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Effects of a cognitive specific imagery intervention on the soccer skill performance of young athletes: Age group comparisons

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ABSTRACT

Objectives: The primary purpose of the present study was to examine the effects of a cognitive specific (CS) imagery intervention on the soccer skill performance of young athletes aged 7–14 years and determine if performance varied with age.
Design: Participants were 143 soccer athletes belonging to 16 different teams. Teams were randomly assigned to either a cognitive specific (CS) or motivational general-arousal imagery intervention.
Methods: Athletes were administered the SIQ-C and tested on the soccer skill to determine baseline performance. Following their imagery intervention, athletes were tested on the same soccer skill, and completed the SIQ-C a second time.
Results: The results indicated that only the younger athletes (7–10 years) receiving CS imagery performed faster following their intervention. Moreover, only the 7–8 year old athletes in the CS imagery condition significantly increased their use of CS imagery over time.
Conclusions: These findings suggest that young athletes who use CS imagery will benefit from a CS imagery intervention, thus implying that mental skills training should begin at a young age if athletes are to maximize the benefits of such training.

Imagery has been shown to be an important mental skill for children (Li-Wei, Qi-Wei, Orlick, & Zitzelsberger, 1992; Munroe-Chandler & Hall, 2004; Munroe-Chandler, Hall, Fishburne, & Shannon, 2005). Despite the recent surge of research examining young athletes' use of imagery, there are still gaps in the literature indicating the need for continued research in this area (Munroe-Chandler, Hall, Fishburne, & Strachan, 2007). In particular, there is a lack of imagery intervention studies with participants under 14 years of age. By examining children's use of imagery in an intervention study, a greater understanding of the impact of imagery on sport performance during childhood and early adolescence can be gained. The positive aspects of imagery use may also lead to a better overall sporting experience for young athletes and, ultimately, their continued involvement in sport (Munroe-Chandler et al., 2005).

While virtually all adult athletes report using imagery to some extent (Hall, Rodgers, & Barr, 1990), researchers have found athletes of higher skill levels employ all functions of imagery more frequently than athletes participating at lower skill levels. For example, Salmon, Hall, and Haslam (1994) demonstrated that elite soccer players more frequently used imagery than non-elite players. Moreover, athletes use imagery for five primary purposes (functions; Hall, Mack, Paivio, & Hausenblas, 1998). The five functions of imagery are: cognitive general (CG; images of strategies of play or routines), cognitive specific (CS; images of specific sport skills), motivational specific (MS; images related to an individual's goals), motivational general-arousal (MG-A; images associated with arousal and stress) and, motivational general-mastery (MG-M; images of being mentally tough, in control, and self-confident).

Recently, Munroe-Chandler et al. (2007) investigated young (7–14 years) athletes' imagery use competing in team and individual sports. All age groups reported using all five functions of imagery. Results also revealed that children (7–10 years) reported using less MG-A and MG-M imagery than their older counterparts (11–14 years). This could be due, in part, to the fact that as children age, their long-term memory improves, allowing them to acquire and retain knowledge with less difficulty (Santrock & Yussen, 1992). It was proposed that further research is needed in order to truly understand the effects of age on young athletes' use of imagery.

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Martin, Moritz, and Hall (1999) developed an Applied Model of Imagery Use in sport with the goal of reducing the many imagery-related variables that have been examined in applied sport contexts to the smallest possible set of meaningful factors. The model consists of four key constructs; the sport situation, the function (type) of imagery used, the outcomes associated with imagery use, and imagery ability as a potential moderator. Overall, the model represents how athletes use imagery. The model centers on the five functions of imagery used by athletes. Martin et al. suggest that selection of the function of imagery to be employed is dependent on the intended outcome for the imagery use. The major outcomes of imagery are facilitating skill and strategy learning and performance, modifying cognitions, and regulating arousal and competitive anxiety.

Martin et al. (1999) argue that it is important to match imagery function with its intended outcome if imagery is to be most beneficial. For example, if the goal is to improve a sport skill (e.g., a direct free kick set-play in soccer), then the athlete should use CS imagery rather than any other function of imagery. Therefore when designing imagery interventions, one must try to develop training programs that incorporate the use of particular imagery functions that closely pertain to the athletic goal. For the purpose of the current study, the focus was on a CS imagery intervention.

CS imagery is the function that has received the most attention by researchers (Martin et al., 1999; Morris, Spittle, & Watt, 2005), and previous findings have suggested that CS imagery is very effective for adult athletes' acquisition and performance of individual motor skills. In one of the only imagery intervention studies with younger children, Li-Wei et al. (1992) examined the benefits of CS imagery training on children's table tennis performance. Participants consisted of three groups of table tennis players aged 7–10 years. Results demonstrated that children who used mental imagery experienced significantly greater improvement in the accuracy and technical quality of their shots in relation to video observer and control groups. More specifically, the mental imagery group was the only group to show significant increases in scores from pre to post intervention on all four measures of performance (i.e., accuracy and technical ratings of topspun and underspun balls).

