

# Youth athletes' developmental outcomes by age, gender, and type of sport

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## ABSTRACT

The purpose of this study was to examine the athletes' perceived developmental outcomes of competence, confidence, connection and character (the 4 Cs) in a competitive youth sport context with respect to age groups (12 – 14 vs 15 – 18-year-old), gender (girls and boys) and sport type (individual vs. team). Participants were 314 athletes (173 girls, 141 boys) and 31 coaches (5 Women, 26 Men) from artistic gymnastics, basketball, football, swimming, tennis, track and field, and volleyball. Data were collected by the adapted and validated form of Positive Youth Development Measurement Toolkit. According to the findings, older group of athletes (15 – 18 years of age) had lower scores than their younger counterparts (12 – 14 years of age) in all of the developmental outcomes. Girls scored lower in competence outcome, while boys had lower scores in connection and character outcomes. Moreover, team sport athletes had lower scores in competence outcome ( $p < .05$ ). The findings were discussed with the extant literature, and programmatic suggestions for future studies were provided. **Keywords:** Youth sport; Athlete outcomes; Coaching effectiveness; Program evaluation; Sport coaching.

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## INTRODUCTION

Sport participation has the potential to provide physical, psychosocial, and motor development for youth (Côté, Strachan, & Fraser-Thomas, 2007), but solely participating in a sport does not automatically guarantee positive outcomes (Coakley, 2016). Considerable research in educational psychology (Larson, 2000) and athlete development (Fraser-Thomas, Côté, & Deakin, 2005) in youth sport underline the potential of organized sport activities in providing an appropriate environment for facilitating youth's developmental outcomes in a sport program. The sport outcomes that result in through children and youth participation were defined in coaching literature as competence, confidence, connection, and character (Côté & Gilbert, 2009). Competence refers to athletes' sport-specific ability. Confidence refers to athletes' internal sense of overall positive self-worth. Connection represents quality relationships with people inside and outside of sport. Finally, character refers to respect, empathy, and responsibility that reflects demonstrating prosocial behaviours while avoiding antisocial behaviours. Coaches are one of the most influential agents in facilitating youth athletes' sport development (Horn, 2008).

Youth can develop physical health, life skills, and fundamental motor skills via participating in recreational and competitive sport environments (Fraser-Thomas et al., 2005). In many sport cultures, however, sport programs usually search for shortcuts for early peak physical performance in order to see fast results. Accordingly, coaches often impose early selection and early specialization to develop young athletes' athletic performance as soon as possible, though specializing early in reaching elite success is not necessary for most sports (Moesch, Hauge, Wikman, & Elbe, 2013; Leite, Baker, & Sampaio, 2009). This performance-driven approach hinders meeting youth athletes' developmental needs and consequently harms long-term athletic development. In many coaching cultures, an early selection is prevalent, aiming to select potential elite athletes, although research proves its unreliability for later sport career, especially when it occurs before or during puberty (Vaeyens, Lenoir, Williams, & Philippaerts, 2008).

Recent sport development models that commonly adopted in many sport cultures such as the Developmental Model of Sport Participation (The DMSP; Côté et al., 2007) and Long-Term Athlete Development (LTAD; Balyi, Way, & Higgs, 2013) provide pathways to reach optimal youth athlete development. The commonly emphasized feature of the models is mainly providing youth with age-appropriate physical, psychological, social, and intellectual developmental opportunities with an inclusive and athlete-centered approach instead of winning at all costs. Therefore, rather than focusing on early talent identification and early specialization, the models suggest developing talent in the long run by including all participants in organized sport systems.

Ample research in the literature showed relations between sport participation and negative physical and psychosocial athlete experiences and outcomes when only early peak performance in one sport is on the emphasis. Among them were training-induced injuries (Elliot, Goldberg, & Kuehl, 2010; Maffulli, Baxter-Jones, & Grieve, 2005), eating disorders (Anshel, 2004), burnout and increased stress (Gould, Tuffey, Udry, & Loehr, 1996; Strachan, Côté, & Deakin, 2009), a decreased self-confidence and moral reasoning (Eccles & Barber, 1999; Shields & Bredemeier, 1995), and dropout (Barynina & Vaitsekhovskii, 1992). Although athletes may continue with their sport career, experiencing injuries, negative coach-athlete relationships, and lack of guidance have a detrimental effect on athletes' successful transition from developmental sport context to elite sport participation (Hollings, Mallett, & Hume, 2014).

