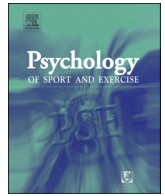




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# Intrinsic motivation and individual deliberate practice are reciprocally related: Evidence from a longitudinal study of adolescent team sport athletes<sup>☆</sup>

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## ABSTRACT

**Objective:** There is limited understanding of how sport motivation is associated with deliberate practice in youth team sport athletes. Therefore, the aim of this study was to examine prospective associations between intrinsic motivation and individual deliberate practice in specializing team sport athletes.

**Design:** Longitudinal.

**Method:** Estonian adolescent team sport athletes ( $N = 163$ ;  $M_{\text{age}} = 13.6$  years at the beginning of study) completed the Sport Motivation Scale and training diary across a 12-month period.

**Results:** Both individual deliberate practice and intrinsic motivation increased over the 1-year period. Greater baseline intrinsic motivation predicted subsequent individual deliberate practice and greater initial individual deliberate practice predicted greater subsequent intrinsic motivation. The bidirectional relationship between athletes intrinsic motivation and individual deliberate practice were replicated across both time lags.

**Conclusion:** The findings have significant implications for the importance placed on intrinsic motivation as a means of increasing of individual deliberate practice as well being an important outcome variable in specializing team sport athletes.

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Although there are a variety of factors that can influence athletic performance and the development of expertise (Côté, Baker, & Abernethy, 2007), there appears little doubt that extensive experience in a sport is necessary to improve performance and to reach the highest levels of performance (Tucker & Collins, 2012). According to theory of deliberate practice, developed by Ericsson and colleagues (Ericsson, Krampe, & Tesch-Römer, 1993), “deliberate practice is a highly structured activity, the explicit goal of which is to improve performance” (p. 368). Deliberate practice refers to practice activities which (a) are performed in a daily, work-like manner; (b) require effort and attention; (c) do not lead to immediate social or financial rewards; and (d) are frequently not enjoyable to perform (Ericsson et al., 1993). Therefore, an individual's level of performance can be increased as a result of deliberate

efforts to improve necessary skills through relevant training activities (Ericsson et al., 1993).

The positive relationship between hours of deliberate practice and sport performance has been shown in a large number of studies in sports (e.g., Baker, Deakin, & Côté, 2005; Ericsson, Nandagopal, & Roring, 2009; Helsen, Starkes, & Hodges, 1998; Hodge & Deakin, 1998; Hodges, Kerr, Starkes, Weir, & Nananidou, 2004; Ward, Hodges, Williams, & Starkes, 2007). Helsen et al. (1998), for example, examined the practice history profiles in young soccer players in Belgium, and found that deliberate practice is better characterized as team or group practice rather than individual practice. Moreover, in contrast to predictions of the theory of deliberate practice, deliberate practice in sport is generally considered enjoyable (Côté, Murphy-Mills, & Abernethy, 2012; Helsen et al., 1998). However, one of the preconditions of theory of deliberate practice that is considered critical in all domains of expertise is the motivation to improve performance (Ericsson et al., 2009).

Motivation in sport is the key determinant behind every action taken and every effort exerted (Ryan & Deci, 2000). Understanding the dynamics of motivated behavior in youth sport is arguably vital. Research using a Self-Determination Theory (SDT) supports the

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view that individuals show different motivations for a given context and that they can be, to a certain extent, intrinsically motivated, extrinsically motivated or amotivated (Ryan & Deci, 2000; Vallerand, 1997). According to Deci and Ryan (1985), intrinsic motivation and identified regulation represent increasingly autonomous, self-determined forms of motivation because they refer to behaviors performed by choice. Although the nature of motivation and its variations across individuals has been studied in diverse domains and contexts, it has never been related to deliberate practice in adolescent athletes across several competitive seasons. Central to SDT is the concept of intrinsic motivation according to which individuals engage in activities and tasks for no external contingency or reinforcement. Intrinsically motivated people experience activities as if they are the origin of their own actions and they have chosen to engage in the activity (Ryan & Deci, 2000). Because they derive a sense of personal satisfaction, competence, and fulfillment as a consequence, intrinsic motivation is relevant to athletes in achievement situations (Hagger & Chatzisarantis, 2011). Additionally, in order to maintain a demanding schedule of daily deliberate practice, often without external rewards, high intrinsic motivation is indispensable (Ericsson et al., 1993, 2009). In a similar manner, determination and persistence (Bloom, 1985) and motivation (MacNamara, Button, & Collins, 2010; Ward, Hodges, Williams, & Starkes, 2004) have been highlighted as factors necessary for the attainment of excellence by facilitating the acquisition of skills and enabling athletes to invest the requisite time for practice and to stay committed to the development process.

