Investigating Discrepancies in Program Quality Related to Youth Volleyball Athletes’ Needs Support

Corliss Bean¹, Tanya Forneris¹, Jennifer Brunet¹

¹ School of Human Kinetics
University of Ottawa
125 University Private
Ottawa, Ontario, K1N 6N5, Canada

Corresponding author: Corliss Bean

Email: cbean@uottawa.ca
Phone: 1 (613) 240-0358
Abstract

Program quality has been outlined as an important predictor of positive outcomes in youth development programs; however, little evidence exists to support this, particularly within sport.

Objective: The purpose of this study was to examine the associations between researcher- and coach-assessed program quality scores as they relate to youth volleyball athletes’ basic needs support. Design: Observational data and self-report data were gathered from coaches and youth. Researchers completed 84 observations using a measure of program quality across 14 teams. Coaches completed the same measure at the end of the season and 138 athletes ($M_{age} = 14.50$) from the 14 teams completed a self-report questionnaire pertaining to needs support. Data were analyzed using polynomial regressions with response surface methodology. Results: Athletes’ needs support was significantly ($p < .001$) associated with all domains of researcher- and coach-assessed program quality (i.e., safe environment, supportive environment, interaction, engagement), and between 20 and 35% of the variance in athletes’ needs support was explained by these variables. The degree of discrepancy between researcher- and coach-assessed program quality increased when progressing through three domains of program quality (safe environment, supportive environment, engagement). Response surface methods indicated that as the degree of agreement increased between researchers’ and coaches’ ratings of the safety of the environment, supportiveness of the environment, and opportunities for engagement, so did athletes’ basic needs support scores in a linear fashion.

Conclusions: Practical implications surrounding coach education and the importance of knowledge translation between academics and practitioners are noted, and future research directions are discussed.

Keywords: youth sport; basic needs theory; quantitative methods; polynomial regression; response surface
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Program quality has been outlined as a critical predictor of positive developmental outcomes in youth programming (Catalano, Hawkins, Berglund, Pollard, & Arthur, 2002; Durlak, Mahoney, Bohnert, & Parente, 2010; Yohalem & Wilson-Ahlstrom, 2010). The National Research Council and Institute of Medicine [NRCIM] within the United States have outlined eight program setting features that may help to foster positive development within youth programs which include: (1) physical and psychological safety; (2) appropriate structure; (3) supportive relationships; (4) opportunities to belong; (5) positive social norms; (6) support for efficacy and mattering; (7) opportunities for skill building; and (8) integration of family, school, and community efforts (Eccles & Gootman, 2002). Since the publication of these setting features, the list has been adopted and utilized to develop youth programs at both academic and applied levels (Bodilly & Beckett, 2005; High/Scope Educational Research Foundation [H/SERF], 2005; Yohalem, Wilson-Ahlstrom, Fischer, & Shinn, 2009). Although there is an emerging consensus that these eight features are what constitute program quality (Granger, Durlak, Yohalem, & Reisner, 2007; Yohalem et al., 2009), little empirical research has been conducted to examine these program setting features within youth sport programs.

Youth sport programs are a viable alternative to general youth programs to foster youth development, as they offer the potential of both physical and psychosocial benefits (Danish, Forneris, Hodge, & Heke, 2004). Program quality should be considered when evaluating sport programs to ensure that youth who participate in such programs are having positive development experiences (Zarrett et al., 2008). Indeed, Roth and Brooks-Gunn (2015) outlined the importance of using program quality in studies to assess outcomes associated with participation in youth development programs. For these reasons, sport psychology researchers have proposed the
integration of the eight aforementioned program setting features within youth sport programs (Côté & Mallett, 2013; Côté, Strachan, & Fraser-Thomas, 2008). For example, Côté and colleagues (2008) contextualized the NRCIM setting features for the sport environment and outlined that youth sport programs should incorporate similar elements. Côté and colleagues further stated that sport programs and coaches should ensure that the physical and psychological safety of youth athletes take priority over performance and success, that respectful peer interactions occur within sport to help ensure enjoyment and build confidence, and that opportunities are provided by coaches that foster autonomy and empowerment – all of which overlap with NRCIM’s eight setting features. Furthermore, Côté and Abernethy (2012) argued the NRCIM’s eight setting features should be the “foundation of any youth sport program and context designed to promote performance, participation, and personal development in sport” (p. 442). Consistent with this perspective, Côté and Mallett (2013) discussed that central to the development of performance within sport is personal development and sustained engagement of youth athletes, which can be attained by integrating the setting features outlined by the NCRIM. When adapted to the sport context, these features may provide a framework for coaches to incorporate a more holistic perspective that focuses on social, emotional, and intellectual components, in addition to the physical development that is inherent within the sport context.

Despite holding considerable promise as a framework for studying youth sport programs (Eccles & Gootman, 2002; Fraser-Thomas, Côté, & Deakin, 2005; Strachan, Côté, & Deakin, 2011), supporting evidence for the benefits of youth sport programs that possess NRCIM’s eight setting features are lacking because the NRCIM’s setting features have not been empirically examined within a youth sport context. Because of the perceived value of NRCIM’s eight setting features, Holt and Jones (2008) proposed using the Youth Program Quality Assessment (H/SERF, 2005), an observational measurement tool based on the NRCIM’s eight program setting features, to
facilitate research within the sport context. Therefore, one goal of this study is to establish links between program quality and basic needs supports—an identified positive outcome in youth sport and physical activity contexts (Adie, Duda, & Ntoumanis, 2012; Coatsworth & Conroy, 2009; Mitchell, Gray, & Inchley, 2015; Standage, Duda, & Ntoumanis, 2005).