In the current study context, the number of sport clubs has doubled during the last decade (Turkish Directory of Youth & Sports Statistics, 2017). However, the national rate of youth sport participation appears to stagnate during adolescence, and steeply decrease as young athletes age (Kin-Isler, Asci, Altintas, & Guven-Karahan,

2009). According to national youth sport participation data, among about four million registered athletes, only one-sixth of them have been actively participating in organized sports. This ten-year unchanging ratio of youth sport participation may imply age-inappropriate practices and dependent negative sport outcomes such as dropout during adolescence (e.g., Pehlivan, 2013). Therefore, examining youth athletes' developmental sport outcomes may provide a conceptual understanding of the areas of need for the improvement of coaches' practices and youth sport programming.

Previous studies have excessively focused on obtaining information from coaches' side by asking them, observing their behaviours, and tracking their performance records in evaluating coaching effectiveness (Lyle, 2002; Mallett & Côté, 2006). In the sport coaching field, there is a dearth of research focusing on youth athlete development. An in-depth understanding of youth athletes' outcomes may provide further insight into athletes' unique developmental needs. Investigating the youth athletes' development from a holistic perspective will also extend our global understanding of coaching effectiveness. Therefore, the purposes of this study were to examine athletes' perceived sport outcomes and any differences between their perceptions regarding age, gender, and sport type in the Turkish youth sport context. To this end, the following three research questions were asked; 1) Are there any significant age group (12 – 14 vs. 15 – 18-year-old) differences in the youth sport athletes' perceived outcome scores? 2) Are there any significant gender differences in the youth sport athletes' perceived outcome scores? And 3) Are there any significant sport type (individual vs. team) differences in the youth sport athletes' perceived outcome scores?

## MATERIALS AND METHODOLOGY

### *Participants*

Athletes ( $n = 314$ ) and coaches ( $n = 31$ ; 5 women, 26 men) of 31 youth sport teams from Ankara, Istanbul, and Izmir metropolitan cities of Turkey participated in the study. As a requirement for inclusion, the coaches have been working with their athletes for at least one year and obtain at least a second-level coaching certificate, which is equal to developmental level coaching certification or higher in Turkey. The coaches were between the ages of 27 and 55 ( $M = 36.39$ ), with an average of 12.87 years of coaching experience ( $SD = 7.42$ ). The participating athletes were between 12 and 18 years of age ( $M = 13.85$ ,  $SD = 1.56$ ), with an average of 6.70 years of sport experience ( $SD = 1.94$ ). Demographics of athletes based on age-group, gender, and sport type are presented in Table 1.

Table 1. Athletes' demographics based on age-group, gender, and sport type.

	(n)	%
Age-group		
1 (12 – 14 years)	196	62.4
2 (15 – 18 years)	118	37.6
Gender		
Girls	173	55.1
Boys	141	44.9
Sport Type		
Individual	200	63.7
Artistic Gymnastics	45	14.3
Swimming	55	17.5
Tennis	38	12.1
Track & Field	62	19.7

Team	114	36.3
Basketball	46	14.6
Football	31	9.9
Volleyball	37	11.8

### Procedure

Permission was obtained from the Research Ethics Committee of Middle East Technical University before data collection. The club settings were visited by the first researcher to collect the data. Athletes (and their coaches, when necessary) completed the adapted versions of the measures (The PYD Toolkit). The data were collected from the athletes and the coaches separately to ensure the trustworthiness of responses. The athletes rated the measures with a consideration of their context of the current sport organization. The athletes completed the toolkit in approximately 15 minutes.

### Measures

#### *The PYD Toolkit*

In examining youth athletes' developmental outcomes, a measurement toolkit proposed (The PYD Toolkit; Vierimaa, Erickson, Côté, & Gilbert, 2012) was used after testing its psychometric properties. The PYD Toolkit provides assessing youth athletes' both performance and psychosocial sport-specific outcomes allowing for identifying the areas of coaches' professional needs as a proxy measure. The measurement tool can also provide indirect evidence for the effectiveness of sport programs (Vierimaa et al., 2012). The measures in the toolkit examine youth athletes' perceptions of competence, confidence, connection, and character outcomes (Table 2).

