body was different...”. Internal consistency was .85.

Athletic competence was measured using the SPPA (Harter, 1988). The response format was modified as described above. The 5 items on the athletic competence subscale were divided into two dimensions, representing athletic esteem (3 items: “Some teenagers do very well at all kinds of sports...”, “some teenagers feel that they are better than others their age at sports...”, and “some teenagers feel that they are very athletic...”) and athletic attitudes (2 items: “Some teenagers think they could do well at just about any new athletic activity...”, and “some teenagers are good at new games right away...”). Internal consistencies were .80 for athletic esteem and .74 for athletic attitudes. Athletic esteem is more closely associated with feelings of confidence and competence in sports already underway, whereas athletic attitudes are more pertinent to evaluation of the capacity to take up a new activity. Adolescents may potentially report incongruence between these domains, perhaps feeling high levels of esteem for the sports they are currently engaged in but lacking confidence in their abilities to excel in a new sport. Similarly, some adolescents may report positive athletic attitudes and optimism regarding their ability to excel at new sports, despite a track record of relatively poor performance in previous endeavours that has been coupled with poor athletic esteem. By making a

distinction between these dimensions of athletic competence, we hope to better represent the range of potential experiences.

Level of team sports involvement was measured using a modified version of the competence items of the Youth Self Report (Achenbach, 1991). Participants listed the school- or club-based team sports that they were involved in and rated how frequently they participated in these activities, including practices, games, team fitness training (i.e., 1-2 hours per week, 3-4 hours per week, 5 or more hours per week). A continuous, weighted variable was generated to tap the overall level of involvement by multiplying each reported team sport by the hours of involvement for that sport, then summing across sports.

Positive team sports involvement was measured using a questionnaire developed specifically for this study by the principal investigator. The measure contains 16 items that ask participants to rate how often positive and negative experiences occur when they are playing team sports (e.g., I feel embarrassed, my coach encourages me, my parents pressure me to play better, I feel like I'm really part of the team). Items were rated on a 5-point Likert scale (1 = never, 3 = sometimes, 5 = always). The measure contains 3 dimensions that reflect a) competence and skill development (7 items; e.g., "I feel like I've improved my skills", "I feel confident"), b) warm, positive coaching (5 items; e.g., "My coach recognizes my efforts", "my coach encourages me"), and c) feelings of social support and belonging (4 items; e.g., "I feel like I'm really part of the team", "my teammates make fun of me"). Internal consistencies were .87 for competence, .75 for coaching and .74 for social support.

Aggression towards peers was assessed via self-report on the CSBS (Crick & Grotpeter, 1995). Aggression scores were created by summing scores on the relational (e.g., “Some teens try to keep others from liking someone by saying mean things about them...”), physical (e.g., “some teens hit others...”), and verbal (e.g., “some teens yell at others and call them mean names”) aggression subscales and were used to control for comorbid effects of externalizing behaviors in predicting depressive symptoms (see description below). Internal consistency was .85.

Depressive symptoms were assessed via self-report, using the Beck Depression Inventory (Beck & Steer, 1993). This measure is designed for use with adolescents ages 13 and older and assesses depressive symptoms over the previous two weeks. At the request of the participating school, the item assessing sexual interest was omitted, leaving a total of 20 items. Each item is rated on a 4 point Likert scale. Scores for each item are summed to provide an overall measure of depressive symptoms (item range = 0 to 3). Scores above 16 points are considered to fall within the clinical range. The BDI has been widely used and shows good internal consistency and validity in both psychiatric and non-psychiatric populations (Beck, Steer, & Garbin, 1988). An examination of the standardized mean scores revealed several outliers with z-scores greater than 3.29. To minimize the effects of the outliers on the overall distribution, eight cases with z-scores greater than 3.29 were trimmed to a raw score of 33.00 (such that the raw score corresponded to the next highest value of the distribution, $z = 3.10$).

Pubertal timing was assessed via self-report on a single item of the Pubertal Development Scale (Petersen, Crockett, Richards, & Boxer (1988) of adolescents’ perceived pubertal timing, relative to that of their peers.

Results

Preliminary Analysis

Bivariate correlations between each of the measured variables are reported by sex, in Table 1 for boys and Table 2 for girls. All correlations were in the expected directions and generally indicated moderate relationships between the observed variables¹².

A one-way multivariate analysis of variance was conducted to examine sex differences in mean levels of the measured variables. Means and standard deviations for all measured variables are reported in Table 3, overall, and by sex.

Boys reported higher mean levels of attractiveness, physical satisfaction, physical appearance, athletic skills, athletic aptitude, and team sports involvement. There were no significant differences in mean levels of social acceptance, social inclusion, or indicators of positive team sports involvement (i.e., competence, coaching and social support). Mean levels of depressive symptoms (using the trimmed BDI scores) among boys ($x = 5.70$) tended to be lower than among girls ($x = 7.15$, $p = .06$).

In order to control for the comorbid effects of externalizing behaviors, a standardized variable was created by regressing aggressive behavior onto the trimmed depression scores and saving the standardized residuals. As such, the dependent variable represents levels of depressive symptoms after removing the effects of aggressive behavior.

¹ Depressive symptoms were also significantly correlated with a dichotomous measure of ethnicity. MANOVA results showed higher levels of depressive symptoms among non-Caucasian participants, however the effects of ethnicity on depressive symptoms were tested and were not significant in the multivariate models and were dropped from the analyses.