Within the context of basic needs theory (BNT), a sub-theory within self-determination theory (Deci & Ryan, 1985), Ryan and Deci (2000, 2002) argued that humans have three basic psychological needs: autonomy (i.e., a person’s ability to make choices and act in accordance with one’s sense of self; Adie, Duda, & Ntoumanis, 2008), competence (i.e., a person’s desire for mastery within one’s environment; Deci, Ryan, & Williams, 1996), and relatedness (i.e., a person’s sense of belongingness and connectedness to others; Ryan & Deci, 2002). Ryan and Deci (2000) further purport that environments that allow individuals to satisfy these three needs can foster positive psychological development and optimal psychological well-being. Sport programs may provide youth an environment to satisfy these three needs, as it is well-recognized that the coach plays a critical role in the development and experiences of youth athletes (Fraser-Thomas et al., 2005; Strachan et al., 2011) and can play a role in the support of youth athletes’ basic needs (Adie, Duda, & Ntoumanis, 2012; Mitchell et al., 2015). For example, Mitchell and colleagues (2015) found that youth engagement levels in a physical activity program increased when leaders promoted youth’s feelings of autonomy, competence, and relatedness. Further, positive developmental outcomes (e.g., increased motivation, well-being) have been reported by youth participating in sport and physical education contexts when basic needs were supported (e.g., Adie et al., 2012; Coatsworth & Conroy, 2009; Quested & Duda, 2010). Moreover, Hodge et al. (2013) proposed that if basic needs are satisfied, individuals are more likely to transfer the skills developed to other life contexts. This is important because skill transference to other contexts is the ultimate goal of many youth sport programs (Gould & Carson, 2008; Petitpas, Cornelius, Van Raalte, & Jones, 2005). As
such, examining which aspects of sport programs affect youth’s needs support is important. The present study focuses on program quality features within the youth sport context.

The Present Study

The purpose of this study was to examine the associations between program quality and youth volleyball athletes’ basic needs support. More specifically, given that coaches may report program quality scores that are discrepant from those reported by an independent observer, this study examined the agreement, discrepancy, and direction of the associations between researcher- and coach-assessed program quality and youth-perceived basic needs support. If youth sport organizations and coaches want to ensure their programs are supporting basic needs and fostering positive outcomes in youth participants, it is imperative that such programs be evaluated for quality, as previous research has shown when stakeholders are not aligned with an organization’s mission, it is difficult for an organization to have its intended impact (Baetz & Kenneth, 1998). As such, there is valuable information to be gained from examining program quality discrepancies from different stakeholders and whether these discrepancies relate to youth athletes’ perceptions of basic needs support. Examining if discrepancies do exist can help to understand the current sport context and act as a starting point for the development of coach education and training related to delivering high quality programs. This research also has value because assessing program quality in conjunction with basic needs will allow for a greater understanding of the structure and specific strategies that coaches are utilizing to support or hinder needs support of their athletes.

Method

Research Design

This study is part of a larger research project that explored program quality based off the NRCIM’s setting features within youth programming, particularly as it relates to basic needs.
support and psychosocial development. Specifically, the larger project involved working with 26 sport programs and teams over the course of 1 year. The current study examines 14 of these teams that were all within the volleyball context. A combination of observational and questionnaire methods was used. With regards to observations the research design resembled a repeated measures design whereby researchers observed the 14 teams on several occasions over the course of the season and completed a measure of program quality (described below) after each observation. The questionnaire portion was a post-only measurement that was completed by coaches and youth athletes. At the end of the season, coaches completed the same measure of program quality that was completed by the researchers (described below) to triangulate perceptions of program quality and extend the current field of research by utilizing observational measures to assess program quality within the youth sport context (Holt & Jones, 2008). The youth completed a self-report questionnaire based on their perceptions of basic needs support provided by the coach (described below).

Context and Participants

Coaches and youth athletes from 14 volleyball teams within two volleyball associations (seven from each association) in South Eastern Ontario, Canada were involved in this study. Both organizations were accredited by the same provincial sport organization and all 14 teams were

There were four studies (including the current study) within the larger sport research project. Each study had unique purposes and research questions related to program quality. In study one, a confirmatory factor analysis was conducted to examine if a youth self-report measure of program quality was a good fit psychometrically for youth within the entire project sample (sport and non-sport programming; Bean & Forneris, 2016a). In study two, a comparative study across sport and non-sport programs examined the importance of intentionally teaching life skills; researcher observations as well as youth self-report data on program quality and positive youth development outcomes (Bean & Forneris, 2016b). In study three, structural equation modelling was used to examine the relationship between program quality, basic needs support and youth developmental outcomes; self-report data only from youth involved in sport programs were used in this study (Bean & Forneris, under review). The current study uses a sub-sample of youth sport participants who were solely involved in the youth volleyball context. This study used the coach data in combination with researcher observations and youth self-report on basic needs and was the only study that used coach data. The rationale for using the larger project data to answer several research questions is because, as a field, we are only just beginning to understand the role program quality plays on the psychosocial development of youth. As mentioned above, although there is some overlap in participants across the studies each study had unique research questions and used a different combination of the measures to answer these various research questions.
competitive in nature and were often involved within the same competitions throughout the season. One organization was from a large city and the other was from a moderately-sized city. Generally, the organizations’ mission statements were to foster athletic and life skills for youth participants through the involvement in volleyball and interactions with caring and knowledgeable coaches. The seasons ran over the course of 8 to 9 months (September to April/May) and teams practiced on-court between 2 and 4 times per week for 2 hours per session where the focus was predominantly on physical, as well as technical and tactical skill development. One organization tended to offer more off-court program components (i.e., strength and conditioning and mental skills training) than the other organization, which tended to only have on-court training. As part of the larger study, two of the 14 teams were identified as intentionally teaching life skills within their regular coaching practices.

