General introduction
Juvenile delinquency is an important problem due to its negative consequences for victims, juvenile offenders, and society as a whole. A considerable proportion of crimes are committed by minors, and the financial and economic costs associated with juvenile delinquency are large (Siegel & Welsh, 2015). A little over one third (35%) of the Dutch youth between 12 and 18 years of age reported to have committed a crime in the last year (Van der Laan & Goudriaan, 2016). In 2008, 423 million euro was spent on fighting crime committed by minors and the corresponding law enforcement by the Dutch government (Moolenaar, 2010). Further, juvenile delinquency causes both material and psychological damage to victims (Siegel & Welsh, 2015). Moreover, juvenile delinquency is associated with a range of negative psychosocial outcomes for the offenders themselves, such as mental health problems, school dropout, unemployment, and substance abuse (Kirk & Sampson, 2012; Wiesner, Kim, & Capaldi, 2010). Finally, previous delinquency is a strong predictor of future delinquent acts (Assink et al., 2015). Once involved in the juvenile justice system, youth may experience stigmatization, which in turn makes it harder to get enrolled in education, find a job and appropriate housing, or build a prosocial, supportive network for themselves. This is putting a strain on the development of youth, increasing the likelihood of re-offenses (Apel & Sweeten, 2010; Chiricos, Barrick, Bales, & Bontrager, 2007; Edwards & Mottarella, 2015; Kirk & Sampson, 2012). Therefore, it has been argued that early prevention of juvenile delinquency, that is, intervening before youth engage in delinquency in the first place, is justified (De Vries, Hoeve, Asscher, & Stams, 2014; Farrington & Welsh, 2008; Siegel & Welsh, 2015).

Within the broad spectrum of programs and activities aimed at preventing juvenile delinquency in youth, there is an increasing use of sports-based interventions to prevent juvenile delinquency. However, the scientific grounds to justify the use of sports-based crime prevention programs are still weak (Chamberlain, 2013; Coakley, 2011). Therefore, the current dissertation investigated the effectiveness and rationale of sports-based interventions to prevent juvenile delinquency.

The following sections provide an overview on general principles that have been learned from previous studies on youth crime prevention. Next, the theoretical and empirical backgrounds of sports-based crime prevention programs are discussed. Subsequently, the Dutch sports-based crime prevention program "Only You Decide Who You Are" is introduced. Finally, an outline of the current dissertation is presented.

**Youth crime prevention**

Youth crime prevention consists of a range of programs and activities aimed at the enhancement of youth development and the prevention of juvenile delinquency (Deković et al., 2011). These programs focus on improving problem behavior, family functioning, parenting behaviors, social skills, and educational outcomes, or try to deter youth from delinquency using various approaches (De Vries, Hoeve, Assink, Stams, & Asscher, 2015;

Youth crime prevention has been considered controversial due to mixed results of youth crime prevention programs. Generally, the effectiveness of youth crime prevention programs is small to moderate (De Vries et al., 2015; Pardini, 2016; Piquero et al., 2009). Some studies revealed that prevention programs could also have iatrogenic effects (Arnold & Hughes, 1999; Petrosino et al., 2013; McCord, 2003; Poulin, Dishion, & Burraston, 2001). These iatrogenic effects have been explained by deviancy training, a group process in which at-risk youth encourage antisocial behavior in each other through deviant talk and modeling, causing an increase in antisocial behavior (Dishion & Tipsord, 2011; Pardini, 2016). Additionally, Goldson (2009) has emphasized the risk of stigmatization in youth crime prevention, causing an increase in the onset of juvenile delinquency. Because of the mixed results of the effectiveness of youth crime prevention interventions, it is important to examine when youth crime prevention is effective.