² Perceived pubertal timing was not significantly associated with depressive symptoms. Among boys, but not girls, small correlations were observed between perceived pubertal timing and attractiveness, physical satisfaction, physical appearance, athletic esteem and athletic attitudes. The effects of pubertal timing on depressive symptoms were tested but were not significant in the multivariate models and were subsequently dropped from the analyses.

Table 1

Zero-order Correlations between Observed Variables for Boys

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Social acceptance	1.00													
2. Social inclusion	.68**	1.00												
3. Attractiveness	.43**	.45**	1.00											
4. Physical satisfaction	.34**	.38**	.63**	1.00										
5. Physical appearance	.51**	.36**	.55**	.32**	1.00									
6. Athletic esteem	.43**	.38**	.36**	.23**	.38**	1.00								
7. Athletic attitudes	.38**	.25**	.27**	.22**	.36**	.65**	1.00							
8. Team sports involvement	.18*	.19**	.19**	.12	.06	.47**	.36**	1.00						
9. Competence (in team sports)	.49**	.57**	.51**	.38**	.37**	.56**	.46**	.34**	1.00					
10. Coaching (in team sports)	.37**	.47**	.39**	.25**	.21*	.38**	.35**	.26**	.71**	1.00				
11. Social support (in team sports)	.48**	.62**	.47**	.41**	.30**	.47**	.36**	.34**	.80**	.63**	1.00			
12. Depressive symptoms	-.47**	-.54**	-.50**	-.37**	-.33**	-.33**	-.32**	-.12	-.59*	-.49**	-.52**	1.00		
13. Depressive symptoms (without aggression)	-.51**	-.53**	-.55**	-.40**	-.35**	-.35**	-.39**	-.17*	-.58**	-.52**	-.52**	.99**	1.00	
14. Perceived pubertal timing	-.05	-.11	-.19**	-.23**	-.18*	-.15*	-.18*	-.04	-.13	-.05	-.07	.10	.12	1.00

* $p < .05$, ** $p < .01$

Table 2

Zero-order Correlations between Observed Variables for Girls

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Social acceptance	1.00													
2. Social inclusion	.65**	1.00												
3. Attractiveness	.33**	.43**	1.00											
4. Physical satisfaction	.21**	.30**	.71**	1.00										
5. Physical appearance	.35**	.33**	.71**	.53**	1.00									
6. Athletic esteem	.19**	.14	.31**	.26**	.16*	1.00								
7. Athletic attitudes	.30**	.26**	.44**	.32**	.28**	.78**	1.00							
8. Team sports involvement	.13	.13	.23**	.17*	.06	.60**	.43**	1.00						
9. Competence (in team sports)	.29**	.40**	.52**	.50**	.30**	.57**	.58**	.40**	1.00					
10. Coaching (in team sports)	.34**	.33**	.30**	.31**	.14	.49**	.40**	.33**	.62**	1.00				
11. Social support (in team sports)	.34**	.41**	.47**	.44**	.23**	.38**	.45**	.30**	.77**	.55**	1.00			
12. Depressive symptoms	-.31**	-.40**	-.51**	-.50**	-.46**	-.11	-.26**	-.11	-.51*	-.22**	-.45**	1.00		
13. Depressive symptoms (without aggression)	-.29**	-.40**	-.50**	-.50**	-.47**	-.11	-.26**	-.12	-.50**	-.21**	-.44**	.99**	1.00	
14. Perceived pubertal timing	-.02	-.02	-.11	-.06	-.02	.00	.05	-.01	-.06	-.11	.02	-.04	-.03	1.00

* $p < .05$, ** $p < .01$

Table 3

*Multivariate Analysis of Variance of Sex Differences in Means (and Standard Deviations)
on Structural Model Variables*

<i>Latent construct and measured indicator</i>	<i>Overall</i>		<i>Boys</i>		<i>Girls</i>		
Social acceptance							
Social acceptance	10.77	(3.31)	10.48	(3.31)	11.01	(3.31)	
Social inclusion	8.60	(2.55)	8.34	(2.76)	8.81	(2.34)	
Body satisfaction							
Attractiveness	20.51	(5.60)	21.64	(5.57)	19.53	(5.46)	***
Physical satisfaction	16.68	(4.37)	17.46	(4.59)	15.99	(4.06)	**
Physical appearance	7.98	(3.93)	8.83	(3.57)	7.24	(4.09)	***
Athletic engagement							
Athletic esteem	5.37	(2.67)	5.81	(2.38)	4.98	(2.86)	**
Athletic attitudes	3.64	(1.80)	3.96	(1.74)	3.35	(1.81)	**
Team sports involvement	3.36	(2.99)	4.11	(3.33)	2.71	(2.49)	***
Positive team sports involvement							
Competence and development	20.29	(5.52)	20.77	(5.47)	19.87	(5.53)	
Coaching	14.32	(3.77)	14.22	(3.99)	14.42	(3.59)	
Social support	11.93	(3.09)	11.65	(3.30)	12.16	(2.89)	
Depressive symptoms	6.48	(6.69)	5.70	(7.19)	7.15	(6.17)	^a

Multivariate $F(12, 281) = 4.95, p < .001$.

Note. ^a $p = .06$, * $p < .05$, ** $p < .01$, *** $p < .001$

Model Evaluation Criteria

Structural equation modelling, using AMOS 5.0 software (Arbuckle, 2003), was used to examine the mediating effects of positive team sports involvement on pathways between social acceptance, body image, athletic performance and depressive symptoms.

Recent guidelines suggest the use of multiple indices when evaluating the fit of structural equation models (Hu & Bentler, 1999; Kline, 1998). The indices selected for the current analysis are the chi-square statistic (with associated degrees of freedom and probability value), the relative chi-square, the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). Model comparisons will be evaluated using the chi-square difference statistic.