The 14 coaches (9 men, 5 women) ranged in age from 29 to 54 years ($M_{age} = 47.94$, $SD = 6.92$) with coaching experience ranging from 1 to 30 years. The average length of coaching experience was 8.44 years ($SD = 7.14$). Coaches self-identified as Caucasian (79%) or Asian (21%). The 138 youth volleyball athletes (21 boys, 117 girls) ranged from 12 to 18 years ($M_{age} = 14.50$, $SD = 1.65$) and had been involved in the clubs between 1 and 9 years with the average length of participation 3.20 years ($SD = 2.00$). Youth of the same age and gender made up each team (e.g., boys’ and girls’ teams between 13U and 18U). The larger number of female athletes in this study was representative of the make-up of both clubs as there were more girls’ teams than boys’ teams during the specific year in which data were collected. Most athletes self-identified as Caucasian (81.8%), while the others self-identified as Aboriginal (5.4%), Asian (5.4%), Black (2.0%), Arabic (2.7%), multiracial (2.7%), and one participant who did not disclose his/her ethnicity.

**Measures**
Program quality. The Youth Program Quality Assessment (YPQA) was used to assess program quality within each of the 14 teams (H/SERF, 2012). The YPQA is based off of the NRCIM’s eight contextual features within programs that are likely to promote positive developmental outcomes (Eccles & Gootman, 2002) and has been found to be a valid and reliable tool in community-based program settings for grades 4 to 12 (Smith & Hohmann, 2005). Moreover, the YPQA has been used within sport contexts (e.g., Bean & Forneris, 2016b; Flett, Gould & Lauer, 2012). The YPQA is a 63-item measure that is used to assess four domains of program quality, namely safe environment, supportive environment, interaction, and engagement (H/SERF, 2005). These four domains are systematized as a pyramid, progressing from foundational elements (safe environment) to higher order elements of program quality (engagement). Subscales fall under each of the four domains, with each subscale having multiple items. Specifically, safe environment measures aspects of emotional safety (2), healthy environment (4), emergency preparedness (6), accommodating environment (4), and nourishment (3). Supportive environment measures aspects of warm welcome (3), session flow (5), active engagement (4), skill building (5), encouragement (3), and reframing conflict (4). Interaction measures aspects of belonging (4), collaboration (3), leadership (3), and adult partners (2). Last, engagement measures aspects of planning (2), choice (2), and reflection (4). For example, within the subscale of ‘warm welcome’, questions are asked for both verbal and non-verbal interactions communicated by program staff, such as whether staff greet youth upon arrival to the program and the tone of voice and body language used by these individuals through the sessions. Moreover, within the ‘choice’ subscale, questions related to opportunities provided to youth related to both content (what) and process (how) choices are included. For each question, concrete descriptions are provided to best illustrate what a 1 (none of something), 3 (some of something), and 5 (all of something) would look like within a program context. The YPQA is measured on a 3-point scale; however, within this study a 5-point scale was
used to increase variability. Of note, space is provided alongside each item to allow researchers and coaches to qualitatively document supporting evidence.

Prior to collecting data, the lead researcher completed a High/Scope training to learn how to properly use and score the YPQA. After receiving certification, the lead researcher held a training session for the four research assistants involved in data collection. This training included outlining the purpose of the measure, the process related to using the measure, and how to score items within the YPQA. Scenario-based questions and sample case study examples were used as a way to test comprehension. A total of 86 observations were conducted by the five researchers across the 14 teams from beginning to end of the season. The YPQA was completed for every observed program session. An average of 6.14 (SD = 1.70, range = 4 to 10) program sessions, lasting 2 hours in length, were observed for each team.

Of note, steps were taken to reduce social desirability effects during observations in attempt to reduce coach uneasiness. Researchers made it clear that the purpose of the study was to understand program quality features and that this project was not an assessment of solely coach competence. Although the coach plays a critical role in delivering the quality of a program, there are other elements (e.g., resources, youth-interactions) that also come into play when assessing program quality. Coaches were also made aware that the study was voluntary in nature and assured that YPQA scores would remain confidential. Last, individual coach performance was not provided to the governing sport organization; reports were provided as an organization summary and did not include individual team scores related to observed program quality.

**Basic needs support.** The Learning Climate Questionnaire (LCQ) was used to measure perceived support for the three basic psychological needs of autonomy, competence, and relatedness by youth athletes. This measure was adapted by Standage and colleagues (2005) from the Health-Care Climate Questionnaire (Williams & Deci, 1996). Specifically, Standage et al. slightly adapted
questions so the wording pertained to the particular situation being studied (e.g., changing
‘instructor’ to ‘coach’), which has been justified by others (Self-Determination Theory, 2016). The
LCQ is a 24-item measure that assesses youth’s perceptions of the degree to which their coach(es)
supported their sense of autonomy (15 items; e.g., “I felt that the coaches provided us with choices
and options”), competence (4 items; e.g., “The coaches helped us to improve”), and relatedness (5
items; e.g., “I felt that the coaches were friendly towards us”). The scale is scored on a 6-point
scale from 1 (strongly disagree) to 6 (strongly agree). The LCQ has been validated with
adolescents in research examining needs support in both sport and physical education settings and
has good internal consistency (e.g., Standage et al., 2005). Similar to previous research examining
basic needs (e.g., Standage, Duda, & Pensgaard, 2005; Standage & Vallerand, 2014), a total score
was used for basic needs support as Deci and Ryan (2012) contend the importance of attaining a
balance of all three needs for positive psychological development and well-being. With the current
sample, the internal consistency for all items was high ($\alpha = 0.96$).

Procedures

Following ethical approval from the Office of Research Ethics and Integrity at the
University of Ottawa, the lead researcher contacted community youth organizations in South
Eastern Ontario, Canada via email outlining the purpose of the study. Study information was further
communicated to coaches and programmers who indicated an interest in study participation. As
mentioned, this was part of a larger study and for the purposes of this study, only programs within
the volleyball context were analyzed. Fourteen teams across two volleyball associations were part
of this study. The researcher met the 14 coaches who agreed to participate in the study in person and
provided them with a summary of the study and answered any questions they had. She also
provided information to parents of athletes on each team and obtained written consent. Data were
collected using a combination of observations and self-report measures. As described above, the
observations were conducted by the research team, using the YPQA, at multiple time points throughout the team’s season. Multiple observations were conducted as it has been encouraged to use this tool at multiple time points throughout a program in order to thoroughly understand quality over the course of a program’s entirety. Additionally, at the end of the season, 14 coaches assessed themselves on program quality by completing the YPQA. Finally, all 138 youth involved in this study completed a self-report measure at the end of the season.

