

1 Investigating Discrepancies in Program Quality Related to Youth Volleyball Athletes' Needs
2 Support

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15 Abstract

16 Program quality has been outlined as an important predictor of positive outcomes in youth
17 development programs; however, little evidence exists to support this, particularly within sport.
18 Objective: The purpose of this study was to examine the associations between researcher- and
19 coach-assessed program quality scores as they relate to youth volleyball athletes' basic needs
20 support. Design: Observational data and self-report data were gathered from coaches and youth.
21 Researchers completed 84 observations using a measure of program quality across 14 teams.
22 Coaches completed the same measure at the end of the season and 138 athletes ($M_{age} = 14.50$) from
23 the 14 teams completed a self-report questionnaire pertaining to needs support. Data were analyzed
24 using polynomial regressions with response surface methodology. Results: Athletes' needs support
25 was significantly ($p < .001$) associated with all domains of researcher- and coach-assessed program
26 quality (i.e., safe environment, supportive environment, interaction, engagement), and between 20
27 and 35% of the variance in athletes' needs support was explained by these variables. The degree of
28 discrepancy between researcher- and coach-assessed program quality increased when progressing
29 through three domains of program quality (safe environment, supportive environment, engagement).
30 Response surface methods indicated that as the degree of agreement increased between researchers'
31 and coaches' ratings of the safety of the environment, supportiveness of the environment, and
32 opportunities for engagement, so did athletes' basic needs support scores in a linear fashion.
33 Conclusions: Practical implications surrounding coach education and the importance of knowledge
34 translation between academics and practitioners are noted, and future research directions are
35 discussed.

36 *Keywords:* youth sport; basic needs theory; quantitative methods; polynomial regression;
37 response surface

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

55 Youth sport programs are a viable alternative to general youth programs to foster youth
56 development, as they offer the potential of both physical and psychosocial benefits (Danish,
57 Forneris, Hodge, & Heke, 2004). Program quality should be considered when evaluating sport
58 programs to ensure that youth who participate in such programs are having positive development
59 experiences (Zarrett et al., 2008). Indeed, Roth and Brooks-Gunn (2015) outlined the importance of
60 using program quality in studies to assess outcomes associated with participation in youth
61 development programs. For these reasons, sport psychology researchers have proposed the

62 integration of the eight aforementioned program setting features within youth sport programs (Côté
63 & Mallett, 2013; Côté, Strachan, & Fraser-Thomas, 2008). For example, Côté and colleagues
64 (2008) contextualized the NRCIM setting features for the sport environment and outlined that youth
65 sport programs should incorporate similar elements. Côté and colleagues further stated that sport
66 programs and coaches should ensure that the physical and psychological safety of youth athletes
67 take priority over performance and success, that respectful peer interactions occur within sport to
68 help ensure enjoyment and build confidence, and that opportunities are provided by coaches that
69 foster autonomy and empowerment – all of which overlap with NRCIM’s eight setting features.
70 Furthermore, Côté and Abernethy (2012) argued the NRCIM’s eight setting features should be the
71 “foundation of any youth sport program and context designed to promote performance,
72 participation, and personal development in sport” (p. 442). Consistent with this perspective, Côté
73 and Mallett (2013) discussed that central to the development of performance within sport is
74 personal development and sustained engagement of youth athletes, which can be attained by
75 integrating the setting features outlined by the NCRIM. When adapted to the sport context, these
76 features may provide a framework for coaches to incorporate a more holistic perspective that
77 focuses on social, emotional, and intellectual components, in addition to the physical development
78 that is inherent within the sport context.

79 Despite holding considerable promise as a framework for studying youth sport programs
80 (Eccles & Gootman, 2002; Fraser-Thomas, Côté, & Deakin, 2005; Strachan, Côté, & Deakin,
81 2011), supporting evidence for the benefits of youth sport programs that possess NRCIM’s eight
82 setting features are lacking because the NRCIM’s setting features have not been empirically
83 examined within a youth sport context. Because of the perceived value of NRCIM’s eight setting
84 features, Holt and Jones (2008) proposed using the Youth Program Quality Assessment (H/SERF,
85 2005), an observational measurement tool based on the NRCIM’s eight program setting features, to

86 facilitate research within the sport context. Therefore, one goal of this study is to establish links
87 between program quality and basic needs supports—an identified positive outcome in youth sport
88 and physical activity contexts (Adie, Duda, & Ntoumanis, 2012; Coatsworth & Conroy, 2009;
89 Mitchell, Gray, & Inchley, 2015; Standage, Duda, & Ntoumanis, 2005).