The chi-square statistic indicates how well a model fits by evaluating the magnitude of the difference between the sample covariance matrix and the fitted covariance matrix (Hu & Bentler, 1995). A non-significant chi-square statistic indicates that the proposed model is a plausible fit for the sample data (Hu & Bentler, 1995; Kline, 1998). However, the chi-square statistic is highly sensitive to sample size, such that models based on large data sets are unlikely to produce non-significant chi-square values. This problem can be addressed to some degree by examining the relative chi-square, which is the ratio of the chi-square statistic to the associated degrees of freedom (noted as χ^2/df). Values of less than three indicate reasonable model fit (Kline, 1998).

The CFI is an incremental fit index that compares the proposed model with a null model that assumes the latent variables are uncorrelated (Kline, 1998). Values of CFI indicate the proportion of covariance in the data that is reproduced in the proposed model

(e.g., CFI = .90 indicates 90% of covariance is accounted for). Conventional guidelines suggest that values greater than .95 indicate a good fitting model (Hu & Bentler, 1999).

The use of RMSEA is particularly recommended in evaluating structural equation models for several reasons, including sensitivity to model misspecification and general consensus in the field regarding the range of acceptable fit values. In addition, the calculation of RMSEA provides a confidence interval that offers additional precision in evaluating the fit of a proposed model (MacCallum & Austin, 2000). Guidelines suggest that RMSEA values less than .06 indicate good fit, values ranging from .06 to .08 indicate adequate fit, and values greater than .08 indicate poor fit (Hu & Bentler, 1999).

The chi-square difference statistic is used to compare hierarchically nested models. The chi-square statistic and associated degrees of freedom of the simpler model (e.g., a model hypothesizing no sex differences) are subtracted from those of the more complex model (e.g., a sex differences model). The resulting chi-square difference statistic and degrees of freedom are evaluated according to the chi-square distribution. A significant chi-square difference statistic indicates that the more complex model fits the data significantly better than the simple model, despite the added complexity (Kline, 1998).

Measurement Model

As reported in Table 4, latent variables represented social acceptance, body satisfaction, athletic engagement and positive team sports involvement. Items for the indicators of each latent variable were parceled into summary scores for their respective subscales. As outlined by Little, Cunningham, Shahar, & Widaman (2002), models based on parceled indicators can provide several advantages over item-based models. First,

Table 4

Description of Questionnaires Used in Measurement Model

<i>Instrument</i>	<i>Source</i>	<i>Latent variable</i>	<i>Indicators (# of items)</i>
Adolescent Self-Perception Profile (SPPA)	Harter (1988)	Social acceptance	Social acceptance (5)
Children's Social Behavior Scale (CSBS)	Crick & Grotpeter (1995)	Social acceptance	Social inclusion (3)
Self-Image Questionnaire for Young Adolescents (SIQYA)	Petersen et al. (1984)	Body satisfaction	Attractiveness (6)
Self-Image Questionnaire for Young Adolescents (SIQYA)	Petersen et al. (1984)	Body satisfaction	Physical satisfaction (5)
SPPA	Harter (1988)	Body satisfaction	Physical appearance (5)
SPPA	Harter (1988)	Athletic engagement	Athletic esteem (3)
SPPA	Harter (1988)	Athletic engagement	Athletic attitudes (2)
Youth Self Report (revised)	Achenbach (1991)	Athletic engagement	Weighted team sports involvement (composite)
Team Sports Questionnaire (TSQ)	Boone (2003)	Positive team sports involvement	Competence and development (7)
TSQ	Boone (2003)	Positive team sports involvement	Coaching (5)
TSQ	Boone (2003)	Positive team sports involvement	Social support (4)

parceled indicators show greater reliability than single items, as aggregate scores are likely to better represent the underlying construct than single items. Second, the influence of non-normal item distributions can be minimized by aggregating items into parcels, which tend to be more normally distributed. Third, the improved psychometric properties associated with parceled scores are likely to generate more stable structural solutions, requiring fewer iterations to converge. Finally, parcel-based models tend to show greater parsimony and lower levels of sampling error.

An initial measurement model was constructed to examine the relationships between the three latent predictors (social acceptance, body satisfaction, and athletic engagement) and the proposed mediator (positive team sports involvement). The model with data combined for boys and girls fit adequately, $\chi^2(38) = 115.20$, $p < .001$, $\chi^2/df = 3.03$, CFI = .97, RMSEA = .07.

Given the current hypotheses and observed sex differences in mean levels of the indicator variables (i.e., attractiveness, physical satisfaction, physical appearance, athletic esteem, athletic attitudes, and team sports involvement), sex differences in factor structures were also evaluated. Specifically, sex differences in the measurement model were tested by using multiple group analysis to allow factor loadings and covariances among latent variables to vary by sex. The sex differences model fit the data well, $\chi^2(76) = 170.22$, $p < .001$, $\chi^2/df = 2.24$, CFI = .96, RMSEA = .05, and was a significant improvement over the model that used combined data, $\Delta\chi^2(38, N = 449) = 55.03$, $p < .001$. As a result, these loadings were allowed to vary by sex in the subsequent analyses. Standardized factor loadings for each latent variable are reported in Table 5. All factor loadings were above .56 and were significant ($p < .001$).