Table 2. Measures and rater characteristics.

	Measurement	Source	Adaptation	Rater
Competence	Sport Competence Inventory	Adapted from Dunn, Dunn, & Bayduza, 2007	Kilic & Ince (2016, 2017a)	Self, coach, peer
Confidence	Self-Confidence Subscale of CSAI-2R	Adapted from Cox, Martens, & Russle, 2003	Kilic & Ince (2016, 2017b)	Self
Connection	the CART-Q	Jowett & Ntoumanis, 2004	Altintas, Cetinkalp, & Asci (2012); Kilic & Ince (2016)	Self
Character	The PABSS	Kavussanu & Boardley, 2009	Balcikanli (2013); Kilic & Ince (2016)	Self

Four steps were followed for the cultural adaptation of the toolkit. Firstly, a standard back-translation procedure was used (Brislin, 1980, p. 432). Secondly, two experts with Ph.D. in sports sciences and coaching and two coaches from competitive youth sports (individual sports and team sports) examined the contextual relevance of the translated items of the toolkit. Then, Turkish forms of measures were generated. Thirdly, cognitive interviews (Willis, 2015) were conducted with the youth athletes from different ages to test the appropriateness of the generated toolkit regarding comprehensibility and content (Kilic & Ince, 2016). The study showed that the toolkit content is appropriate; however, athletes below 12 years of age might not be

able to comprehend the concepts of the toolkit as intended. Additionally, the content of the scale that measures character outcome was found to need further refinement for individual youth sport context. Lastly, the construct validity and reliability of each measure were tested when needed.

Competence was measured using the Sport Competence Inventory (adapted by Vierimaa et al., 2012 from Dunn et al., 2007). A multi-perspective approach of measuring athletes' competence was adopted in collecting the data. Athletes, coaches, and peers rated the three versions (self, coach, and peer) of the instrument for each athlete of a team. The raters rated competence on a 5-point Likert scale ranging from 1 (not at all competent) to 5 (extremely competent) in the areas of technical skills, tactical skills, and physical skills. The reliability of the Sport Competence Inventory was tested (Kilic & Ince, 2017a). The internal consistency value of the inventory was .81 for athletes, .86 for coaches, and .88 for teammates. For the present sample, the internal consistency value was .74 for athletes, .86 for coaches, and .92 for teammates.

Confidence was measured using the self-confidence subscale of the Revised Competitive State Anxiety – 2 (adapted by Vierimaa et al., 2012 from Cox et al., 2003). The subscale has five items (e.g., I am confident about performing well) that athletes rated themselves on a 4-point scale ranging from 1 (not at all) to 4 (very much so). The psychometric properties of the Turkish self-confidence subscale of the CSAI-2R, which aims to measure trait confidence (Vierimaa et al., 2012), was examined by Kilic and Ince (2017b). The findings revealed that the scale has a good construct validity with an internal consistency value of .76. For the present sample, the internal consistency value was .71.

Connection was measured using the Coach-Athlete Relationship Questionnaire (the CART-Q; Jowett & Ntoumanis, 2004). The CART-Q has eleven items (e.g., "I trust my coach") that measures perceived coach-athlete relationship on a 7-point scale (1 = Not at all to 7 = Extremely). Altintas et al. (2012) evaluated the psychometric properties of the Turkish version of the CART-Q. Internal consistency coefficients of the subscales of the CART-Q were reported to range from .82 to .90 for athletes. For the present sample, Cronbach's alpha values of the subscales of the CART-Q range from .71 to .73 for athletes.

