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Research article

A Multilevel Approach to the Path to Expertise in Three Different Competitive Settings

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Abstract
The objectives of the study were to analyze the deliberate practice variables in three different youth competitive sport settings; to analyze the effects of a season-long exposure on deliberate practice variables. The study explores three contexts in two different sports, soccer and volleyball, and at two competitive levels. The athletes fulfilled the questionnaire at the beginning and at the end of the season. A multilevel analysis was performed. Forty eight boys aged 15-17 years (14 from a volleyball club; 14 from an elite volleyball centre; 20 from a professional soccer club) participated in the study. The measure was an adapted version for soccer and volleyball of the Deliberate Practice Motivation Questionnaire, which assesses two dimensions: the will to compete and the will to excel. Fewer people in the volleyball group showed a will to excel, the soccer group showed an increase in the scores. In will to compete, the three teams showed a decrease in their means. The decrease is more pronounced in the will to excel but the context effect is not significant. The biggest decrease is shown by the elite volleyball team, followed by the club teams. The findings raise questions for managers and coaches who look for physical and technical gifted young athletes and aim to develop their qualities through a careful planned training programme. The insertion in programmes that are believed to foster expertise seems to have unexpected consequences. Sport participation cannot rely exclusively on an orientation toward expertise, forgetting the autonomy of young people to set their goals.

Key words: Deliberate practice, multilevel, expertise, soccer, volleyball.

Introduction

Excellent performance in sport has a strong positive relationship with the accumulated number of hours of practice and with the specialization years, which are considered crucial for the development of the athlete's skill level, readiness and sport commitment (De Bruin et al., 2007; Gonçalves et al., 2009). Thus, if youth athletes want to achieve high performances, they need to engage in deliberate practice during their specialization years, focusing on tasks that challenge their current performance. In particular to build solid competences and skills in future top-performers, sport organizations interested in the preparation of young talents select potential athletes at increasingly young ages, providing them more time and better conditions to practice, better coaches, teammates and opponents. This perspective seems reasonable and led sport organizations around the world to create specialized training centres where selected talented young athletes practised under the supervision of experienced coaches in order to become professional athletes and integrate with the youth national teams. In team sports this strategy has been adopted by professional clubs or national sports associations, and starts usually at around 14 years of age.

In most cases, the youngsters live, go to school and practice at the training campus, isolated from their families and familiar environments. This choice towards an elite restricted group at an early age raises the problem of talent identification and selection. To recruit adolescents or pre-adolescents to join a demanding training program on a full commitment basis is a complex task that may generate errors in prognosis.

With a concern for this critical issue, some authors (Elferink-Gemser et al., 2007; Helsen et al., 2000) argue that the selection and orientation of talent has been strongly dependent on biological and motor variables, although these variables are not able to fully differentiate athletes by competitive levels. Furthermore, it is believed that, in order to engage in a demanding schedule of year-long practice, individuals have to be highly motivated.

The effects of the competitive environment on enjoyment and positive feelings in sport are not fully understood, but the study of elite performers has shown that they are competitive, self-confident, and cope well with stress with respect to lower level athletes, or amateurs (Gould et al., 2002; Harwood et al., 2004). Hence, it is expected that adolescents who engage in elite programmes will show the same personality characteristics, and the exposure to demanding training loads will reinforce them.

Beyond the normal path to sport specialization, the perspective of a professional career plays a major role in the young athletes' choices. Although high level sport is performed by professional athletes, only a few sports offer a rewarding career, allowing the athlete to improve his/her life standards and to plan the future. The present study explores three contexts of practice in two different sports, soccer and volleyball. In most European countries, soccer is the only sport seen to be truly professional. Conversely, Volleyball, although a popular sport among youngsters, does not offer a professional career, but the national association runs an elite programme for adolescents, in an all-year-long training campus, where the athletes live in closure, providing opportunities for high training volume and quality.