Table 5

Standardized Factor Loadings, Standard Errors and R² for the Final Measurement

Model

<i>Latent construct and measured indicator</i>	<i>Boys</i>			<i>Girls</i>		
	β	<i>SE</i>	<i>R²</i>	β	<i>SE</i>	<i>R²</i>
Social acceptance						
Social inclusion ^a	.85	– ^b	.72	.92	– ^b	.84
Social acceptance	.79	.12	.63	.73	.15	.53
Body satisfaction						
Attractiveness ^a	.93	– ^b	.86	.96	– ^b	.93
Physical satisfaction	.67	.06	.44	.74	.05	.55
Physical appearance	.61	.05	.37	.73	.04	.54
Athletic engagement						
Athletic esteem ^a	.91	– ^b	.83	.95	– ^b	.91
Athletic attitudes	.72	.06	.52	.82	.04	.67
Weighted team sports involvement	.56	.11	.31	.63	.06	.39
Positive team sports involvement						
Competence and development ^a	.96	– ^b	.92	.96	– ^b	.92
Coaching	.76	.04	.58	.66	.04	.44
Social support	.85	.03	.73	.81	.03	.66

Note. All β are significantly different from zero ($p < .001$).

^a Factor loadings fixed at 1.0 in the unstandardized solution.

^b Standard error was not estimated.

Correlations among the each of the four latent variables were significant in the expected directions and are reported by sex in Tables 6 and 7. With the exception of social acceptance, which, among boys, showed stronger associations to the other latent variables, correlations among the latent variables were similar for boys and girls.

Table 6

*Bivariate Correlations Between Latent Variables in the Final
Measurement Model for Boys*

	1.	2.	3.	4.
1. Social acceptance	1.00			
2. Body satisfaction	.61	1.00		
3. Athletic engagement	.55	.45	1.00	
4. Positive team sports involvement	.75	.62	.69	1.00

Note. All correlations are significant, $p < .001$.

Table 7

*Bivariate Correlations Between Latent Variables in the Final
Measurement Model for Girls*

	1.	2.	3.	4.
1. Social acceptance	1.00			
2. Body satisfaction	.49	1.00		
3. Athletic engagement	.26	.38	1.00	
4. Positive team sports involvement	.51	.60	.66	1.00

Note. All correlations are significant, $p < .001$.

Structural Equation Model

The full mediational model, testing all direct and indirect pathways to depressive symptoms, fit the data well, $\chi^2 (97, N = 449) = 197.52, p < .001, \chi^2/df = 2.04, CFI = .96, RMSEA = .05$ (see Figures 2 and 3³). All coefficients were significant. Overall, this model accounted for 46% of the variance in depressive symptoms among boys and 48% of the variance among girls.

Mediating effects

Consistent with the mediating hypotheses, Sobel tests (Baron & Kenny, 1986)⁴ showed that the indirect effects of social acceptance ($t = -3.87, p < .001$), body satisfaction ($t = -3.59, p < .001$), and athletic engagement ($t = -4.60, p < .001$) were significant.

Exploring sex differences in regression coefficients

To test the significance of sex differences in each of the pathways described above, the model constraining each of the seven pathways (i.e., p1 to p7 in Figure 1) to be equal across boys and girls was compared to a model which allowed these pathways to vary by sex. The sex differences model fit the data similarly, $\chi^2 (90) = 188.96, p < .001, CFI = .96, \chi^2/df = 2.10, RMSEA = .05$. A chi-square difference test was conducted to compare the two models and showed no significant improvement in fit, $\Delta\chi^2 (7) = 8.56, p = .29$, indicating that the first model, hypothesizing no sex differences in regression coefficients, fit the data best (see Figures 2 and 3).

³ As a result of gender differences in factor loadings and associated variance estimates, standardized regression co-efficients are not identical between girls and boys (unstandardized estimates are equivalent). However, for ease of interpretation, standardized estimates are presented.

⁴ Sobel tests were calculated according to the formula cited by Baron & Kenny (1986). Unstandardized regression weights and associated standard errors for the pathways from the each of the predictors to the mediator and the mediator to the outcome variable were entered into separate equations to test the significance of the mediating effects of each predictor on depressive symptoms.