Data Analysis

Data analysis involved multiple sequential steps that were performed in SPSS 23.0. Initially, data were screened for missing values and violations of the assumptions of multiple regression analysis (Tabachnick & Fidell, 2013), the Kappa statistic was performed to test interrater reliability (i.e., determine consistency or agreement among the researchers collecting data using the YPQA), descriptive statistics were computed for study variables, and Pearson correlation coefficients among study variables were examined. Following Edwards’ (2002) and Cafri et al.’s (2010) recommendations, polynomial regressions with response surface analysis was performed to examine the discrepancy between researcher-assessed and coach-assessed YPQA scores and athletes’ basic needs support. This analytical approach is a superior approach to using difference scores when the discrepancy between two variables is of central interest (Edwards, 2002). As outlined by Edwards, using polynomial regressions analysis avoids problems associated with the use of difference scores (i.e., effects of each of the component on the outcome is confounded) because the independent effect of each component is retained. Further, the use of response surface methodology allows for in-depth explorations into: (1) how agreement between assessments of program quality are related to needs support, (2) how the degree of discrepancy between the assessment of program quality are related to needs support, and (3) how the direction of the discrepancy between these assessment of program quality are related to needs support.
Polynomial regressions with response surface values involved several sequential steps. First, researcher-assessed and coach-assessed YPQA scores were mean-centered to facilitate interpretation and reduce issues with multicollinearity. Mean-centering involved subtracting a constant (the mean) from every value of a variable. The slope between that predictor and the response variable does not change; however, the interpretation of the intercept does. Second, for each of the four YPQA domains (i.e., safe environment, support environment, interaction, engagement), three additional variables were created: (a) the square of the mean-centered researcher-assessed YPQA domains, (b) the square of the mean-centered coach-assessed YPQA domains, and (c) the cross-product of the mean-centered researcher-assessed and coach-assessed YPQA domains. Third, four separate polynomial regression models were tested; one for each YPQA domain. Separate models were tested to maintain power and avoid issues of multicollinearity issues between the YPQA domains. In each model, the outcome variable of youth athletes’ perceived basic needs support was regressed on the centered independent variables of researcher-assessed program quality ($x_1$), coach-assessed program quality ($x_2$), the square of each of these centered variables ($x_1 \times x_1$ and $x_2 \times x_2$), and the cross-product of centered researcher-assessed and coach-assessed program quality ($x_1 \times x_2$) to assess the linear, nonlinear, and joint relationships between perceptions of program quality and youth athletes’ basic needs support. Standardized beta coefficients were calculated using Gelman’s (2008) calculation of dividing each independent variable by two standard deviations. For each of the four models, all five independent variables were entered simultaneously in the regression model. The other three program quality domains were not entered into the subsequent regression models as covariates, as this would have required entering 15 additional variables into the regression model, requiring 20 independent variables in the regression of one dependent variable. A much larger sample would have been required for this analysis.

The data set is considered to be hierarchical consisting of two levels, as youth athletes are
nested within individual teams. Nesting involves grouping youth who were part of the same team within one group; youth were assigned a number from 1 to 14 based on what team they were a part of. Being on the same team and working with the same coach can have a common effect on perceived levels of needs support, as these youth athletes will be more alike than two randomly selected youth athletes. This can result in biased estimates of standard errors, thereby increasing the risk of an inflated type I error rate (Hayes & Cai, 2007). As such, the Huber/White estimator was used to calculate standard errors during the polynomial regression analysis in order to account for clustering (Hayes & Cai, 2007; Huber, 1967; Whyte, 1980). This method allows for the errors of the within-team clusters to be correlated while assuming independence of the between-team errors.

If the \( p \)-value for the \( F \)-test of overall significance was less than .013, as a Bonferroni adjusted alpha level was used, the model was deemed significant and the estimated regression coefficients were transformed into four surface test values: \( a_1 \) to \( a_4 \) (Kazén & Kuhl, 2011). The values of \( a_1 (\beta_{x1} + \beta_{x2}) \) reflect the linear relationship between the agreement in researcher-assessed and coach-assessed YPQA scores and LCQ scores. The values of \( a_2 (\beta_{x3} + \beta_{x4} + \beta_{x5}) \) reflect the nonlinear relationship between the agreement of researcher-assessed and coach-assessed YPQA scores and LCQ scores. The values of \( a_3 (\beta_{x1} - \beta_{x2}) \) reflect how the direction of the discrepancy between researcher-assessed and coach-assessed YPQA scores is related to LCQ scores. The values of \( a_4 (\beta_{x3} - \beta_{x4} + \beta_{x5}) \) reflect how the degree of discrepancy between researcher-assessed and coach-assessed YPQA scores relate to LCQ scores (Shanock, Baran, Gentry, Pattison, & heggestad, 2010).

**Results**

**Preliminary Results**

Missing data were 3.1% or less for any one variable and were estimated using multiple imputation methods (Yuan, 2010). The distributional properties of all variables suggested that the
assumptions of normality, linearity, and homoscedasticity were satisfied (Tabachnick & Fidell, 2013). The Kappa statistic between the different researcher-assessed YPQA scores was .61 ($p<0.001$, 95% CI [.58, .64]; range across subscales = .52-.62), indicating there was substantial agreement between the researchers’ ratings of program quality (Landis & Koch, 1977).

