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Changes in developmental assets across a 4-month competitive season among youth basketball players

Mudanças nos ativos de desenvolvimento em uma temporada competitiva de quatro meses entre os jovens jogadores de basquete

Felipe G. Mendes [1]
https://orcid.org/0000-0001-9552-754X
André L.A. Soares [1]
https://orcid.org/0000-0001-6629-656X
Ahlan B. Lima [1]
https://orcid.org/0000-0001-8691-5719
Carlos E. Palheta [1]
https://orcid.org/0000-0001-7066-7562
Luisa D. Kós [1]
https://orcid.org/0000-0002-2280-6262
Fabricio J. Milan [1]
https://orcid.org/0000-0003-1724-3722
Carine Collet [1,2]
https://orcid.org/0000-0003-3742-4037
Humberto M. Carvalho [1]
http://orcid.org/0000-0002-2855-0296

Abstract – The present study examined the changes in developmental assets among young basketball players during a 4-month competitive period, accounting for variation by age group. Additionally, we examined the age-related variation on developmental assets. Sixty-five adolescent basketball players aged between 9.5 to 17.3 years were considered. We used the Portuguese version of the *Developmental Assets Profile Questionnaire*. Multilevel modeling was used to estimate the magnitude of changes on developmental assets across the 4-month competitive season, as well as aligning assets scores by chronological age. Positive values and positive identity scores were substantially increased after the 4-month competitive sample. The other assets scores showed no variation across the competitive 4-month competitive season, independent of age group. There was a trend of linear decrease in developmental assets as the adolescent players got older. For positive values, there was a non-linear trend with a higher decrease rate between about 10 to 14 years, levelling off thereafter. Developmental assets did not appear to be influenced by exposure to a period of organized training and competition among adolescent basketball players. Hence, the observed decrease on developmental assets when aligning by age may reflect the influence of contextual and cultural environments of practice. This is of particularly interest for positive values, which refer to school engagement or and social justice, qualities that are not sport-specific but assume a key and importance position in sport participation for a positive role in youth development.

Key words: Adolescents; Multilevel analysis; Psychology developmental; Training; Youth sports.

Resumo – *O presente estudo examinou as mudanças nos ativos de desenvolvimento entre jovens jogadores de basquetebol durante um período competitivo de 4 meses, considerando a variação por faixa etária. Adicionalmente, examinou-se a variação da idade no desenvolvimento dos Ativos. Participaram deste estudo 65 adolescentes jogadores de basquetebol com idade entre 9.5 a 17.3 anos. Utilizou-se a versão em português do Questionário de Perfil de Ativos de Desenvolvimento. O modelo multinível foi usado para estimar a magnitude das mudanças nos ativos de desenvolvimento, bem como alinhar as pontuações dos ativos por idade cronológica. Os valores de valores positivos e de identidade positiva foram aumentados após 4 meses competitivos. Já os outros não mostraram variação na mesma temporada, independente da faixa etária. Houve uma tendência de diminuição linear nos ativos de desenvolvimento à medida que os adolescentes se tornaram mais velhos. Para os valores positivos, houve uma tendência não linear com uma taxa de decréscimo mais alta entre cerca de 10 a 14 anos, nivelando-se depois disso. Os ativos de desenvolvimento não parecem ser influenciados pela exposição a um período de competição entre jogadores de basquete adolescentes. Assim, a diminuição nos ativos de desenvolvimento ao alinhar pela idade pode refletir a influência dos contextos culturais e de prática. Isto é particularmente interessante para valores positivos, que se referem ao envolvimento escolar ou à justiça social, qualidades que não são específicas do esporte, mas que assumem uma posição chave e importante na participação esportiva para desenvolvimento positivo da juventude.*

Palavras-chave: *Adolescentes; Esportes juvenil; Modelo multinível; Psicologia do desenvolvimento; Treinamento.*

1 Universidade Federal de Santa Catarina. Florianópolis, SC. Brasil

2 Universidade do Estado de Santa Catarina. Florianópolis, SC. Brasil

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INTRODUCTION

Young athletes´ development promotes the interaction between individuals' performance, abilities, skills and competences for their positive development[1]. Developmental assets comprise relationships, opportunities provided by adults and peers, values, skills, abilities, and a positive self-perception developed over time[2]. Therefore, assets can be understand as 'building blocks' for human development, promoting thriving, resilience and reduced risk behaviors[3-6]. Assets need to be considered as the outcome of youth interactions with themselves[6] and within their context[5], combining learning commitment, positive values, social competencies, positive identity, support, empowerment, boundaries, expectations, and the constructive use of time. Positive youth coach supervision within sport participation programs potentially provide a powerful context to promote environments linked to various positive aspects of healthy development throughout life[7,8].