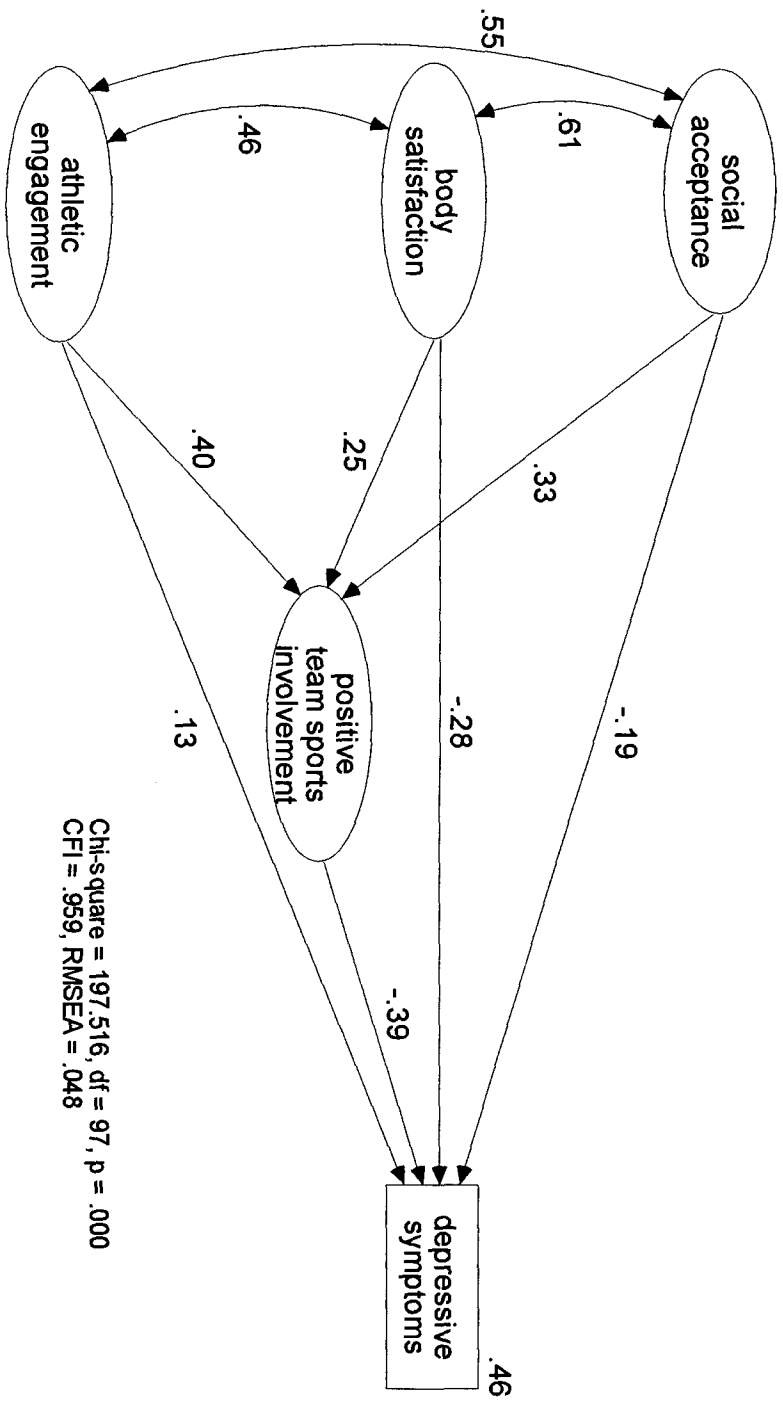


Figure 2. Boys' Pathways to Depressive Symptoms. Coefficients are standardized. All coefficients shown are significant ($p < .05$).

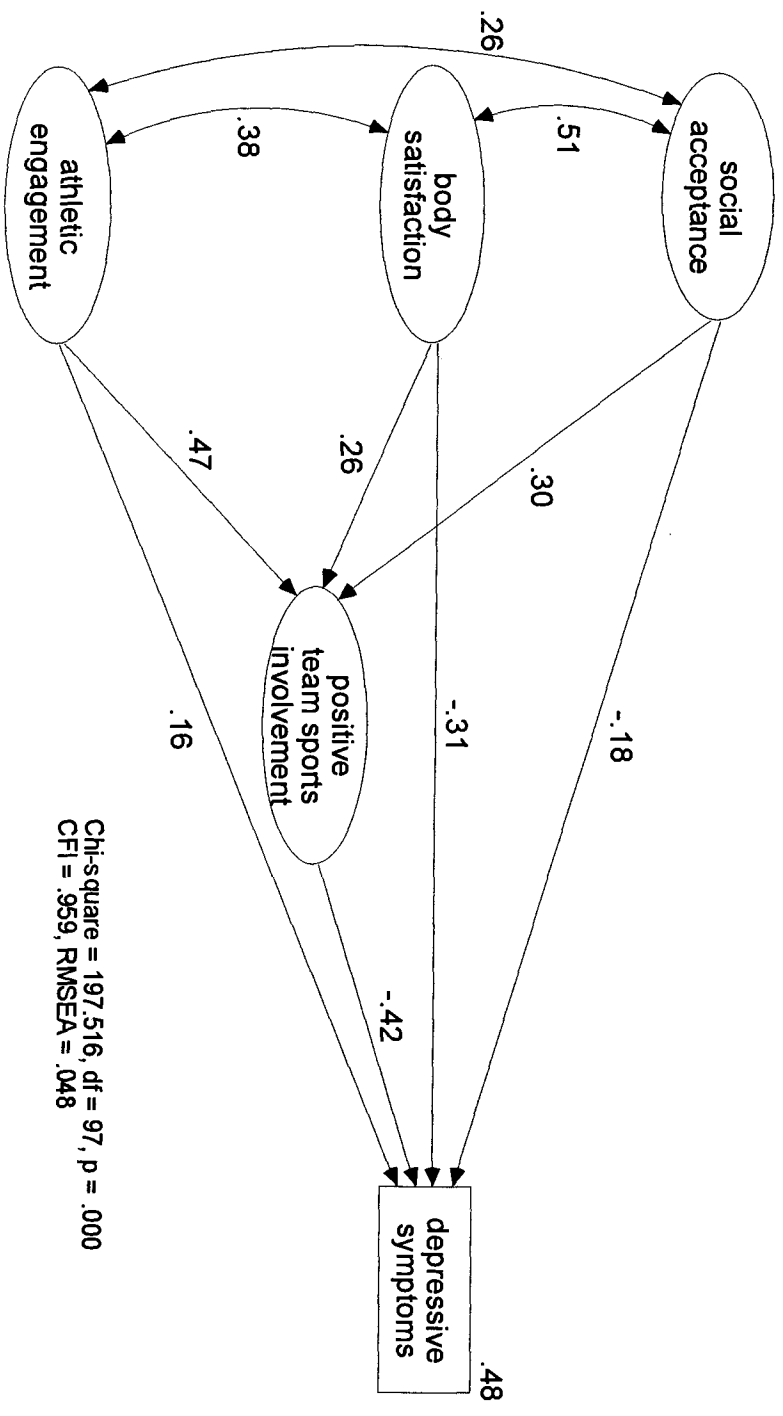


Figure 3. Girls' Pathways to Depressive Symptoms. Coefficients are standardized. All coefficients shown are significant ($p < .05$).