Descriptive statistics (mean, standard deviation, range) for the four researcher-assessed and coach-assessed YPQA scores and for youth athletes’ perceptions of basic needs support are presented in Table 1. There were small differences in researcher-assessed and coach-assessed safe environment scores, and larger differences in researcher-assessed and coach-assessed supportive environment, interaction, and engagement scores. Additionally, Pearson bivariate correlations between the nine study variables are also presented in Table 1. Youth athletes’ basic needs support scores were significantly and positively correlated with (1) researcher-assessed safe environment, supportive environment, interaction and engagement scores; and (2) coach-assessed safe environment and supportive environment. In contrast, youth athletes’ basic needs support scores were significantly and negatively correlated with the coach-assessed interaction scores. Coach-assessed engagement scores were not significantly related to youth athletes’ basic needs support scores. Moreover, all four researcher-assessed and coach-assessed YPQA domains were positive and significantly inter-correlated.

**Main Results**

Results of the polynomial regression analyses using the Huber/White estimate to calculate standard errors are presented in Table 2. Four models are presented based on the four subscales of the YPQA that measures program quality. For each model, the R² value, $p$-value, as well as the unstandardized (including standard error) and standardized beta values are presented. The $p$-values from the $F$-tests for each of the four models were significant ($p \leq .001$). A total of 27%, 26%, 20%, and 22% of the variance in youth athletes’ basic needs support scores was explained by the five
variables created with the researcher-assessed and coach-assessed safe environment, supportive environment, interaction, and engagement scores, respectively. Inspection of the regression coefficients within model 1 showed that researcher- and coach-assessed safe environment, as well as the interaction between these two variables, were significantly associated with youth athletes’ basic needs support. Researcher-assessed supportive environment and the product of researcher-assessed and coach-assessed supportive environment were linearly associated with youth athletes’ needs support scores (model 2). Researcher-assessed supportive environment was also nonlinearly associated with youth athletes’ needs support scores (model 2). Researcher-assessed and coach-assessed interaction were associated with needs support of youth athletes (model 3). Last, coach-assessed engagement was linearly associated with youth athletes’ needs support scores, whereas researcher-assessed and coach-assessed engagement were nonlinearly associated with youth athletes’ needs support scores (model 4).

The response surface values ($a_1$ to $a_4$) calculated from the regression parameters are presented in Table 3. These values are presented for each of the four subscales of the YPQA. Results indicated that $a_1$ values were positive and significant for safe environment, supportive environment, and engagement, demonstrating that as the degree of agreement increased between researchers’ and coaches’ ratings of the safety of the environment, supportiveness of the environment, and opportunities for engagement, so did athletes’ needs support scores in a linear fashion. Similarly, $a_2$ values were positive and significant for safe environment and engagement, demonstrating that as the degree of agreement increased between researchers’ and coaches’ ratings of the safety of the environment and opportunities for engagement, so did athletes’ needs support scores in a nonlinear fashion ($a_2$). This means athletes’ needs support scores were highest when coaches and researchers’ ratings were similar either at the high or low end of the rating scales. As well, $a_3$ surface values were positive and significant for safe environment and interaction, indicating
that athletes’ needs support scores were higher when the direction of the discrepancy was such that
coaches’ ratings were higher than researchers’ ratings. Last, $a_4$ values were significant and positive
for supportive environment and engagement, indicating athletes’ needs support scores increased as
the degree of discrepancy between researchers’ and coaches’ ratings increased. In contrast, $a_4$ values
were significant and negative for safe environment indicating athletes’ needs support scores
decreased as the degree of the discrepancy between researchers’ and coaches’ ratings increased.

**Discussion**

The purpose of this study was to examine the associations between program quality and
youth athletes’ basic needs support within a volleyball context. Specifically, the associations related
to agreement, discrepancy, and direction between researcher-assessed and coach-assessed program
quality were examined in relation to needs support of youth athletes. Results from the $F$-tests
indicate that all four domains of program quality significantly predicted needs support, outlining
that program quality assessed by both researchers and coaches is associated with youth athletes’
needs support in this context. Results also outline that examining the degree of agreement and
discrepancy between researcher-assessed and coach-assessed domains of program quality aided in
understanding needs support with these athletes, specifically as it relates to domains of safe
environment, supportive environment, and engagement. Therefore, this study provides merit for
having program quality assessed by two perspectives to identify where congruencies and
discrepancies exist in order to better understand how to deliver a sport program that facilitates needs
support in youth athletes. Specifically, findings from this paper outline that when coaches’ ratings
of certain element of program quality were consistent with researchers’ observations then basic
needs of athletes appear to be supported, which may lead to psychological well-being (Ryan &
Deci, 2012). However, by attaining both perspectives, it was evident that discrepancies did exist on
some subscales of program quality, which warrants further consideration in future research.
Moreover, as the measure used to assess program quality (YPQA) encompasses all eight program setting features proposed by the NRCIM (Eccles & Gootman, 2002), this study provides initial empirical evidence of these setting features within youth sport programs.

Results outline that needs support was significantly predicted by all four subscales of program quality. As such, it is important to recognize how elements of program quality contribute to supporting these needs. Coaches’ efforts to provide an environment that fosters basic needs may benefit from focusing on improving the quality of program delivery. Specifically, research has indicated that higher levels of needs support can lead to psychosocial development and well-being (Deci & Ryan, 2012). Moreover, as previously outlined, it is believed that there is greater likelihood for individuals to transfer the skills in which he/she has developed within a program if basic needs are satisfied (Hodge et al., 2013). This notion of transfer is the ultimate goal of many youth programs, specifically within the sport context (Petitpas et al., 2005). Therefore, if coaches understand not only the importance of, but also how to deliver high quality programming that support these needs, there may be greater likelihood of the development and transfer of life skills.