In general, youth sports programs are focused on performance development. However, an holistic approach to the athletes´ development needs to be considered[9,10], including changes in young athletes´ to favor both societal and individual welfare[11]. Considering team-sports, youth basketball in particular, interactions within the team may present a potential positive role in the developmental process, extending from personal and immediate outcomes such as enjoyment, positive expectations, and personal assets and skills to more long-term and distant positive effects[12].

However, the available information considering young athletes´ development during pubertal years, particular adopting repeated measures, is limited. In basketball, as generally among other youth sports competitions and training groups, athletes are grouped by one- or two- chronological age groups. Therefore, in the present study we examined the changes in developmental assets among young basketball players across a 4-month competitive period, considering possible variation between age group. Considering the repeated measures design adopted, we examined the trend of changes of developmental assets between the ages of 10 to 17 years.

METHOD

Participants and experimental design

Sixty-five adolescent basketball players aged between 9.5 to 17.3 years at the baseline of the observation were considered. Follow-up measures were performed after the players were exposed to a 4-months competitive season. The players were engaged in a structured basketball youth training program from a club within the metropolitan region of São Paulo (Mauá, São Paulo, Brazil), which competed at state level under the supervision of the *Federação Paulista de Basketball* (S. Paulo Basketball Federation). Within the club players were grouped by age category teams (under-11, under-13, under-15 and under-17), being engaged in six to ten hours of training per week according to their age group.

Participation in this study was voluntary, and players and their parents or legal guardians provided informed written consent. The study was approved by the *Research Ethics Committee of the University of Campinas* and was conducted in accordance with recognized ethical standards[13].

Procedure

Chronological age was calculated considering the difference between date of birth and date of baseline observation to the nearest 0.1 year.

We used the Portuguese version of the Developmental Assets Profile (DAP) questionnaire[14,15]. The questionnaire is composed of 58 items, rated on a Likert type scale as follows: 'Not at all or rarely' (1), 'Somewhat or Sometimes' (2), 'Very Often' (3) and 'Extremely or almost always' (4). The questionnaire structure includes information about external and internal factors from a personal perspective, such as, support (4 items), boundaries and expectations (5 items), commitment to learning (4 items), positive values (3 items), and positive identity (5 items).

Statistical Analysis

Multilevel modeling was used to examine variation on developmental assets between measures at baseline and across the 4-month competitive season. We considered a hierarchical structure, where measurements (level 1) to be nested by players (level-2), that were nested by age group (level-3). In the first step of the analysis we allowed for players´ scores (level 2) and grouped by age-group (level-3) were allowed to vary at baseline and in the rate of change between measures at baseline and post 4-month competitive season.

In the second step of the analysis we took advantage of the mixed-longitudinal design available, and explored whether there was a trend of changes on developmental assets across the age range of observation. Hence we modeled each assets score by chronological age. For modeling convenience, we centered age at grand mean, i.e., 13.8 years. We allowed for the shape of changes to be non-linear including by fitting a quadratic polynomial, which is age term squared. Intercept (i.e., score at the minimum age observed), centered age and squared age terms were allowed to vary at level-2 (between players). Estimations were performed using *lme* function from the "nlme" [16] package in R statistical language[17].

RESULTS

Mean scores and uncertainty estimates pre- and post- 4-months competitive for assets scores accounting for variation by age group are given in Table 1. Positive values and positive identity scores were substantially increased after the 4-month competitive sample. The other assets scores showed no variation across the competitive 4-month competitive season, accounting for age group variation. There was substantial variation between age group for positive values, learning commitment, and boundaries and expectations, although variation was constant with the 4-month competitive season.

Figure 1 shows the trends of variation of developmental assets across adolescent years among the basketball players. There was a trend of substantial linear decrease in developmental assets as the adolescent players got older, except for positive values. In this case we observed a non-linear trend. A higher decrease rate between about 10 to 14 years was observed levelling off thereafter.