90 Within the context of basic needs theory (BNT), a sub-theory within self-determination
91 theory (Deci & Ryan, 1985), Ryan and Deci (2000, 2002) argued that humans have three basic
92 psychological needs: autonomy (i.e., a person's ability to make choices and act in accordance with
93 one's sense of self; Adie, Duda, & Ntoumanis, 2008), competence (i.e., a person's desire for
94 mastery within one's environment; Deci, Ryan, & Williams, 1996), and relatedness (i.e., a person's
95 sense of belongingness and connectedness to others; Ryan & Deci, 2002). Ryan and Deci (2000)
96 further purport that environments that allow individuals to satisfy these three needs can foster
97 positive psychological development and optimal psychological well-being. Sport programs may
98 provide youth an environment to satisfy these three needs, as it is well-recognized that the coach
99 plays a critical role in the development and experiences of youth athletes (Fraser-Thomas et al.,
100 2005; Strachan et al., 2011) and can play a role in the support of youth athletes' basic needs (Adie,
101 Duda, & Ntoumanis, 2012; Mitchell et al., 2015). For example, Mitchell and colleagues (2015)
102 found that youth engagement levels in a physical activity program increased when leaders promoted
103 youth's feelings of autonomy, competence, and relatedness. Further, positive developmental
104 outcomes (e.g., increased motivation, well-being) have been reported by youth participating in sport
105 and physical education contexts when basic needs were supported (e.g., Adie et al., 2012;
106 Coatsworth & Conroy, 2009; Quested & Duda, 2010). Moreover, Hodge et al. (2013) proposed that
107 if basic needs are satisfied, individuals are more likely to transfer the skills developed to other life
108 contexts. This is important because skill transference to other contexts is the ultimate goal of many
109 youth sport programs (Gould & Carson, 2008; Petitpas, Cornelius, Van Raalte, & Jones, 2005). As

110 such, examining which aspects of sport programs affect youth's needs support is important. The
111 present study focuses on program quality features within the youth sport context.

112 **The Present Study**

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

129 **Method**

130 **Research Design**

131 This study is part of a larger research project that explored program quality based off the
132 NRCIM's setting features within youth programming, particularly as it relates to basic needs

133 support and psychosocial development¹. Specifically, the larger project involved working with 26
134 sport programs and teams over the course of 1 year. The current study examines 14 of these teams
135 that were all within the volleyball context. A combination of observational and questionnaire
136 methods was used. With regards to observations the research design resembled a repeated measures
137 design whereby researchers observed the 14 teams on several occasions over the course of the
138 season and completed a measure of program quality (described below) after each observation. The
139 questionnaire portion was a post-only measurement that was completed by coaches and youth
140 athletes. At the end of the season, coaches completed the same measure of program quality that was
141 completed by the researchers (described below) to triangulate perceptions of program quality and
142 extend the current field of research by utilizing observational measures to assess program quality
143 within the youth sport context (Holt & Jones, 2008). The youth completed a self-report
144 questionnaire based on their perceptions of basic needs support provided by the coach (described
145 below).

146 **Context and Participants**

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

¹There 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.

150 competitive in nature and were often involved within the same competitions throughout the season.
151 One organization was from a large city and the other was from a moderately-sized city. Generally,
152 the organizations' mission statements were to foster athletic and life skills for youth participants
153 through the involvement in volleyball and interactions with caring and knowledgeable coaches. The
154 seasons ran over the course of 8 to 9 months (September to April/May) and teams practiced on-
155 court between 2 and 4 times per week for 2 hours per session where the focus was predominantly on
156 physical, as well as technical and tactical skill development. One organization tended to offer more
157 off-court program components (i.e., strength and conditioning and mental skills training) than the
158 other organization, which tended to only have on-court training. As part of the larger study, two of
159 the 14 teams were identified as intentionally teaching life skills within their regular coaching
160 practices.

