



The effects of physical activity interventions on psychosocial outcomes in adolescents: A meta-analytic review



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HIGHLIGHTS

- Four meta-analyses on the effects of physical activity interventions were conducted.
- Significant effects of physical activity were found on all psychosocial outcomes.
- Physical activity interventions can be effective in reducing psychosocial problems.
- Effects depend on several outcome, study, sample and intervention characteristics.

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ABSTRACT

Physical activity interventions are often implemented in the adolescent mental health care practice to prevent or treat psychosocial problems. To date, no systematic review of the effect of these physical activity interventions in adolescents has been conducted. In the current study, four multilevel meta-analyses were performed to assess the overall effect of physical activity interventions on externalizing problems, internalizing problems, self-concept, and academic achievement in adolescents. In addition, possible moderating factors were examined. In total, 57 studies reporting on 216 effect sizes were included, and the results showed significant small-to-moderate effects of physical activity interventions on externalizing problems ($d = 0.320$), internalizing problems ($d = 0.316$), self-concept ($d = 0.297$), and academic achievement ($d = 0.367$). Further, moderator analyses showed that outcome, study, sample, and intervention characteristics influenced the effects of physical activity interventions on psychosocial outcomes. Implications for theory and practice concerning the use of physical activity interventions in adolescent mental health care practice are discussed.

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1. Introduction

For decades, physical activity has been associated with a broad range of positive outcomes in youth. Historically, empirical research focused on identifying associations between physical activity and general health benefits, such as lower risks of chronic diseases and adiposity (Andersen et al., 2006; Haynos & O'Donohue, 2012; Janssen & LeBlanc, 2010). This type of research was later extended to psychosocial outcomes (Biddle & Asare, 2011; Strong et al., 2005). Nowadays, a large body of empirical evidence describing the relation between physical activity and psychosocial outcomes is available. Physical activity is associated with better academic performance, higher self-esteem, and less anxiety, depression, and behavioral problems (Bailey, 2006; Biddle & Asare, 2011; Daniels & Leaper, 2006; Rasberry et al., 2011; Rasmussen & Laumann, 2013; Samek, Elkins, Keyes, Iacono, & McGue, 2015; Singh, Uijtendewilligen, Twisk, Van Mechelen, & Chinapaw, 2012; Strauss, Rodzilsky, Burack, & Colin, 2001). Hence, physical activity interventions are widely used to treat or prevent all kinds of psychosocial problems in youth. The present meta-analytic study provides a systematic review of the literature on the effects of physical activity interventions on four psychosocial outcomes in adolescents: externalizing problems, internalizing problems, self-concept, and academic achievement.

1.1. Theoretical framework

Physical activity interventions contain elements of sports or (aerobic) exercise, and are implemented in many different settings. There are several theories on how physical activity interventions may lead to improved psychosocial outcomes. First, some researchers have argued that the physiological effects of physical activity positively influence psychological and cognitive aspects (Matta Mello Portugal et al., 2013; Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991; Singh et al., 2012). For example, physical activity leads to increased body temperature, higher norepinephrine and endorphins releases, elevated blood and oxygen flow to the brain, heightened nerve cell growth and brain plasticity, and decreased blood pressure and resting heart rate (Cotman & Berchtold, 2002; Kenney, Wilmore, & Costill, 2015; Ide & Secher, 2000). These physiological effects have often been related to reduced stress, anxiety and depression levels, and better cognitive functions, such as more concentration and an improved learning ability (Chang, Labban, Gapin, & Etnier, 2012; Knöchel et al., 2012; Petruzzello et al., 1991; Singh et al., 2012; Smith, Potter, McLaren, & Blumenthal, 2013; Trudeau & Shephard, 2010).

Second, scholars have hypothesized that the context in which the physical activity is offered, provides a wide range of learning opportunities for social skills and moral virtues that are thought to protect against

psychosocial problems (Holt & Neely, 2011). By participating in physical activities, such as sports, youth are expected to develop honesty, sportsmanship, fairness, and moral judgment, and to learn obeying rules and authority, self-control, conflict-resolution, skills to cope with disappointments, and to cooperate with others (Arnold, 1994; Kreager, 2007; Shields & Bredemeier, 1995). Additionally, it was shown that young athletes had higher levels of emotion regulation and initiative taking compared to non-athletes (Larson, Hansen, & Moneta, 2006). As a result of these (alleged) contribution of sports to the moral and socio-emotional development of youth, it is often stated that physical activity interventions comprising sports elements may help in preventing or treating internalizing and externalizing problems (Boone & Leadbeater, 2006; Rutten et al., 2007; Shields & Bredemeier, 1995).

Third, a common underlying rationale for physical activity interventions is that participation in physical activities, such as sports, may have a positive effect on social inclusion, sense of identity, community participation, and bonding with society (Agnew & Petersen, 1989; Bailey, 2005; Haudenhuyse, Theeboom, & Skille, 2014; Perks, 2007). According to this sociological approach, young athletes can derive their identity from the sports team they belong to or the group of athletes practicing the same sport, which could influence the youth's self-concept positively (Armour & Duncombe, 2012; Boone & Leadbeater, 2006). Further, professional players and coaches may become important role models for young athletes, who can reinforce prosocial behaviors and prevent antisocial behaviors (Rutten et al., 2007). Also, the sports field may be seen as a context in which people from different backgrounds can interact with each other, leading to the social inclusion of vulnerable youth and stronger bonds with society (Perks, 2007). Consequently, it is argued that sports participation may prevent externalizing behaviors, and increase school involvement (Agnew & Petersen, 1989; Bailey, 2005; Fredricks & Eccles, 2006; Nichols, 2010; Eccles, Barber, Stone, & Hunt, 2003). On the other hand, there are also scholars who have pointed to the negative effects of physical activity interventions on social inclusion. For instance, social inequalities between players can actually be emphasized through the competitive component of sports resulting in stronger "us" and "them" feelings (Haudenhuyse et al., 2014; Hutchins, 2007; Spaaij, Farquharson, & Marjoribanks, 2015). However, to date there is little empirical evidence to support either assumption of the effects of physical activity interventions on social inclusion (Bailey, 2005; Haudenhuyse et al., 2014; Henley, Schweizer, de Gara, & Vetter, 2007).

Finally, it has been argued that by learning athletic skills, achieving goals, and experiencing success by winning games, physical activity interventions can positively influence self-concept (Bowker, 2006; Petruzzello et al., 1991). Physical activity may increase specific domains of self-concept (i.e., physical competence and satisfaction with physical appearance), which in turn positively influences global self-concept

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