Character was measured using the Prosocial and Antisocial Behavior in Sport Scale (the PABSS, Kavussanu & Boardley, 2009). The PABSS has 20 items that measure athletes' prosocial (e.g., "helped an injured opponent") and antisocial behaviours (e.g., "deliberately fouled an opponent") that they exhibit during training/competitions. The PABSS was originally developed for team sports, and its psychometric properties were tested for Turkish team sport culture (Balcikanli, 2013). To use the scale for also individual sports in which physical contact of an opponent is not likely to occur, the content of the measure was revised as suggested (Vierimaa et al., 2012). The cognitive interviews and the expert opinion regarding the scale revealed that the items "I deliberately fouled an opponent," "I retaliated after a bad foul," and "I tried to injure an opponent" might not apply to individual sports context. Both the field experts and the athletes interviewed regarded these items as irrelevant to their sport context. Therefore, the abovementioned three items were excluded from further testing.

To evaluate the psychometric properties of the 17-item PABSS, a Confirmatory Factor Analysis (CFA) was conducted with a sample of 158 competitive youth athletes (artistic gymnastics,  $n = 40$ , 25.32%; swimming,  $n = 33$ , 20.9%; tennis,  $n = 34$ , 21.5%; and track and field,  $n = 51$ , 32.3%) between 12 and 18 years of age. The first run of CFA revealed that item 20, "I physically intimidated an opponent," was loaded with a value much less than .40. Therefore, this item was also eliminated from the scale before further analysis (Field, 2009). The second run of CFA with 16-item PABSS revealed the model indices as CFI = .939; NNFI = .925; RMSEA = .053, and  $\chi^2/df = 1.436$ , indicating a good fit of the model. Cronbach's alpha assessing internal

consistency was .74 for prosocial dimension, and .80 for the antisocial dimension of the scale. For the present sample, Cronbach's alpha values for prosocial and antisocial dimensions of the 16-item scale were .59 and .81, respectively.

### Data analysis

The analyses aimed to determine significant differences in the athletes' developmental outcomes based on their age, gender, and sport type. Firstly, the descriptive account of athletes' responses in each outcome was calculated (Table 3). In order to examine sport-based outcome differences between the youth athletes based on age and gender, the athletes' scores were standardized into Z scores and illustrated for each outcome (Figure 1 & Figure 2). Then, the athletes' scores were compared based on their age, gender, and sport type to examine any significant differences between their scores in each outcome, running independent sample t-tests ( $p < .05$ ).

Table 3. Descriptive statistics of the variables in the PYD Toolkit.

Measures	Mean	SD	Min	Max
Competence (1 – 5)	3.47	.66	1.54	4.79
Confidence (1 – 4)	3.14	.54	1.60	4.00
Connection (1 – 7)	5.86	.85	2.73	7.00
Character	10.36	6.85	-11.85	25.00

*Note: Character score calculated by extracting antisocial score from the prosocial score*

As the study aimed at determining youth athletes' needs in each developmental aspect, the athletes' scores were separately calculated for each outcome. In order to examine age-related differences between the athletes' perceived scores on the outcomes, the athletes were grouped as age-group 1 (12 – 14 years of age) and age-group 2 (15 – 18 years of age). In deciding age groups, the developmental stages pointed out in sport development models (e.g., LTAD, from 'train to train' to 'train to compete'; Balyi et al., 2013) were considered. The statistical analyses were run using SPSS software (25th version).

### Data screening

Primarily, the data were screened regarding missing data, outliers, and violation of normality and homogeneity of variance. There were neither any missing values nor univariate outliers in the data. The results of the Shapiro-Wilk test showed a significant violation in connection dimension in team sport and individual sport comparison. Field (2009) suggested that this test can be significant even when the scores are only slightly different from a normal distribution in large samples (above 200). Levene's test revealed violations of homogeneity of variance in the outcomes of competence and connection. Therefore, the  $p$  values of the t-tests that "equal variances not assumed" were reported.

## RESULTS

According to the age group comparisons of the 4 Cs, there were no significant differences between the competence scores of age-group 1 and age-group 2,  $t(312) = -0.35$ ,  $p > .05$ ,  $r = 0.53$ . However, "age-group 1" athletes' scores in confidence, connection and character outcomes were found significantly higher than the scores of age-group 2 athletes (confidence:  $t(312) = 9.153$ ,  $p < .05$ ,  $r = 0.46$ ; connection:  $t(216.759) = 8.533$ ,  $p < .05$ ,  $r = 0.45$ ; character:  $t(312) = 11.128$ ,  $p < .05$ ,  $r = 0.53$ ). (Table 3). Figure 1 presents athletes' sport specific standardized 4 Cs scores by two age groups.