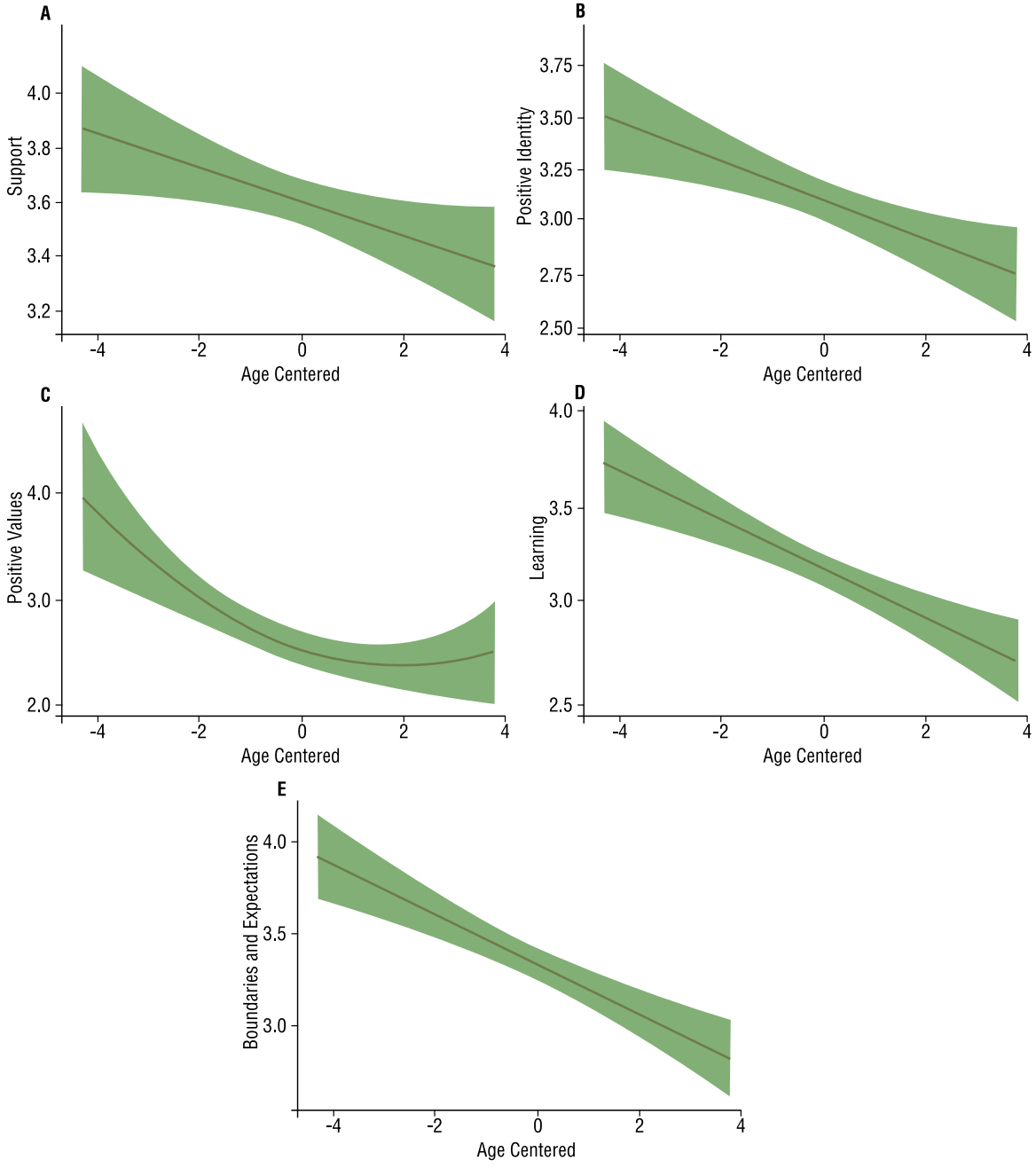

Figure 1. Variability of DAP factors by chronological age.

DISCUSSION

In the present study we examined the changes in developmental assets

Table 1. Multilevel regression analysis of changes DAPs pre- and end-season in adolescent basketball players. (n=65)