Research pointed out that an orientation for mastery achievement is critical for overcoming challenging motor tasks (Duda, 2001; Roberts, 2001), and that a competitive, ego achievement orientation has been described as a deterrent factor for enjoyment in practice and the

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sport adherence (Sage and Kavussanu, 2007; Sarrazin and Guillet, 2001). However, the pursuit of excellence in sport means that progress in competitive level must be constantly evaluated and the most efficient kind of evaluation is competition. If practice is oriented to improve performance, it is reasonable to expect that athletes show a strong interest in competitive outcomes and see victory as an important moment in the process. The on-going conflict between the specific characteristics of competition and the persistence in sport programmes is far from being clarified or solved (Gonçalves et al., 2012).

Hence, our purpose was to assess the situational specific contexts that could lead the youngsters to engage and to continue in competitive programmes. De Bruin et al. (2007), in a study with young chess players, designed an instrument, called Deliberate Practice Motivation Questionnaire (DPMQ), to assess the individuals' will to become an excellent performer and to improve in competition. The DPMQ was adapted to soccer and volleyball. In a previous study with young basketball players (Gonçalves et al., 2011), was found that the will to excel and the will to compete represented variables that can discriminate between players at elite and non-elite level. It appears relevant for coaches and sport managers to have an accurate insight of the effects of sport engagement in the sport commitment of talented young athletes, and for scholars to approach the issue of talent identification through multiple perspectives and methodologies. We hypothesize that the exposure to hard training programmes would have different effects on adolescent athletes. At the same time, it seems plausible that if a young athlete is selected for a competitive team, whether in a professional-oriented environment, or in an elite-oriented programme, the will to excel and the will to compete would be reinforced with time, when compared to athletes in an ordinary club environment.

To analyse the effects of time, in this case a sport season, the multilevel approach was deemed suitable to evaluate the effects of training in diverse settings, with diverse interactions on all kinds of variables (Papaioannou, 2004). The aims of the study are: a) to analyze the deliberate practice variables in three different youth competitive sport settings; b) to analyze the effects of a season-long exposure to different environments on the deliberate practice variables.

Methods

The local ethical committee, the clubs and the Portuguese Volleyball association approved the study. Before the study, written informed consent was obtained from parents and coaches. Forty eight boys aged 15-17 years (M_{age} =16.2±0.81) were divided in three groups: 14 from a volleyball club; 14 from an elite volleyball centre; 20 from a professional soccer club. The athletes' previous competitive sport experience was 7.7 years (soccer), 5.5 years (elite volleyball), 4.2 (volleyball club). The elite volleyball players lived and practiced in a high performance center run by the Portuguese national association. The average hours of practice per week were 19 for elite volleyball, 7 for the volleyball club and 6 for the soccer club.

The instrument was an adapted version for soccer and volleyball of the Deliberate Practice Motivation Questionnaire/DPMQ, originally designed for chess by DeBruin et al. (2007). The DMPQ assesses two dimensions of deliberate practice: the will to compete and the will to excel. The questionnaire addresses two long time goals ("I want to be a professional soccer/volleyball player"), and specific changing situations ("I like tough drills in practice because they help me to improve my skills" or "I prefer to play with my friends rather than practicing hard").The 18 items were rated in a 1-5 Likert scale (1 =c ompletely disagree, 5 = completely agree). The questionnaire showed good reliability in previous studies (Gonçalves et al., 2011).

The questionnaires were completed before training sessions, in the presence of one of the researchers. The first one was completed in the pre-competitive period, and the second was completed before the end of the season. The completions of the two questionnaires were separated by a 6 month period.