Discussion

Past research examining risk and protective factors for adolescent depression has generally relied on single indicators of these factors. The current study is among the first to test a more complete, multivariate picture of the complex relationships between risk and protective factors that shape adolescent depression.

Consistent with previous research and current hypotheses, girls reported greater risks than boys for several key factors for depressive symptoms. Girls reported feeling less attractive, less satisfied with their bodies and having poorer perceptions of their physical appearance than did boys. Girls also reported lower levels of athletic esteem, poorer attitudes towards their ability to learn new athletic activities, and lower levels of participation in team sports. There were no sex differences in mean levels of the indicators of positive team sports involvement (i.e., competence, social support, and coaching). Girls' levels of depressive symptoms tended to be higher than those of boys, although this effect was not as strong as might be anticipated from past research (Nolen-Hoeksema & Girgus, 1994).

These data also provide evidence of the mediating effects of positive team sports involvement on well-established risks for depressive symptoms in early adolescence. Despite sex differences in the levels of risk factors, analyses show that both direct and mediating pathways from social acceptance (i.e., social acceptance and social inclusion), body satisfaction (i.e., attractiveness, physical satisfaction, and physical appearance) and athletic engagement (i.e., athletic esteem, athletic attitudes, and frequency of team sports involvement) to depressive symptoms are similar for boys and girls. As expected, social acceptance and body satisfaction were negatively associated with depressive symptoms

and positively associated with positive team sports involvement. Surprisingly, although athletic engagement was associated with higher levels of positive team sports involvement, it was also directly associated with higher levels of depressive symptoms. This somewhat perplexing finding and potential explanations are discussed in more detail below. Contrary to expectations, pubertal timing was not significantly associated with levels of depressive symptoms.

These findings converge with many other studies in showing that girls not only report higher mean levels of depressive symptoms compared to boys, they also show elevated risk profiles, particularly with respect to body satisfaction (e.g., Cole, Maxwell, et al., 2001; McCabe et al., 2001; McCabe & Ricciardelli, 2001; Siegel, 2002; Siegel et al., 1999). Consistent with a competency-based model of depression (Cole, 1990; 1991), this multivariate model suggests that perceptions of competence in at least one domain of self-concept can effectively reduce risks for depressive symptoms (Seroczynski et al., 1997). This model also shows that positive team sports involvement can effectively ameliorate the risks posed by low levels of social acceptance, body satisfaction, and athletic engagement. Interestingly, despite girls' lower rates of participation in team sports, they are just as likely as boys to report positive team sports involvement when they do become involved. Moreover, given their elevated vulnerability to depressive symptoms, these findings show that girls may benefit from increased participation in positive team sports environments.

Positive Team Sports Involvement and Social Acceptance

Team sports involvement may hold particular promise for youth who are otherwise poorly accepted or excluded by their peers. Participation in a sports team

provides social interaction with a consistent group of peers, across at least one sports season. Positive coaching may further enhance these benefits by encouraging interaction among team members, modeling appropriate conflict resolution strategies, and emphasizing the need to work as a coherent unit in order to achieve success.

Furthermore, sports teams frequently draw members from a variety of schools, social groups, and cliques and may help marginalized youth connect with peers in a less threatening environment. Team sports environments may support youth in stepping outside the boundaries otherwise imposed by their normative peer culture to shed labels (e.g., nerd, rebel) and try out new roles.

Endeavours to sustain or increase positive team sports involvement could take advantage of adolescents' increasing concern with social interaction, peer relationships and social status to market sports teams as engaging social contexts. Promotional campaigns could emphasize the opportunities sports teams provide for youth to spend time together, to learn new skills and activities, to develop common social capital and to establish a supportive peer networks.

Positive Team Sports Involvement and Body Satisfaction

Findings indicate that body satisfaction is associated with depressive symptoms for both boys and girls, both directly and indirectly. Although positive team sports involvement diminishes the risk, the direct association between body satisfaction and depressive symptoms was only partially mediated by positive team sports involvement. Further research is needed to investigate other potential mediators (e.g., participation in media literacy programs) of this important risk factor.

Youth may benefit from sports programs that directly address issues of body dissatisfaction. For example, participation in media literacy programs may assist youth in deconstructing pervasive cultural stereotypes that perpetuate unhealthy perceptions of physical appearance (Gross, 2003; Kusel, 1999; Stice & Whitenton, 2002). Sports programs may also provide a particularly effective vehicle to highlight skill development, to improve physical fitness and to help youth recognize and appreciate the strengths and capabilities of their active bodies. Indeed, research has shown that, for both boys and girls who report elevated levels of body dissatisfaction, adoption of strategies to increase muscle tone (e.g., sports involvement, weight training) are associated with positive affect (McCabe et al., 2001). Sports programs may also provide opportunities to learn about healthy nutrition. Although many youth are already exposed to some form of nutritional education at school, the sports environment may provide added motivation to establish healthy eating habits, particularly if coaches and program administrators highlight the connection between adequate nutrition and sports performance. This type of support may be particularly important for girls who experience high levels of body dissatisfaction, as they are more likely to engage in weight control strategies (e.g., dieting) that have been linked to increases in negative affect in previous research (McCabe & Ricciardelli, 2001; McCabe et al., 2001).