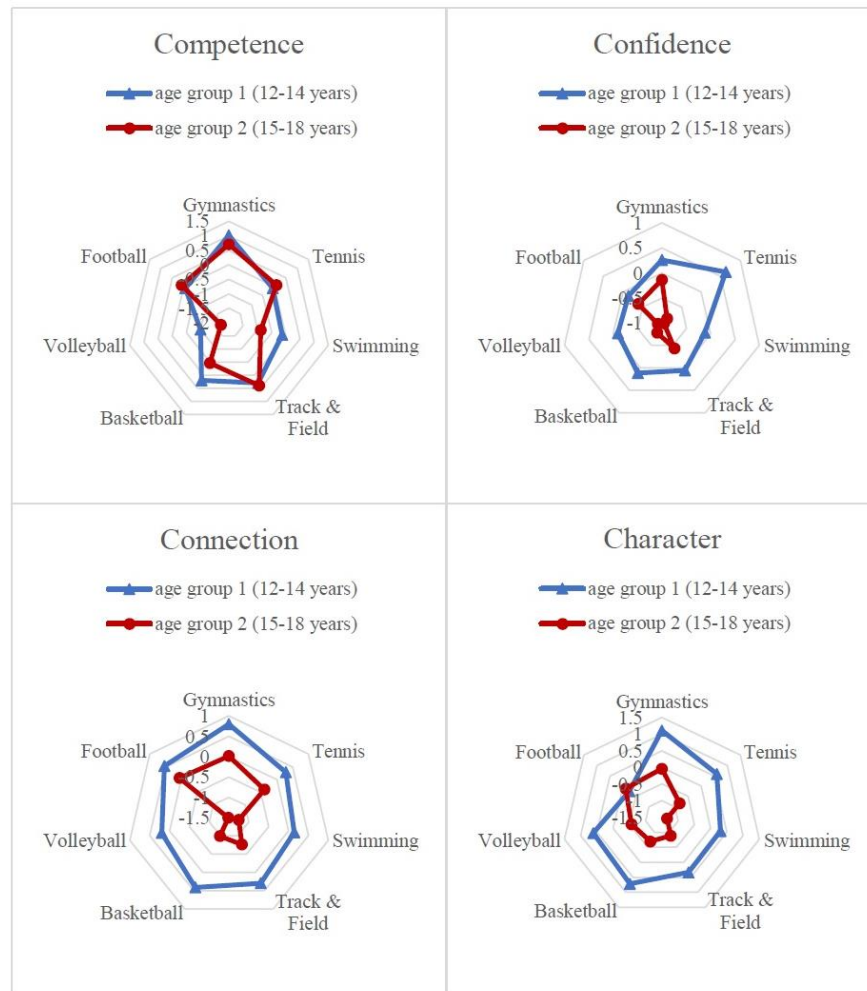


Figure 1. The athletes' sport-based standardized outcome scores by two age groups.

Gender-based analysis revealed that boys had significantly higher competence scores than girls,  $t(311.127) = -4.228$ ,  $p < .05$ ,  $r = -0.30$ . No significant differences were found between confidence scores of girls and boys,  $t(312) = 0.620$ ,  $p > .05$ ,  $r = 0.03$ . However, girls had significantly higher connection and character scores than boys (connection:  $t(312) = 2.494$ ,  $p < .05$ ,  $r = 0.28$ ; character:  $t(312) = 4.857$ ,  $p < .05$ ,  $r = 0.55$ ) (Table 3). Figure 2 presents athletes' sport specific standardized 4 Cs scores by gender.

The findings regarding sport type comparison of the athletes' outcomes indicated that individual sport athletes had significantly higher competence scores than the team sports athletes,  $t(312) = 5.086$ ,  $p < .05$ ,  $r = 0.29$ . No significant differences were found between the scores of individual sport athletes and team sport athletes in confidence, connection and character (confidence:  $t(312) = 0.691$ ,  $p > .05$ ,  $r = 0.04$ ; connection:  $t(312) = -0.308$ ,  $p > .05$ ,  $r = -0.02$ ; character:  $t(268.596) = -1.424$ ,  $p > .05$ ,  $r = -0.08$ ).