Within this study, there was little discrepancy between scores for safe and supportive environment with smaller ranges that tended to be at the higher end of the scale for these two domains. This is similar to previous research that has utilized the YPQA within youth programming (Smith & Hohmann, 2005). Larger discrepancies were present between researcher and coach assessments of interaction and engagement, outlining much larger ranges and mean scores. As noted, interaction measured opportunities provided within the program related to belonging, collaboration, leadership, and adult partners and the domain of engagement assessed aspects related to planning, choice, and reflection. This finding also supports previous research in which youth programs tended to score lower on opportunities for interaction and engagement (Akiva, 2005; Bean & Forneris, 2016b; Flett et al., 2012), as these higher-order items require the delivery of more
intentional strategies. It is important to note that the purpose of examining the discrepancies between researchers and coaches was not to determine which stakeholder was more accurate, but to understand whether there were congruencies or incongruences between these two stakeholders’ perceptions, as limited research exists on this topic within the field. Results of the current study support findings from a previous study conducted by Camiré and colleagues (2012) who found that coaches rated themselves higher in their perceived ability to facilitate positive developmental outcomes than what athletes and administrators rated these coaches on. Evidence from this study outlines that there may be discrepancies with coaches rating themselves highly, particularly on aspects program quality related to interaction and engagement which measure various aspects of positive youth development. Therefore, it is important to understand both why these exist and how to minimize these discrepancies. One potential hypothesis is that there is limited training and education available to youth sport coaches related to program quality (Strachan, McDonald, & Côté, 2016) and therefore coaches may believe they are doing what is expected as they are not aware of what constitutes a high quality program. Many people believe that sport can implicitly support basic needs and foster positive outcomes through the notion of that ‘sport builds character’ (Docheff, 1997; Fullinwider, 2006). Specifically, McCallister and colleagues (2000) outlined that participants assumed “coaching at the youth sport level required minimal knowledge or preparation” (p. 42). As such, coaches may equate other elements, such as a winning record or the development of talented athletes, to a program of high quality. Such climates are often ego-oriented, where the focus is associated with performance and success over effort (Duda, 2013; Smith et al., 2015) and can ultimately influence whether youth athletes’ basic needs are supported.

Integrating information related to program quality such as strategies to foster a high quality program would be useful within coach education programs. Many researchers have highlighted the need to train coaches to deliberately integrate strategies relating to the positive development of
youth in sport (Strachan et al., 2016; Vella, Odes, & Crowe, 2011). Moreover, intervention work with coaches would provide opportunities to bridge the gap between research and practice, as the collaboration and feedback attained from coaches would help contribute to understanding best practices within the academic field.

As the degree of agreement increased between researchers’ and coaches’ ratings of the safety of the environment, supportiveness of the environment, and opportunities for engagement, so did athletes’ basic needs support scores. Moreover, athletes’ perceptions of needs support were highest when coaches and researchers’ ratings were similar either at the high or low end of the rating scales for safe environment and engagement. It is not the congruence of scores that supports the needs of youth, but rather when coaches and researchers are congruent there must be an aspect of the environment created by the coach(es) that lead to higher scores on needs support as reported by the youth. However, it should be noted that ceiling effects may have occurred within the safe environment domain, as low scores were still considered relatively high (lower bound range was 4.44 and 4.20 for researcher- and coach-assessments respectively), which is why perceptions of needs support were high at both low and high levels of agreement. Providing a safe environment, both physically and psychologically, has been outlined in the literature as a fundamental element for needs support (Eccles & Gootman, 2002; Smith & Hohmann, 2005). Therefore, youth need to experience a safe environment in order to experience needs support. Research examining program quality and needs support within one youth leadership program found that providing a safe and supportive environment was more essential for supporting youth’s basic needs within the program over opportunities related to interaction and engagement (Bean, Harlow, & Forneris, 2016). As a result, the lower scores and large discrepancies on the domain of engagement may not influence youth athletes’ perceptions of basic needs. This also supports an argument by Yohlem and Wilson-Ahlstrom (2010) stating that providing youth with opportunities for higher-order elements
(interaction, engagement) tend to influence positive developmental outcomes and therefore may not have as critical of an influence on needs support. However, further research is necessary to tease out the influence of these lower-versus higher-order elements of program quality and youth development.

There is value of external and observational assessments when conducting program quality evaluations (Fitzpatrick, Sanders, & Worthen, 2004). The discrepancies observed in this study may be due, in part, to a self-serving bias from coaches completing the YPQA; a common limitation of self-report measures (Van de Mortel, 2008). Conversely, coaches may truly believe they are fostering opportunities for higher-order elements of program quality (interaction and engagement), as previously noted that stakeholders may perceive mere participation in sport allows youth to foster development (Omar-Fauzee et al., 2012; Theokas, Danish, Hodge, Heke, & Forneris, 2008). For example, coaches may rate program quality higher than researchers as they view opportunities for belonging, collaboration, and leadership, which are all subscales within the interaction domain, as inherent in sport. However, many researchers have argued against this outlining that the context of sport must be intentionally structured in order for such opportunities to exist (Bean & Forneris, 2016b; Danish et al., 2004; Gould & Carson, 2008). As a result, when researchers, particularly those who have expertise in youth development programming, conduct observations within the sport context, they may associate higher program quality scores with strategies delivered by a coach to foster deliberate opportunities for these elements instead of inherently occurring within the sport context. It is important to recognize these discrepancies exist, highlighting a practical implication related to coach training. Specifically, training would also be valuable for sport coaches to understand how to facilitate high levels of program quality, particularly related to levels of interaction and engagement.

**Strengths, Limitations, and Future Directions**
This study makes important contributions to youth sport, needs support, and program quality literatures, responding to calls for empirical research conducted on program quality in youth programming (Holt & Jones, 2008; Roth & Brooks-Gunn, 2015), particularly as it relates to the NRCIM eight program setting features (Côté et al., 2008). This study also utilized observational research to assess program quality instead of relying solely on self-report data that addressed a call for research utilizing observational data, and specifically the YPQA within the sport context (Flett et al., 2012; Holt & Jones, 2008). Although there is no way to tell whether researcher or coach perceptions of program quality are more accurate, this extends the field by moving beyond solely self-report measures and utilizing external observational data (Holt & Jones, 2008). Attaining both perspectives allowed for triangulating perceptions and understanding congruencies and discrepancies between stakeholders related to program quality. Moreover, the interrater reliability of researchers was good, indicating an objective measure of program quality. Further, this study provided an account of how program quality can affect basic needs support of youth athletes.