Farrington (2007) has argued that effective crime prevention should focus on risk and protective factors for delinquency. Several domains of risks and protective factors have been identified in the past decades, including individual risk factors (e.g., low intelligence and poor social skills), family risk factors (e.g., antisocial families and parenting style), school factors (e.g., academic achievement and truancy), and peer factors (e.g., antisocial friends and gang membership) (Farrington, 2007; Van der Put et al., 2012). According to Farrington (2007), crime prevention should be aimed at reducing the presence of risk factors and increasing the presence of prosocial factors for delinquency. Farrington (2007) refers to this principle as “risk-focused prevention”. De Vries, Hoeve, Assink, Stams, and Asscher (2015) have recently conducted a meta-analytic review to assess the specific effective components of youth crime prevention programs. They found that prevention programs with elements of behavioral modeling, contracting, or parenting skills were more effective than programs that did not contain these elements. Additionally, programs delivered in an individual, family, or multimodal setting yielded larger effect sizes than group-based programs. Finally, less intensive programs yielded larger effects than intensive programs (De Vries et al., 2015). In sum, previous research has identified general principles that can be used as guidelines for effective youth crime prevention (Pardini, 2016).

To date, youth policy makers have become interested in the use of sports in prevention programs. Sports-based activities are well integrated in the services of local crime prevention

**Sports-based crime prevention**

Historically, sports are thought to have a positive influence on the development of youth. This belief can even be traced back to Plato, who considered sports as an important part of education with regard to building character (Reid, 2007). During the mid-19th century, the British, who adopted this belief, introduced sports participation in public schools to positively stimulate youth’ character development, such as their confidence, self-reliance, and responsibility (Hargreaves, 1986; Shields & Bredemeier, 1995).

An important rationale for the use of sports-based crime prevention programs is the assumption that sports participation increases positive skills, values, and psychosocial outcomes that prevent the development of juvenile delinquency (Rees, Howell, & Miracle, 1990; Sage, 1990; Segrave, 1983). For example, it has been argued that sports participation can enhance moral development in youth, because athletes learn about right and wrong, practice honesty and fairness, and develop sportsmanship and morality (Arnold, 1994; Shields & Bredemeier, 1995). Furthermore, sports participation has been shown to be related to a range of positive developmental outcomes, including better general health outcomes, higher self-esteem, better academic achievement, and less mental health problems (Biddle & Asare, 2011; Eime, Young, Harvey, Charity, & Payne, 2013; Janssen & LeBlanc, 2010; Rasberry et al., 2011; Rasmussen & Laumann, 2013; Samek, Elkins, Keyes, Iacono, & McGue, 2015; Singh, Uijtdewilligen, Twisk, Van Mechelen, & Chinapaw, 2012). Finally, practicing sports could teach youth to deal with setbacks, to encourage initiative taking, endurance, and emotion regulation, and to increase the co-operation between peers and peer acceptance (Kreager 2007; Larson, Hansen, & Moneta, 2006; Shields and Bredemeier 1995).

A second theory supporting the use of sports-based crime prevention programs is Hirschi’s social bonding theory (1969). According to Hirschi (1969), individuals with stronger bonds to society are less likely to engage in delinquency. The elements of attachment, commitment, belief, and involvement are central to Hirschi’s (1969) theory of social bonding. Scholars have argued that all four of these elements could be enhanced by sports participation (Agnew & Petersen, 1989; Hass, 2001). The attachment to significant others may be strengthened by sports, as youth become members of a team, generally supervised by a coach who is closely related to all members. Further, youth are committed to conventional activities by participating in sports programs. Therefore, they may refrain from deviant acts, as delinquency may jeopardize their opportunity to continue sports.
Beliefs in society's values may be strengthened by sports participation, because similar rules, norms, and values are being pursued in the sports context. Finally, it is assumed that because of their involvement in sports, youth are simply too occupied to engage in juvenile delinquency (Hirschi, 1969). Therefore, it has been argued that sports-based interventions could prevent juvenile delinquency.