Past research has shown that, for girls, social support can moderate the risk for increases in body dissatisfaction, such that low levels of perceived social support predict increases in body dissatisfaction (Stice & Whitenton, 2002). Indeed, in the current study, for both boys and girls, social support from team-mates was an important component of positive team sports involvement, which in turn mediated risks posed by elevated body

dissatisfaction. Strategies to improve peer networks, social interaction and social support are essential components of successful team environment and team spirit. As such, team sports involvement provides built-in opportunities for youth to strengthen social support and belonging to a peer group, potentially diminishing the risks associated with elevated body dissatisfaction. As little is known about other factors that mitigate the risks of body dissatisfaction, further research in this area could explore the effects of extracurricular activities and other leisure time pursuits that offer similarly positive environments for social interaction and social networking.

Positive Team Sports Involvement and Athletic Engagement

Although athletic engagement indirectly contributed to a reduction in risk via positive team sports involvement, it was also positively associated with depressive symptoms. This positive association was entirely unexpected and prompted post-hoc speculation regarding the possible reasons for this anomalous relationship.

The zero-order correlations between depressive symptoms and the indicators of athletic engagement (i.e., athletic esteem, athletic attitudes, and frequency of team sports involvement) were in the expected directions and suggests that the association between athletic engagement and depressive symptoms is, in fact, negative. The mediating model tests the association between athletic engagement and depressive symptoms in the presence of both social acceptance and body satisfaction. These variables are generally considered to be more powerful predictors of depressive symptoms and, as such, may garner the greater portion of the variance in this particular model, leading to a suppressor effect (and a positive association between athletic engagement and depressive symptoms). The shared variance between athletic engagement and the other variables in

the model may reflect more positive aspects of athletic engagement, such as feeling competent at performing sport-related skills, and understanding the strategy of the game. The remaining variance may better represent negative aspects of athletic engagement, such as performance anxiety, which we would expect to be positively associated with depressive symptoms. In future studies, the use of additional indicators of athletic engagement would not only aid in clarifying the meaning of the underlying construct and improving model validity, but would also allow for greater exploration of components of athletic engagement that may be directly linked to negative affect.

It may also be important to consider adolescents' motivation for athletic involvement, as previous research has shown that the use of body change strategies (e.g., weight control, exercise, dietary supplements) is strongly related to negative affect (McCabe et al., 2001). Body satisfaction, strategies to lose weight, use of dietary supplements, and strategies to improve muscle tone predicted depressive symptoms among both boys and girls (McCabe et al., 2001). This finding suggests that it may be important to consider adolescents' motives for athletic involvement in order to better understand the association between athletic engagement and depressive symptoms. For example, participating in team sports to lose weight and to improve physical appearance may be qualitatively different than participating to have fun and to spend time with friends.

Turning to a more complex explanation, it is possible that protective effects generally associated with high levels of athletic activity are relinquished in cases where it becomes difficult for youth to express those competencies, leading to feelings of frustration, a lack of achievement and increases in negative affect. Adolescents who are

involved in positive team sports environments have the opportunity to express their athletic competence in a meaningful and rewarding manner that contributes to the protective effects for depressive symptoms. On the contrary, athletes who report high levels of athletic involvement, esteem, and attitudes, but are forced to participate in highly critical and competitive team environments might be expected to show elevated levels of depressive symptoms. These situations may be particularly troubling for youth for whom team sports involvement may preclude the opportunity to effectively engage a domain of exceptional competence.

Although the current structural model fits the data well, it is possible that another theoretically plausible model may fit the data equally well. One possibility is that the current model misspecifies the association between athletic engagement and positive team sports involvement, such that athletic engagement may be mediating the effects of positive team sports involvement on depressive symptoms, rather than the other way around. For example, for some adolescents, low levels of athletic engagement may increase anxiety and heighten peer comparisons, subsequently reducing the capacity to receive the benefits of a positive team sports environment and exacerbating symptoms of depression.

Further research is needed to better understand the components of athletic engagement, to clarify the theoretical distinction between athletic engagement and positive team sports involvement, and to tease apart these complex relations. Future studies need to make use of multiple indicators of athletic engagement and could draw upon existing measures of physical self-concept that have been more widely used in the field of sport and exercise psychology.

Pubertal Timing

Although hypotheses were proposed regarding the effects of pubertal timing on depressive symptoms, these variables were not significantly associated. As the majority of this sample was post-pubertal, it was impossible to calculate accurate objective scores of pubertal timing. A single item assessing adolescents' perceptions of their pubertal timing was used to evaluate the association between pubertal timing and depressive symptoms and may have been inadequate. In future, it may be necessary to follow a younger, pre-pubertal sample over a period of several years in order to accurately assess pubertal timing. Previous research has consistently shown that early-maturing girls are at increased risk for elevated body dissatisfaction and depressive symptoms. Considering the protective effects of positive team sports involvement on risks for depressive symptoms, it is possible that early-maturing girls may receive great benefits from team sports involvement. Further research is needed to explore whether the protective effects of positive team sports involvement are moderated by pubertal timing.

Limitations and Directions for Future Research

Research examining risk and protective factors for adolescent depression has tended to rely on theoretical models that are based on single indicator variables. This study makes an important theoretical contribution to this field by using multiple indicators to reflect the complex relationships between social acceptance, body satisfaction, athletic engagement, positive team sports involvement, and depressive symptoms. Our findings show that these variables are well represented by a multiple indicator structural model. The use of cross-sectional data in the current study provides preliminary validation of this model; however, longitudinal data is needed to adequately

assess the directionality of the relations specified in the model. Longitudinal data is also needed to examine stability and change in risk profiles for depressive symptoms and to understand how team sports involvement and other potential mediators operate over time to ameliorate risks.