Lastly, this is one of the first studies to utilize three different subjects to assess the dependent and independent variables, as previous research using polynomial regression analyses has tended to focus on same-subject or two-subject designs (e.g., Castonguay, Brunet, Ferguson, & Sabiston, 2012; Surya, Eys, & Benson, 2015).

The current study must be considered in light of the limitations. First, two standardized beta scores within safe environment were over the value of 1.0 and therefore should be interpreted with caution. However, Kraha et al. (2012) outline standardized regression coefficients greater than 1.0 can legitimately occur, yet is often due to multicollinearity, as suspected to be the case within this study despite mean-centring the scores to minimize this risk. As researcher and coach scores were quite similar on this domain of program quality, these are preliminary analyses that need to be interpreted cautiously. Second, as this study was conducted solely within the youth volleyball
context, study findings may not be generalizable to other youth sport contexts. As such, future research is needed to understand if similar findings exist within other sport types (e.g., ice hockey, basketball, soccer) and contexts (e.g., individual/team; recreational/competitive). Third, the majority of participants within this study were female; however, participation in the study was voluntary and therefore out of the researcher’s control. Future research would be useful to examine if such findings differentiate across male and female youth athletes. Fourth, biases common to self-report measures (e.g., social desirability) may play a role in the coach self-assessment as social desirability can have effects on the validity of self-report research (Van de Mortel, 2008). Moreover, coaches provided an assessment of program quality at solely one-time point (season end), thus these scores reflected their overall impression of an entire season. In contrast, researchers completed assessments of program quality at the sessional-level and therefore, the difference in timing of assessment should be acknowledged as a limitation. Last, it should be recognized that researchers did not observe every program session and therefore there is potential for certain elements of program quality to not be observed. Nevertheless, the number of observed hours in this study exceeded recommendations put forward by Yohalem et al. (2009) that raters must observe 4 hours of programming to generate sound data. Within the current study, the average number of observations per team was 6.14, outlining an average of 12 hours of programming per team was observed as each session lasted 2 hours.

Findings from this study can be used to guide future research. As this was the first study to utilize polynomial regression and response surface analysis to understand the relationship between program quality and youth athletes’ needs support, research is needed to further confirm these relationships within other youth athlete samples. Specifically, the large discrepancies between researcher- and coach-assessments of the interaction and engagement subscales of program quality warrant future research to better understand why these exist. Qualitative research may be useful in
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understanding how and why such discrepancies exist between researchers and coaches’ assessment of program quality, as well as understanding strategies to facilitate program quality in the sport context that supports the basic needs of youth athletes. Although previous research has explored program quality within youth programming from the youth perspective (e.g., Bean & Forneris, 2016a; Silliman & Schumm, 2013), measures completed by youth are quite different from the YPQA making a discrepancy analysis unfeasible. Future research is needed to measure program quality for youth and coaches on the same or similar scales so that coach and youth perceptions can be analyzed using polynomial regression, as youth are critical agents of the youth programming context in which they participate, their perceptions provide valuable insight (Powers & Tiffany, 2006). As this was the first study to use polynomial regression to examine this relationship, researchers should integrate additional dependent variables into the model. Specifically, examining the relationship between program quality and the needs of autonomy, competence, and relatedness individually would be of value to tease out how these three variables are individually influenced by program quality. It would be beneficial for researchers to integrate additional outcome measures (e.g., needs satisfaction, trust, developmental outcomes, engagement) into similar models to provide greater insight into the links between program quality elements and youth development. Specifically, a measure of positive developmental outcomes would be useful to better understand how scores of higher-order program quality elements (e.g., interaction, engagement) influence these outcomes.

There are several practical implications that can be taken from this research, in addition to those discussed previously. As noted, due to the discrepancies between researchers and coaches relating to program quality assessments, there is a need for increased knowledge translation between academia and the sport context, namely establishing and/or strengthening collaborations between scholars and sport administrators. Findings from this study further support BNT as an
important theoretical framework for both coaches and researchers to utilize within the sport context as it can provide guidance about specific coaching behaviors that can be adopted in order to increase motivation and enhance psychosocial development in the context of youth sport. Moreover, coach training on strategies related to delivering high quality sport programs that also foster basic needs is critical. As such, it is hoped that this research can help inform training youth sport coaches in regards to strategies to deliver high quality programs that can foster basic needs support.

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References


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Table 1. Descriptive Statistics and Correlations of All Study Variables

<table>
<thead>
<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<td>-</td>
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<td>.32**</td>
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<td><strong>Coach-Supportive Environment</strong></td>
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<td>.54**</td>
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<td>.70**</td>
<td>.46**</td>
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<td>.08</td>
<td>-.28**</td>
<td>.30**</td>
<td>-.13</td>
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<td><strong>Researcher-Engagement</strong></td>
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<td>.24**</td>
<td>.78**</td>
<td>.29**</td>
<td>.66**</td>
<td>-.37**</td>
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<td>-.13</td>
<td>.23**</td>
<td>.46**</td>
<td>.43**</td>
<td>.24**</td>
<td>-.06</td>
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<tr>
<td><strong>Youth Reported Basic Needs Support</strong></td>
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<td>.19*</td>
<td>.39**</td>
<td>.34**</td>
<td>.35**</td>
<td>-.30**</td>
<td>.37**</td>
<td>.09</td>
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<tr>
<td>Mean</td>
<td>4.88</td>
<td>4.69</td>
<td>4.20</td>
<td>4.45</td>
<td>3.30</td>
<td>4.29</td>
<td>1.86</td>
<td>3.17</td>
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<td>SD</td>
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<td>.33</td>
<td>.35</td>
<td>.38</td>
<td>.39</td>
<td>.39</td>
<td>.82</td>
<td>.75</td>
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<td>Range of scores a</td>
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<td>4.20-</td>
<td>3.58-</td>
<td>3.78-</td>
<td>2.81-</td>
<td>3.67-</td>
<td>1.34-</td>
<td>1.38-</td>
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<td></td>
<td>5.00</td>
<td>5.00</td>
<td>4.81</td>
<td>4.90</td>
<td>4.14</td>
<td>4.75</td>
<td>2.98</td>
<td>4.38</td>
<td>6.00</td>
</tr>
</tbody>
</table>

Note: *Researcher* refers to scores based on observed assessments conducted by researchers of program quality. *Coach* refers to scores based on coach assessments of program quality.