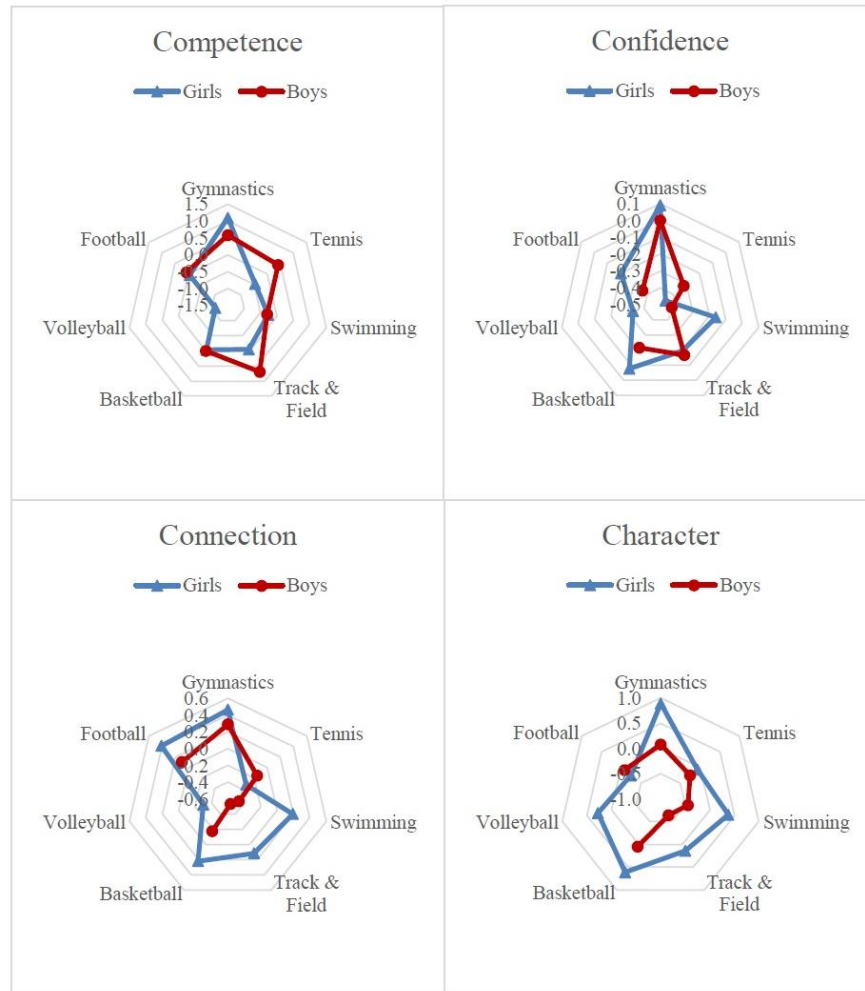


Figure 2. The athletes' sport-based standardized outcomes scores by gender.

## DISCUSSION

The purpose of this study was to examine differences between youth athletes' perceptions in each of the developmental outcomes (i.e., the 4 Cs) regarding age, gender, and type of sport in the Turkish sport context. Initial descriptive analyses and the independent samples t-tests revealed differences between the athletes' scores in each outcome. Findings indicated a general decline in the older athletes' perceived developmental outcomes with significant differences in confidence, connection, and character. The analyses also revealed significant gender differences in competence, connection, and character outcomes. Girls had a lower score in competence outcome, while boys had lower scores in connection and character outcomes. Lastly, individual sport athletes had higher competence scores while no significant score differences were found between individual sport athletes and team sport athletes in the perception of confidence, connection, and character.