Descriptive statistics (mean ± standard deviation) for all measures at the beginning and the end of training were calculated. Pre/post season changes in the will to excel and the will to compete were examined based on two-level models. Each participant's successive measurements over time were defined as an individual response change and a random error (level 1). Differences in response change between groups of individuals were examined (level 2). The 95% confidence limit for each effect was calculated to make inferences about the true (population) values of the effect of training (Batterham & Hopkins, 2006). The between-subject standard deviation for each dependent variable was used to convert the absolute changes´ values in responses into standardized changes in the mean. The smallest standardized change was assumed to be 0.20 (Cohen, 1988). SPSS software package, version 20.0 was used.

Results

Descriptive statistics of the two factors of the DPMQ are presented in Table 1. At the time of the first questionnaire, the three groups showed differences in both variables. In the will to excel the soccer players had the highest score, followed by the volleyball elite players and the club players. In will to compete, the elite volleyball players had the highest score, followed by the soccer players and the volleyball club players. The scores tend to group around the mean value, with little variability among them.

The mean changes are presented in Table 2 and

Table 1. Descriptive statistics for the factors of the DPMQ. Data are means (±SD).

Context	Will to Excel 1	Will to compete 1	Will to Excel 2	Will to compete 2
Volleyball club	3.84 (.80)	4.25 (.49)	3.45 (.88)	4.13 (.57)
Volleyball elite	4.13 (.44)	4.59 (.37)	3.98 (.40)	3.86 (.48)
Soccer club	4.55 (.45)	4.38 (.38)	4.68 (.40)	4.22 (.52)

Table 2. Mean changes on composite scores in Will to excel and Will to compete as a consequence of training in the young athletes and chances that the true difference in the changes is substantial.

	Will to Excel l	Will to compete
Pre-season	4.26 (0.57)	4.41 (0.39)
Post-season	4.16 (0.77)	4.10 (0.53)
Changes in mean (95% CL)	-0.10 (-0.28 to 0.09)	-0.31 (-0.46 to 0.16)
Practical inference	Trivial	Probably beneficial /harmful

Table 3. Multilevel regression analysis for composite scores in Will to excel and Will to compete.

	Will to excell	Will to compete
Fixed Explanatory Variables		
Exponent value (standard error)		
Constant	4.20 (0.25)**	5.16 (0.18)**
Growth trajectory	-0.12 (0.15)	-0.65 (0.12)**
Club context	-	-
Professional club context	0.24 (0.37)	-0.54 (0.26)*
High performance training context	0.19 (0.32)	-0.68 (0.23)**
Growth trajectory x Club context	-	-
Growth trajectory x Professional club context	-0.40 (0.23)	0.40 (0.18)*
Growth trajectory x High performance training context	0.27 (0.20)	0.51 (0.15)**
Variance-Covariance Matrix of Random Variables		
Level 1 (within individuals)		
Repeated measures variance	0.10 (0.03)**	0.06 (0.02)**
Level 2 (between individuals)		
Constant	0.26 (0.13)*	0.08 (0.08)
Covariance	-0.09 (0.04)*	-0.02 (0.03)
Growth trajectory	0.08 (0.00)	0.06 (0.00)
-2 Restricted Log Likelihood	125.142	91.863
Akaike's Information Criterion	133.142	99.863

* $p < 0.05$; ** $p < 0.01$

Figure 1, and are significant only in the case of the will to compete, although in both cases there is a decrease in the mean values. As the soccer players are also those who have spent more years participating in sport (7.7), when compared with their volleyball peers, it appears that the most experienced athletes have the highest score in the will to excel.

Regarding the effects of the context, in the will to excel category the groups have different scores but without statistical significance (Table 3 and Figure 2). Both volleyball groups showed a decrease in the will to excel, but the soccer group showed a slight increase in the same variable. A moderate effect of the context is observed. In the will to compete, the three teams showed a decrease in their means, following a similar trend. The decrease is more pronounced than for the will to excel but the context effect is not significant. The biggest decrease is shown by the elite volleyball team, followed by the club teams.