Young athletes pass through various stages of development as they progress (e.g., sampling, specialization, investment; Bloom, 1985; Côté, Baker, & Abernethy, 2003), recognizing that the amounts of deliberate practice change with this progression (Hodges et al., 2004). According to the Developmental Model of Sport Participation (DMSP; Côté et al., 2003), athletes pass through three stages of sport development: the sampling (age 6–12), specializing (age 13–15), and investment years (age 16+). This model suggests that in specializing years, athletes begin to narrow their focus and participate in fewer activities and their engagement in deliberate practice activities in their main sport discipline will increase. Team sport participation is generally typified by the “late specialization and early diversification” pathway with athletes usually beginning to specialize at around 14–16 years of age (Côté et al., 2003; Ford, Ward, Hodges, & Williams, 2009). During this stage of athletic development, responsibility for generating and maintaining motivation to practice and compete rests with the performers and not with the coach or parent who are largely responsible for young athletes' early motivation (MacNamara & Collins, 2013).

Recently, MacNamara et al. (2010) stressed the importance of the different psychological skills (termed “Psychological Characteristics of Developing Excellence”, or PCDEs) as critical determinants of athletic development. PCDEs include both the trait characteristics (the tendency to ...) and the state-deployed skills (the ability to ... when ...) that have been shown to play a crucial role in the realization of potential (MacNamara & Collins, 2013). Several studies have also indicated that differences in psychological factors exist between individual sports (e.g. swimming, judo) and team sport athletes (Anshel, 1996; Helsen et al., 1998). Johnson and colleagues, for example, in a study of young swimmers found that motivation level was high and that young athletes self-identified themselves as an “athlete” (Johnson, Tenenbaum, Edmonds, & Castillo, 2008). In addition, Rikberg and Raudsepp (2011) found that motivational variables (mastery approach goals and perceived sport competence) were important variables which discriminated successful and less successful male junior volleyball players. To the

contrary, recent study by Hendry and co-workers found that practice and play activities were not associated with future levels of intrinsic or autonomous motivation in sample of elite youth soccer players (Hendry, Crocker, & Hodges, 2014). More specifically, the hypothesis according to which early, intrinsically motivating behaviors (e.g. deliberate play) have a positive effect over time on an individual's self-determined motivation (Cote et al., 2012; Ryan & Deci, 2000), was not supported.

In summary, applied researchers and practitioners lack empirically-derived knowledge regarding how intrinsic motivation and deliberate practice are inter-related in specializing team sport athletes. A major problem with most previous work is that investigations have relied on cross-sectional (De Bruin, Rikers, & Schmidt, 2007) and retrospective recall data (Hendry et al., 2014), making directional interpretation problematic. While it would appear intuitive that high intrinsic motivation is indispensable in order to maintain a demanding schedule of daily deliberate practice and that the deliberate practice enhances intrinsic motivation over time, empirical work addressing this issue is limited.

The main aim of the present study was to examine prospective associations between intrinsic motivation and individual deliberate practice in specializing team sport athletes.

We adopt a unique integrated theoretical perspective (see Côté et al., 2007; Deci & Ryan, 1985; Ericsson et al., 1993) adopting constructs and hypotheses from multiple theoretical approaches, namely theory of deliberate practice, DMSP and SDT. In line with the SDT (Deci & Ryan, 1985) and DMSP (Côté et al., 2007), it was hypothesized that intrinsic motivation would predict hours of individual deliberate practice and hours of individual deliberate practice would predict intrinsic motivation in specializing team sport athletes. Our second aim was to assess differential stability of intrinsic motivation of specializing teams sport athletes across a one-year period. Due to lack of empirical evidence, we made no predictions regarding the stability of intrinsic motivation of specializing team sport athletes.

## Method

### *Participants and procedures*

Data were collected from a sample of 163 young volleyball and basketball players representing 16 teams (range 6–14 athletes per team). Participants included 102 male and 61 female athletes and ranged in age from 13 to 14 years ( $M = 13.6$ ,  $SD = 0.3$ ) at the beginning of the study (T1 measurement). All players participated in U-14 or/and U-16 Estonian Youth Championship in volleyball and/or basketball and they were not participating in other sports during the present study period. The participants reported involvement in their respective sports for an average of 5.4 years ( $SD = 1.7$ ) and they were recruited from the National Talent Identification Project in Team Sports.

Data were collected three times during 2010/2011 and 2011/2012 competitive seasons (T1 = beginning of the first season,  $n = 174$ ; T2 = end of the first season,  $n = 169$ ; T3 = beginning of the second season;  $n = 163$ ). The competitive season in U-14 and U-16 Estonian Youth volleyball and basketball championships started in October and ended in April. Therefore, data were collected in October 2010, April 2011, and October 2011. Parental consent was obtained prior to the data collection. All athletes received information about the study aims and the procedures. Sixteen athletes declined to participate before T1 measurement. Those who agreed were assigned personal codes to secure anonymity across the data collection period. Study drop-out was mainly due to athletes injury or health problems. All procedures were approved by the University's Ethics Committee.

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