	Fixed effects (95% confidence interval)			Random effects (95% confidence interval)		
	Pre-Season	Post-season	Changes across the 4-months season	Level-1 standard deviation	Level-2 standard deviation	Level-3 standard deviation
Assets						
Positive values	2.55 (2.26 to 2.84)	2.76 (2.47 to 3.05)	0.21 (0.00 to 0.41)	0.54 (0.45 to 0.65)	0.53 (0.39 to 0.71)	0.20 (0.06 to 0.65)
Support	3.59 (3.46 to 3.72)	3.58 (3.46 to 3.71)	-0.01 (-0.14 to 0.12)	0.35 (0.29 to 0.42)	0.34 (0.25 to 0.46	-
Learning commitment	3.16 (2.90 to 3.40)	3.19 (2.94 to 3.44)	0.03 (-0.10 to 0.17)	0.37 (0.31 to 0.44)	0.30 (0.21 to 0.43)	0.21 (0.08 to 0.53)
Positive identity	3.02 (2.88 to 3.16)	3.17 (3.03 to 3.30)	0.15 (0.02 to 0.27)	0.32 (0.26 to 0.38)	0.42 (0.33 to 0.53)	-
Boundaries and expectations	3.28 (3.06 to 3.50)	3.33 (3.11 to 3.54)	0.04 (-0.07 to 0.16)	0.32 (0.26 to 0.38)	0.39 (0.30 to 0.50)	0.17 (0.05 to 0.52)

among young basketball players across a 4-month competitive period, accounting for variation by age group. Increases in positive values and positive identity were observed after exposure to the 4-month competitive season. At least personal development dimensions appear susceptible to be influenced by the short-term influence of exposure to organized training and competition among adolescent basketball players aged 10 to 17 years. Overall these observations support the potential benefits of engagement in organized youth sports programs.

Developmental assets score, on average, were lower compared to available data with young athletes[7,18]. However, the present results were somewhat higher than comparable data of Brazilian underserved adolescents exposed to extra-curricular sports programs[11]. It is apparent that exposure to organized sports and the social community environment contribute substantially to the development of the adolescent assets. Moreover, the present data provides a support that exposure to organized sports may be a useful context to promote the development of personal life skills transferable to other areas of life[19]. Even considering the competitive nature of organized youth basketball programs, it was apparent a positive effect on both positive values and positive identity. Hence, potential benefits related to school engagement or equality and social justice and qualities, often not sport-specific, may assume an important position of sport participation to claim for a positive role in youth development[6].

It is claimed that organized youth sports may be favorable to a positive youth development purpose with a supportive and positive environment of teaching, learning, playing and competition[20, 21]. Altogether, available information suggests that the context of youth sports delivery may have an impact on developmental assets. Hence, the process of positive to youth development in the sports need to further understand the context of training, as well as players life outside sports, particularly in socio-economically vulnerable contexts[11,22].

A marked trend of decrease in developmental assets across adolescence was observed. These results were consistent with the limited available data

in young soccer players[18]. These results in youth sports contexts may reflect the highly selective and exclusive character of sports as competitive level increases with age[23]. Its appears reasonable that the young athletes may perceive their performance level changes in comparison with their peers and their prospects of a future career in sports in adult years. Consequently, the coaches should be aware of the need the changes of the young athlete personal and contextual perceptions as they grow and develop within the sport.

Likely maturity associated variation on performance level[24] and behavioral characteristics[25] may influence developmental assets. In the present study were did not consider maturity indicators, as the only method available for us was the maturity offset[26], but given the wide range of age in our sample the method would provide unreliable estimations. Also, future studies should consider the influence of accumulated training experience and functional performance on behavioral characteristics, such as developmental assets. Also, caution is warranted when interpreting and generalizing our data as it represents a mixed longitudinal data with small time unit (four months between repeated measures).

CONCLUSION

In summary, we examined the changes in developmental assets among young basketball players during a 4-month competitive period, accounting for variation by age group. Developmental assets among adolescent basketball players appear to be sensitive to training and competition exposure among adolescent basketball players. The present study provides valuable information to understand the importance of youth sports programs to positive development of young athletes.

COMPLIANCE WITH ETHICAL STANDARDS

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Ethical approval

Ethical approval was obtained from the local Human Research Ethics Committee –University of Campinas and the protocol (no. 1.329.389) was written in accordance with the standards set by the Declaration of Helsinki.

Conflict of interest statement

The authors have no conflict of interests to declare.

Author Contributions

Conceived and designed the experiments: HMC, CC, FGM. Performed the experiments: ALAS, HMC. Analyzed the data: FGM, HMC, ALAS. Contributed reagents/materials/analysis tools: ABL, CEP, LDK . Wrote the paper: FGM, HMC, FJM, CC .

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Corresponding author
Felipe Goedert Mendes
Department Physical Education, Sports Center,
Federal University of Santa Catarina
Campus Reitor João David Ferreira Lima, 88040-900 Florianópolis
Florianópolis/Santa Catarina, Brasil
E-mail: Felipe_goedert@hotmail.com