Age group findings indicated that athletes' perceived scores of competence, confidence, connection, and character decrease as they move from 12 – 14 years old to 15 – 18 years old. In the LTAD model, 12 – 14 years represent the developmental period of 'training to train' in which athletes start to accelerate their adaptation to skill training and physical development with the emphasis on process rather than competition



or winning. 15 – 18 age represents the 'train to compete' phase that athletes begin to specialize in one sport and are exposed to year-round high volume and high-intensity training (Balyi et al., 2013; p. 188). The DMSP also identifies 16+ years as the investment years where athletes specialize in one sport. Both models emphasize the detrimental effect of the improper alignment of training to competition ratio and being exposed to adult style competition on athletes' developmental experiences. During this developmental phase, beginning to be exposed to a high volume of training and a high amount of adult-like competitions may be both challenging and inappropriate for young athletes. They may trigger a decrease in perceived sport outcomes. Although the sport-specific comparison is not the primary aim of the current study, the spider chart diagrams in Figure 1 clearly illustrate the sport-based decreases in each developmental outcome between the age groups. Examining youth athletes' training and competition regimen and their sport-specific perception of the 4 Cs in different age groups appears to be a critical research area for future studies.

The significant gender differences found in the athletes' competence, connection, and character scores may be attributed to several reasons that need attention to coaching practices and youth sport programming.

Girls having lower competence perceptions can be linked to negative psychosocial and socio-cultural effects maturation poses on their perceptions during adolescence (e.g., Wigfield, Byrnes, & Eccles, 2006). Also, coaches have a critical role in triggering these adverse effects by their expectations and belief system (e.g., Horn, Lox, & Labrador, 2010). As a result, maturation may result in negative perceptions on girls' self-esteem, body image, and social physique anxiety and pose depressive disorder, especially in adolescence (Thapar, Collishaw, Pine, & Thapar, 2012). Additionally, gender-role appropriate activities might become critical in adolescence (Wigfield et al., 2006), and therefore, girls are more likely to conform to gender-role stereotypes whenever they enter puberty (Hill & Lynch, 1983). Wigfield et al. (2006) emphasized that boys hold higher competence beliefs than girls for sports. In the Turkish context, girls and women are more disadvantaged in benefiting from sport participation opportunities than boys and men (Yaprak & Amman, 2009). Among the barriers of girls' sport participation are sex discrimination, religious misinterpretations, and gender-role stereotypes taught by families and society. Coaches significantly influence athletes' personal development. Therefore, it is suggested that coaches be conscious about aligning their expectations and imposition of their belief system to their athletes, which may significantly affect their sport potential (Thapar et al., 2012).

Secondly, girls and boys may have different motives for participating in sports. A recent study done in school sports on gender motivation differences in sport participation revealed that girls prefer to be more social and make friends. In contrast, boys' value more on competition and being popular (Soares, Antunes, & van den Tillaar, 2013). Therefore, coaching practices and youth sport programming need to be responsive to the different motives of girls and boys in youth sport participation.

Descriptive analysis of athletes' gender illustrates, however, a contradicting trend in the perception of competence among the sports. Specifically, in artistic gymnastics, girls had higher competence scores than boys. Competition age is much earlier (as early as age 7) in sports in which high performance is reached before puberty. Physical maturation may partially explain girls' higher perception of competence since it positively affects physical competence in a sport. Therefore, this finding may be partially attributed to girls' earlier puberty onset, which allows for larger strength gains early (Behringer, Vom Heede, Yue, & Mester, 2010).

The spider charts also illustrate that girls have higher scores than boys in connection and character (Figure 2). Gender is one of the influential factors in the quality of the relationships in youth sport (Jowett, 2017). Jowett and Nezelek (2012) suggest that same-gender relationships between coaches and athletes result in

higher levels of a quality relationship. Given that most of the coaches participated to the study were men, the findings of the present study appear to contradict with the previous findings in the literature that were based on the view of attraction theory, which suggests people are attracted to others who are similar to them (Byrne, Clore, & Smeaton, 1986). The feeling of commonalities that connect the athletes and the coaches in the present study appears to be different in Turkish coaching culture. The underlying reasons for this cultural difference regarding building common grounds between athletes and coaches based on gender need further investigation.

Regarding character outcome, the findings of this study were in line with the previous research on youth athletes' gender differences in moral maturity and moral reasoning (Bredemeier & Shields, 1986), legitimacy judgments (Conroy, Silva, Newcomer, Walker, & Johnson, 2001), and unsportsmanlike approach (Duda, Olson, & Templin, 1991). In these studies, girls were found to have a higher general moral maturity and moral reasoning, lower perceptions of legitimacy judgments on antisocial behaviours (i.e., rule-breaking and injurious behaviours), and lower approval of unsportsmanlike play. Boys and girls appear to accept traditional cultural practices related to gender roles automatically (Coakley & White, 1992), such as males express and accept behaviours of physical aggression more consistently (Weiss & Bredemeier, 1990). An in-depth examination of quality relationships between athletes and other actors in the sport environment may provide a better understanding of the reasons for this difference in character outcome.