* Variables 1-8 range from a possible score of 1 to 5, whereas variable 9 ranges from a possible score of 1 to 6.

* p < .05.

** p < .01.
Table 2

Polynomial Regression Analyses between Researcher Assessed and Coach Assessed Program Quality by Subscale

<table>
<thead>
<tr>
<th>Model</th>
<th>$R^2$</th>
<th>$b$</th>
<th>SE</th>
<th>$\beta$</th>
</tr>
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<tbody>
<tr>
<td>Model 1</td>
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<tr>
<td>Researcher SE</td>
<td>7.11</td>
<td>1.10</td>
<td>1.4266'</td>
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<tr>
<td>Coach SE</td>
<td>-1.76</td>
<td>0.52</td>
<td>-1.2657</td>
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<tr>
<td>Researcher SE squared</td>
<td>-7.52</td>
<td>5.40</td>
<td>-1.4058</td>
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<tr>
<td>Researcher SE x Coach SE</td>
<td>20.82</td>
<td>5.50</td>
<td>1.5169*</td>
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<tr>
<td>Coach SE squared</td>
<td>-2.61</td>
<td>1.51</td>
<td>-1.2900</td>
<td></td>
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<tr>
<td>Model 2</td>
<td>.26***</td>
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<td></td>
<td></td>
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<tr>
<td>Researcher SuE</td>
<td>0.68</td>
<td>.19</td>
<td>.30762</td>
<td></td>
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<tr>
<td>Coach SuE</td>
<td>0.34</td>
<td>.23</td>
<td>.16763</td>
<td></td>
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<tr>
<td>Researcher SuE squared</td>
<td>2.15</td>
<td>.54</td>
<td>.39764</td>
<td></td>
</tr>
<tr>
<td>Researcher SuE x Coach SuE</td>
<td>-2.42</td>
<td>.95</td>
<td>-.4165*</td>
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<tr>
<td>Coach SuE squared</td>
<td>0.56</td>
<td>.91</td>
<td>.09766</td>
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<tr>
<td>Model 3</td>
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<tr>
<td>Researcher INT</td>
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<td>0.22</td>
<td>.33768</td>
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<td>.02770</td>
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<td>Researcher INT x Coach INT</td>
<td>-0.17</td>
<td>0.41</td>
<td>-0.0471</td>
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<tr>
<td>Coach INT squared</td>
<td>-0.73</td>
<td>0.51</td>
<td>-1.272</td>
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<tr>
<td>Model 4</td>
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<td>Coach ENG</td>
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<td>Researcher ENG squared</td>
<td>1.13</td>
<td>.32</td>
<td>.48776</td>
<td></td>
</tr>
</tbody>
</table>
| Researcher ENG x Coach ENG | .41   | .30    | .16777*
| Coach ENG squared | .20   | .10    | .22778**|

Note. SE is Safe Environment, SuE is Supportive Environment, INT is Interaction, ENG is Engagement; $b$ = unstandardized coefficient; $\beta$ = standardized coefficient; SE = standard error. To interpret the standardized regression coefficients: for every standard deviation change in the independent variable, the dependent variable changes by “$b$” units. As calculated using Gelman’s approach, standardized coefficients may be larger than 1.0.

* $p < .05$.
** $p < .01$.
*** $p < .001$. 
Table 3

Surface Values of Assessed Program Quality Subscales as Related to Basic Needs Support

<table>
<thead>
<tr>
<th></th>
<th>Safe Environment</th>
<th>Supportive Environment</th>
<th>Interaction</th>
<th>Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>$a_1$</td>
<td>5.35 (.76)***</td>
<td>1.02 (.25)***</td>
<td>.05 (.28)</td>
<td>.52 (.25)*</td>
</tr>
<tr>
<td>$a_2$</td>
<td>10.69 (2.12)***</td>
<td>.29 (.64)</td>
<td>-.82 (.55)</td>
<td>1.74 (.57)**</td>
</tr>
<tr>
<td>$a_3$</td>
<td>8.87 (1.53)***</td>
<td>.35 (.35)</td>
<td>1.25 (.30)***</td>
<td>-.06 (.31)</td>
</tr>
<tr>
<td>$a_4$</td>
<td>-30.94 (11.28)**</td>
<td>5.13 (2.08)*</td>
<td>-.49 (.90)</td>
<td>.92 (.38)*</td>
</tr>
</tbody>
</table>

Note. $a_1 = b_1 + b_2$, where $b_1$ is the beta coefficient of researcher assessed program quality and $b_2$ is the beta coefficient for coach assessed program quality. $a_2 = b_3 + b_4 + b_5$, where $b_3$ is the beta coefficient of researcher assessed program quality squared, $b_4$ is the beta coefficient for the cross-product of researcher assessed program quality and coach assessed program quality, and $b_5$ is the beta coefficient for coach assessed program quality squared. $a_3 = b_1 - b_2$, $a_4 = b_3 - b_4 + b_5$.

Significance depends partially on standard errors; as such values of equivalent magnitude may not be significant.

* $p < .05$.
** $p < .01$.
*** $p < .001$. 