Although sports-based interventions have proved to be effective in reducing a variety of mental health problems (Biddle & Assare, 2011; Eime, Young, Harvey, Charity, & Payne, 2013), convincing empirical evidence for the effectiveness of sports-based crime prevention is absent (Chamberlain, 2013; Kelly, 2013). Some sports-based crime prevention programs have been evaluated, but these studies lacked the methodological rigor to draw conclusions about the effectiveness of sports-based interventions (Chamberlain, 2013; Coalter, 2015; Kelly, 2013). The current dissertation adds to the existing literature on sports-based crime prevention by conducting literature reviews on the relation between sports participation and juvenile delinquency and the effectiveness of physical activity interventions on psychosocial outcomes in adolescents. Additionally, the effectiveness of the Dutch sports-based crime prevention program ‘Only you decide who you are’ [Alleen jij bepaalt wie je bent (AJB)] is evaluated.

Only You Decide Who You Are

‘Only you decide who you are’ is a secondary sports-based crime prevention program, aimed at reducing the presence of risk factors and enhancing the presence of protective factors for delinquency in adolescents at risk for developing delinquent behavior. AJB targets male adolescents from disadvantaged neighborhoods with high crime rates enrolled in special education [Praktijkonderwijs] or the lowest educational levels [VMBO-basis and –kader]. These youth experience emerging problems in multiple life domains due to (mild/borderline) intellectual disabilities, lack of a supportive home environment, and a low socioeconomic status, which puts them at risk for delinquency (GGD Amsterdam, 2014; Nicis Institute, 2009; Ploegman & Gijzel, 2012).

AJB was developed by the Dutch Ministry of Security and Justice to prevent juvenile delinquency. Youth are encouraged to participate in AJB through sports clinics given by professional athletes at selected schools. If they are interested, they can become a member of a locally partnered sports club. Contribution fees and sports materials are covered by the Ministry of Security and Justice. At the sports clubs, youth participate in (indoor) soccer, baseball, or basketball training in special AJB-teams. The Ministry of Security and Justice selects the coaches on their ability to act as a role model and to adequately deal with the characteristics of at-risk youth. During the training, specific attention is given to behavioral difficulties of the participants. The aim of the training is to create an adequate, safe (educational) environment, with positive relationships between the coach and the
participants. The coach has to be clear about desirable and undesirable behavior, and set a good example. The participants are approached in a positive, respectful way and motivated to participate in prosocial activities at the club. If necessary, the trainer provides individual guidance to the participants and discusses concerns about the behavior with the school. AJB-coordinators ensure good coordination between the schools and sport clubs. During the first sports season, the teams consist only of participants of AJB. Over the course of the second season, participants are encouraged to join the regular sports teams of the club if their behavior and development allows this.

**Dissertation Outline**

This dissertation aims to gain insights into the effectiveness of sports-based interventions in the prevention of juvenile delinquency. Chapter 2 presents the results of a meta-analytic review on the relation between sports participation and juvenile delinquency in adolescence. Additionally, it was assessed whether offense type and study, sample, and sports characteristics moderated the association between sports participation and juvenile delinquency.

Chapter 3 reports on the results of four meta-analyses on the effects of physical activity interventions on psychosocial outcomes (externalizing problems, internalizing problems, self-concept, and academic achievement) in adolescents. For each psychosocial outcome, the potential moderating influence of outcome, study, sample, and intervention characteristics was tested.

The study in Chapter 4 evaluates the effects of the Dutch sports-based crime prevention program ‘Only you decide who you are’ using a quasi-experimental design. The effectiveness of AJB was assessed on juvenile delinquency (measured with official police registration data) and risk and protective factors for juvenile delinquency (e.g., conduct problems, aggression, perceived peer pressure, prosocial behavior, and academic engagement).

Chapter 5 presents the results of a study on the predictors of intervention success in AJB (i.e., reduction in risk factors and enhancement of protective factors for juvenile delinquency). It was investigated whether youth characteristics (e.g., type of education and sex), coach characteristics (e.g., coaching behaviors, such as motivating and individual guidance), and context factors (e.g., type of sports, and the quality of the socio-moral environment) were associated with (the degree of) change in the outcome variables.

Finally, Chapter 6 provides an overall conclusion of the dissertation. The results of the above mentioned studies are discussed in the light of previous research on sports-based interventions and youth crime prevention in general. Additionally, the strengths and limitations of the dissertation are mentioned. The chapter concludes with suggestions for future research and implications for crime prevention practice.