Findings on sport type differences on the 4 Cs perception give support to the literature in that the nature of sporting culture may be the reason why athletes' competence scores from individual sports were higher than the team sport athletes. There is a shared responsibility and stress in team sports, whereas the only source of success or failure is on athletes' shoulders in individual sports (e.g., Rhind, Jowett, & Yang, 2012). Although team culture is present in both types, the form of the relationships with coaches and among peers and other key people in the context may be different (Carron, Hausenblas, & Eys, 2005). In individual sports, athletes spend more time with their coaches, whereas in team sports coaches' time, and energy is shared with the whole team that may affect athletes' perceptions of competence. From an ecological perspective, athletes are influenced by a variety of variables (e.g., significant others), including their situated sport culture and their national culture (e.g., Henriksen, Stambulova, & Roessler, 2010). Therefore, the nature of relationships established with significant others, and the influence of sport culture and national culture created to a given sport need careful consideration to understand athletes' developmental needs.

Overall, the current study findings provide critical information about youth athletes' developmental outcomes in the Turkish youth sport context. There is limited research that has examined youth athletes' developmental outcomes with a shared conceptual understanding (Côté & Gilbert, 2009). Previous studies generally have not directly focused on athletes' outcomes while concentrating on the coaches' side (Côté, Bruner, Erickson, Strachan, & Fraser-Thomas, 2010) when evaluating coaching effectiveness. This study provides a conceptual understanding of youth athletes' perception of their coaching context, focusing primarily on athletes' age, gender, and type of sport. This study provided an understanding of the extent that coaches are positively influencing their athletes' sport development. Examining coaching effectiveness has been mainly based on investigating coaches' effectiveness by asking them, and their performance records (Mallett & Côté, 2006). This study extended our knowledge of coaching effectiveness in the Turkish youth sport context. This study provides more objective and holistic information on athletes' developmental outcomes, and a proxy measure of coaches' professional needs, from the athletes' perspective.

From the program design point of view, the findings indicate that formal coach education programs appear to fall short in meeting coaches with the relevant and eligible information they need (Kilic & Ince, 2015). It

appears that there is an urgent need for developing complementary continuing learning opportunities for coaches that are contextual, ongoing, and prioritize athletes' holistic development (Gilbert, Gallimore, & Trudel, 2009). The design of such programs needs to be based on measurable outcomes to be effective (Trudel, Gilbert, & Werthner, 2010). The study findings based on the youth athletes' developmental outcomes provide a well-structured needs analysis for developing informed professional development programs for coaches.

While evaluating the current study findings following limitations of the study should be considered. Firstly, the data were collected by surveys — secondly, data collected from three major cities in Turkey. Thirdly, the findings, except competence outcome, reflect only athletes' perceptions. Measurement of competence score also includes the coaches' and teammates' perceptions due to the design of the related measurement tool. Lastly, peer relationships among teammates could not be examined due to the physical setting restrictions.

## CONCLUSIONS

In summary, this study on youth athletes' outcomes provides a comprehensive evaluation of coaching effectiveness mainly from participants' perceptions using the 4 Cs framework. The study portrays what is happening in the field of Turkish youth sports concerning athletes' development of competence, confidence, connection, and character. The findings on age, gender, and type of sport indicate the areas of need for improving coaching effectiveness and, consequently, the quality of youth sport programs. Youth athletes' optimal sport development appears to be interrupted as they get matured, and there are significant gender and sport-type related differences between the youth athletes' perceived developmental outcomes. This present study may partially explain the decreasing trend in the youth sports participation rate in the Turkish context. It is hoped that the findings can lead to further research and realization of holistic athlete development in youth sport.

## AUTHOR CONTRIBUTIONS

Koray Kilic and Mustafa Levent Ince contributed to the design and implementation of this study, to the analysis of the results and to the writing of the manuscript.

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## DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

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