Despite gender differences in mean levels of risk factors (i.e., social acceptance, body dissatisfaction, and athletic engagement) for depressive symptoms, the findings suggest that these risks operate similarly for girls and boys as predictors of depressive symptoms. The findings also show that, when they do participate, girls are just as likely as boys to receive benefits from positive team sports involvement. This is a promising finding, as it suggests that gender differences in depressive symptoms may be better explained by differences in levels of risk factors (Leadbeater et al., 1995; Leadbeater et al., 1999), rather than by differences in the multivariate associations between risk factors and depressive symptoms, per se. Longitudinal research exploring the development of gender differences in risk factors for depressive symptoms is needed to better understand how to construct effective prevention and intervention programs to target adolescent depression.

This study adds to our understanding of the particular risks mediated by positive team sports involvement, however, little is known about *how* these mechanisms operate. There is a critical need for qualitative research to examine two key issues. First, we need a better understanding of what constitutes positive team sports involvement. The measure developed for the current study is a preliminary tool that requires validation with other samples. Consultation with community sports groups, coaches, players, and parents should be a central component of this process. Secondly, more detailed data are needed to

better understand *how* positive team sports involvement operates to reduce risk factors for depression. For example, do adolescent athletes benefit from fitness testing to gauge their physical progress across a season, or does this attention to the body heighten dissatisfaction and concerns about appearance?

Although the final structural model fit the data well, the validity of the model would be improved by increasing the number of indicators for each latent variable, particularly for athletic engagement. This model relies exclusively on self-report data and would be further validated by incorporating data from multiple sources. Future studies could make use of teacher, parent, and coach reports to help validate data provided by adolescent participants. For example, teachers and parents could provide data on adolescents' depressive symptoms, integration in social networks, and involvement in sports and extracurricular activities. Coaches could describe team cohesion and social support among team mates and provide evaluations of players' sports performance and anxiety. Observational data and qualitative interviews would also be useful for exploring potential mechanisms through which positive team sports involvement operates to reduce risks for depressive symptoms.

Finally, this model needs to be tested with larger, more diverse populations to examine whether these findings are consistent across ethnic backgrounds and variations in socio-economic status.

Recommendations for Community- and School-based Sports Programs

Overall, these findings highlight the potential benefits associated with team sports involvement in adolescence and emphasize the need for parents, coaches and program leaders to carefully consider the nature of youth sports environments. The qualitative

experience youth have in team sports environments may influence mental health outcomes. Despite girls' elevated vulnerability to depressive symptoms, they are as likely as boys to report positive experiences in team sports. This finding is particularly promising as it suggests that, despite dwindling sports participation rates, elevated levels of body dissatisfaction and low athletic engagement, adolescent girls who participate in positive team sports can significantly reduce their risk for depressive symptoms.

Many youth drop out of recreational sports programs (Craig et al., 2001). This is likely due to several factors, including increasing levels of competition and commitment, conflicts with other hobbies and leisure time activities, changes in interests and increasing demands of schoolwork (Fredricks & Eccles, 2002). In particular, sports teams that demand more and more time and become increasingly competitive may lead some youth to drop out of these activities. Research with competitive teams has shown that participants who drop out tend to feel excluded from an otherwise cohesive social group and identify a lack of enjoyment as a principal reason for ending participation (Robinson & Carron, 1982). This suggests that the qualitative nature of the team sports experience is an important predictor of sustained participation.

Despite declining sports participation rates, informal comments from our participants suggest that many youth are interested in trying new sports but may be anxious about doing so, as they tend to feel outclassed by peers who have been participating in these sports since early childhood. Intramural and drop-in leagues may better meet the needs of youth who wish to begin new activities, prefer lower levels of competition and who are primarily seeking an enjoyable leisure time activity. Organized sports leagues that dedicate resources towards providing novice-level programs at all

ages may further encourage youth to begin new sports throughout adolescence. Municipal and provincial governments could play a key role in these initiatives by earmarking funding for recreational-level programs that will sustain youth participation rates at all levels of play and help youth to establish patterns of sport and physical activity that they can realistically maintain throughout adulthood.

For community- and school-based programs facing ongoing restructuring and cuts to funding, these findings provide evidence of some of the specific psychological benefits that are associated with positive team sports involvement. These kinds of data are needed to lobby municipal and provincial governments for sustained funding and to support grant applications for youth sports initiatives.

Most recreational sports programs rely heavily on volunteer coaches who have varying credentials and coaching experience in their respective sports. In order to ensure that coaches are providing youth with positive, engaging experiences, recreational programs need to provide adequate coaching support. For example, sports programs could hire coaching development coordinators to provide seminars on the physical and psychological benefits associated with team sports involvement, to offer workshops on coaching strategies, and to observe and provide feedback on coaching behavior at practices and games.

By making coaches more aware of how positive team sports involvement interacts with risk factors such as elevated body dissatisfaction and low social acceptance, community- and school-based sports programs can empower coaches to create positive team environments that directly address these risks and foster resilience among youth. Given their elevated risk profile, particular attention should be paid towards improving

girls' appreciation of the strengths and capacities of their bodies, enhancing perceptions of athletic performance and fostering confidence in sports endeavours. Moreover, by educating youth about the psychological benefits associated with team sports involvement, we can increase awareness of adolescent depression and help support youth in developing effective strategies for maintaining mental health throughout adolescence and into adulthood.

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