Discussion

The aim of the study was to analyze two factors, the will to excel and the will to compete, of deliberate practice motivation in three different youth sport contexts and to understand how these variables evolve with the exposure to a one season-long training process. It was hypothesized

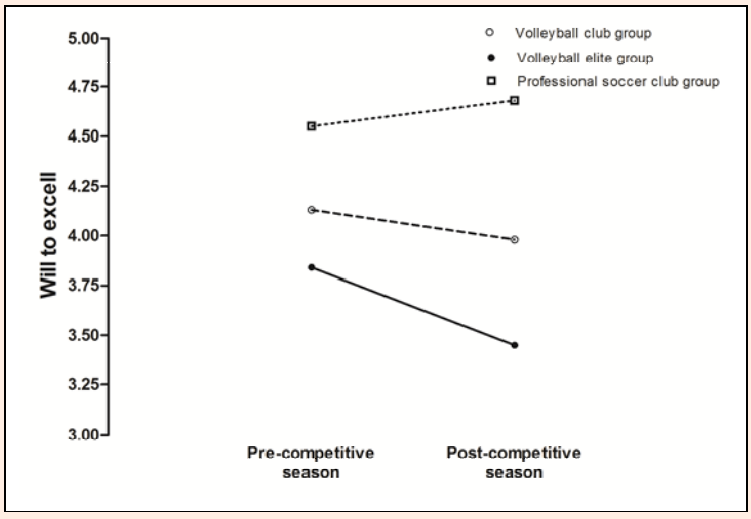

Figure 1. Will to excel across pre- and post-competitive season for volleyball groups.

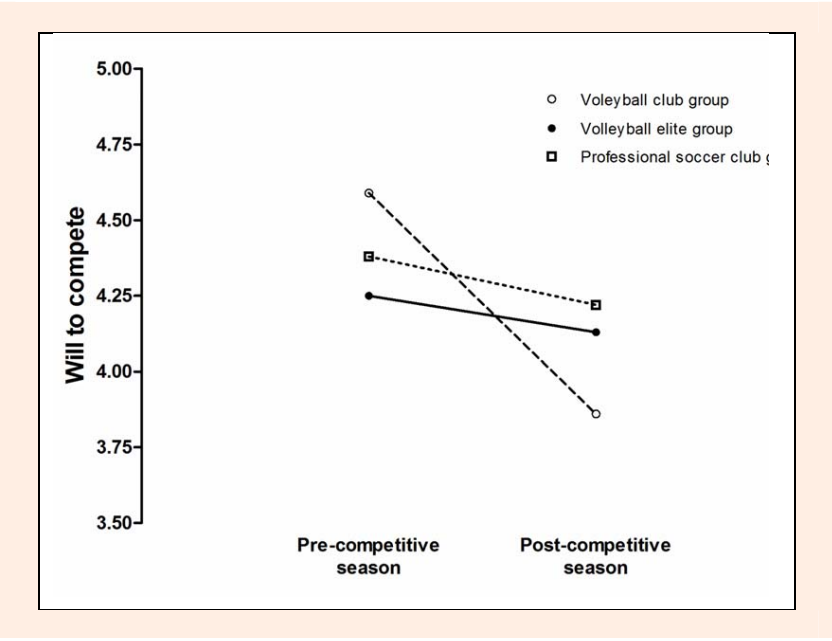

Figure 2. Will to compete across pre- and post-competitive season for volleyball groups.

that a demanding environment, with daily practice sessions and a constant evaluation by the coaches, alongside with the perspective of an elite career would strengthen the will of the young athletes to become elite athletes during adulthood. We argued that this opinion was shared by managers and coaches, who believe that the path to excellence in sport is grounded in an appropriate adolescents' specialization, with demanding training loads in a competitive environment. Hence, it could be expected that the athletes belonging to teams with a strong talent identification and selection filter – the soccer team and the volleyball elite team – would express higher scores in the will to excel and the will to compete at the end of the competitive season.