While the majority of the imagery studies have examined the use of CS imagery on skill performance, the other imagery functions have received some attention. In addition, a few of these studies have included younger participants. For example, in a study examining the relationship between imagery use and competitive anxiety, 57 roller skaters aged 12–18 years completed a state anxiety questionnaire as well as an imagery use and imagery ability questionnaire (Vadocz, Hall, & Moritz, 1997). The results revealed that those athletes who reported using more MG-A imagery had higher levels of cognitive anxiety, and those athletes that used more MG-M imagery reported higher levels of self-confidence. In a more recent study, Strachan and Munroe-Chandler (2006) examined the relationship between imagery use, self-confidence, and anxiety in young female baton-twirlers. The results indicated that MG-A imagery was a significant predictor of cognitive anxiety as well as self-confidence in athletes aged 7–11 years.

In a youth soccer imagery intervention study, Munroe-Chandler et al. (2005) examined the effectiveness of CG imagery on three soccer strategies in an elite female soccer team (12 years of age). While performance of the soccer strategies failed to improve following the intervention, CG imagery use did increase. In addition, players increased their CS and MG-A imagery use from baseline to post intervention. The authors proposed that CS imagery use increased because soccer strategies are comprised of various skills, while the increase in MG-A imagery may have been because players were using this function of imagery to relax or reduce anxiety prior to executing the strategy. Overall, findings indicated that pre adolescent athletes use imagery quite extensively and their use of imagery increased over the seven weeks, most likely due to the imagery intervention.

Previous research has demonstrated that young athletes use the various imagery functions (Munroe-Chandler et al., 2007) and that the young athletes will increase their use of imagery when participating in an imagery intervention study (Munroe-Chandler et al., 2005). In addition, a couple of studies indicate children's motor performance can be improved through the use of CS imagery (Li-Wei et al., 1992; Short, Afremow, & Overby, 2001). The primary purpose of the present study was to extend this research by examining in the same study, the effects of a CS imagery intervention on both the imagery use and soccer skill performance of young athletes. It was hypothsized that athletes administered an imagery intervention that targeted a specific function of imagery (e.g., CS imagery) would increase their use of that function of imagery. In addition, based on the applied imagery model proposed by Martin et al. (1999), it was hypothesized that athletes in a CS imagery intervention condition would perform better (increased speed and accuracy) on the soccer skill from pre to post testing than those in a control condition who received an MG-A imagery intervention. Also, the young athletes were from four age cohorts, 7–8, 9–10, 11–12 and 13–14 years (cf. Munroe-Chandler et al., 2007) to determine if the effects of the intervention varied with age. Given the previous research of Munroe-Chandler et al. (2007), it also was hypothesized that athletes from the older age cohorts (11–14 years) would show greater performance improvements on the soccer task (speed and accuracy) from pre to post testing than their younger cohort counterparts (7–10 year olds).

Method

Participants

One hundred and sixty three young athletes were recruited from local soccer clubs to participate in the current study. Twenty of the participants did not complete the post test and, as a result, were eliminated from the subsequent analyses. The final sample included 143 athletes (75 males, 68 females; Mage = 10.11 years, SD = 2.15). The participants were volunteer, competitive, male and female youth soccer players, between the ages of 7–14 years (7–8 $n = 40$, 9–10 $n = 42$, 11–12n = 41, 13–14 $n = 20$). Athletes belonged to 16 different soccer teams, with eight teams ($n = 75$ athletes) participating in a CS imagery intervention and eight teams ($n = 68$ athletes) completing an MG-A imagery intervention.

Soccer task

The task that was used in this study, prior to and following the imagery intervention, was a series of game-like soccer skills. The task was derived from a previous imagery soccer study (Blair, Hall, & Leyshon, 1993) and consisted of dribbling, passing, shooting, and checking off (i.e., moving into empty space, then back to the ball). Fig. 1 provides a symbolic representation of the task as well as the measurements (i.e., distance in meters) used in the present study. Participants were instructed to complete the task as quickly and accurately as possible. Therefore, time required to complete the task, as well as time penalties for each error made (e.g., hitting a pylon, going out of bounds), were recorded. In the study by Blair et al., the task was designed for adult athletes. As such a pilot test was conducted to determine appropriate distances (i.e., in meters) and time penalties (e.g., seconds added for missing a target) for children 7–14 years completing the task. Time penalties remained identical to those