The results did not confirm the hypothesis referred above. Moreover, the group exposed to the highest training load and selected on a national basis showed the most relevant decrease in both variables. The group that showed the biggest stability of in the will to excel and the will to compete scores was the soccer one. In a previous study with young basketball players (Gonçalves et al., 2011), it was found that the will to excel and will to compete represent variables that can differentiate between players at elite and non-elite level, with the elite athletes showing higher orientations to professional success and top level performances. In the present study, only the soccer players showed similar orientations.

The case of the elite volleyball team is a particular concern. At the end of an extremely demanding season, they showed a reduced interest in a professional career and in competition. It is important to highlight the fact that these boys were isolated from their families and familiar environments, spending the whole year in a training campus.

Although the club players, in volleyball and soccer, had similar school and practice schedules but they gave different answers to DPMQ. The volleyball players showed a reduction in scores like their peers from the elite centre, but the slope is more evident in the will to excel. This is a plausible finding because this group was not selected and a professional career in volleyball probably was not among their aims in life. But the other two groups had been selected by coaches since their pre-pubertal years, through a process of exclusion based on the search for talent.

The present findings raise questions for sport managers and coaches that look for physical and technically-gifted young athletes and aim to develop their potential qualities through a careful planned training. The training loads and logistic conditions included in programmes that are believed to foster expertise and the will to become an expert seem to have unexpected consequences. If we assume that a self-orientation to excellence may play a crucial role in athletes' persistence in sport programs, in order to achieve higher standards in competition, then the will to reach excellence in performance can be considered a condition to persist in more specialized and demanding practice. In the case of the volleyball players, this assumption was not confirmed.

Most coaches and theorists argue that the adolescent years are crucial in making a final step toward expertise in sport, meaning that during those years the athletes are already selected and they must practice and compete harder (Bályi and Williams, 2009). But Côté et al. (2009) argue that elite performance can be reached through different trajectories: early sampling and late specialization and early specialization. This last trajectory, documented in the present study, demands an early selection, is less precise and can produce negative experiences in the long term. The need for the adolescents to focus on game performance can be deterrent for their own perspectives of a career or just to have fun. The same process can also negatively influence coaches and managers decisions. As pointed by Martindale et al. (2005), actual performance is not the same as potential for the future and the young athletes should be allowed autonomy to set their own goals.

The crucial factor to influence the players' answers

seems to be the perspective of a rewarding professional career in sport. As mentioned before, soccer is the only sport that offers opportunities to a relative large number of young athletes to become professionals. It is possible that the volleyball players, after a hard season, re-evaluated their priorities and thought that their dedication to sport did not fit their initial expectations.

The study presents some limitations and needs to be complemented with further research that should focus on the contextual effects of diverse clubs or performance centers in the same or in different competitive levels or age groups.

Conclusion

The study has important pedagogical implications for both managers and coaches. The potential role of sport for positive development, as the most important activity for young people, is well known (Light, 2012). But the effectiveness of sport participation cannot rely exclusively on an orientation toward specialization and expertise, forgetting the emotional and social support, alongside with the respect for the autonomy of young people to set their own goals. The study of contexts of practice and of their effects over time is an important theme. Ecological climates affect and shape the experiences of young people, helping to develop autonomy, self-esteem, enjoyment, and positive attitudes.

But the time variable has to be always considered. The players assessed in the present study need to be followed in subsequent years using a longitudinal design study. Their future evolution as athletes, or even dropouts, represents a key factor to depict a process that is only meaningful over a long period of time.

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Key points

- The need for the adolescents to focus on game performance can be a deterrent for their own perspectives of a career or just to have fun.
- The crucial factor to influence the players' answers seems to be the perspective of a rewarding professional career in sport.
- It is possible that young athletes, after a hard season, re-evaluate their priorities and think that their dedication to sport did not fit their initial expectations.
- Managers and coaches should be aware of important pedagogical implications, and the effectiveness of sport participation cannot rely exclusively on an orientation toward expertise.

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