161 The 14 coaches (9 men, 5 women) ranged in age from 29 to 54 years ($M_{age} = 47.94$, $SD =$
162 6.92) with coaching experience ranging from 1 to 30 years. The average length of coaching
163 experience was 8.44 years ($SD = 7.14$). Coaches self-identified as Caucasian (79%) or Asian (21%).
164 The 138 youth volleyball athletes (21 boys, 117 girls) ranged from 12 to 18 years ($M_{age} = 14.50$, SD
165 $= 1.65$) and had been involved in the clubs between 1 and 9 years with the average length of
166 participation 3.20 years ($SD = 2.00$). Youth of the same age and gender made up each team (e.g.,
167 boys' and girls' teams between 13U and 18U). The larger number of female athletes in this study
168 was representative of the make-up of both clubs as there were more girls' teams than boys' teams
169 during the specific year in which data were collected. Most athletes self-identified as Caucasian
170 (81.8%), while the others self-identified as Aboriginal (5.4%), Asian (5.4%), Black (2.0%), Arabic
171 (2.7%), multiracial (2.7%), and one participant who did not disclose his/her ethnicity.

172 **Measures**

173 **Program quality.** The Youth Program Quality Assessment (YPQA) was used to assess
174 program quality within each of the 14 teams (H/SERF, 2012). The YPQA is based off of the
175 NRCIM’s eight contextual features within programs that are likely to promote positive
176 developmental outcomes (Eccles & Gootman, 2002) and has been found to be a valid and reliable
177 tool in community-based program settings for grades 4 to 12 (Smith & Hohmann, 2005). Moreover,
178 the YPQA has been used within sport contexts (e.g., Bean & Forneris, 2016b; Flett, Gould & Lauer,
179 2012). The YPQA is a 63-item measure that is used to assess four domains of program quality,
180 namely safe environment, supportive environment, interaction, and engagement (H/SERF, 2005).
181 These four domains are systematized as a pyramid, progressing from foundational elements (safe
182 environment) to higher order elements of program quality (engagement). Subscales fall under each
183 of the four domains, with each subscale having multiple items. Specifically, safe environment
184 measures aspects of emotional safety (2), healthy environment (4), emergency preparedness (6),
185 accommodating environment (4), and nourishment (3). Supportive environment measures aspects of
186 warm welcome (3), session flow (5), active engagement (4), skill building (5), encouragement (3),
187 and reframing conflict (4). Interaction measures aspects of belonging (4), collaboration (3),
188 leadership (3), and adult partners (2). Last, engagement measures aspects of planning (2), choice
189 (2), and reflection (4). For example, within the subscale of ‘warm welcome’, questions are asked for
190 both verbal and non-verbal interactions communicated by program staff, such as whether staff greet
191 youth upon arrival to the program and the tone of voice and body language used by these
192 individuals through the sessions. Moreover, within the ‘choice’ subscale, questions related to
193 opportunities provided to youth related to both content (what) and process (how) choices are
194 included. For each question, concrete descriptions are provided to best illustrate what a 1 (*none of*
195 *something*), 3 (*some of something*), and 5 (*all of something*) would look like within a program
196 context. The YPQA is measured on a 3-point scale; however, within this study a 5-point scale was

197 used to increase variability. Of note, space is provided alongside each item to allow researchers and
198 coaches to qualitatively document supporting evidence.

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

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

217 **Basic needs support.** The Learning Climate Questionnaire (LCQ) was used to measure
218 perceived support for the three basic psychological needs of autonomy, competence, and relatedness
219 by youth athletes. This measure was adapted by Standage and colleagues (2005) from the Health-
220 Care Climate Questionnaire (Williams & Deci, 1996). Specifically, Standage et al. slightly adapted

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

234 **Procedures**

235 Following ethical approval from the Office of Research Ethics and Integrity at the
236 University of Ottawa, the lead researcher contacted community youth organizations in South
237 Eastern Ontario, Canada via email outlining the purpose of the study. Study information was further
238 communicated to coaches and programmers who indicated an interest in study participation. As
239 mentioned, this was part of a larger study and for the purposes of this study, only programs within
240 the volleyball context were analyzed. Fourteen teams across two volleyball associations were part
241 of this study. The researcher met the 14 coaches who agreed to participate in the study in person and
242 provided them with a summary of the study and answered any questions they had. She also
243 provided information to parents of athletes on each team and obtained written consent. Data were
244 collected using a combination of observations and self-report measures. As described above, the

245 observations were conducted by the research team, using the YPQA, at multiple time points
246 throughout the team's season. Multiple observations were conducted as it has been encouraged to
247 use this tool at multiple time points throughout a program in order to thoroughly understand quality
248 over the course of a program's entirety. Additionally, at the end of the season, 14 coaches assessed
249 themselves on program quality by completing the YPQA. Finally, all 138 youth involved in this
250 study completed a self-report measure at the end of the season.

251 **Data Analysis**

252 Data analysis involved multiple sequential steps that were performed in SPSS 23.0. Initially,
253 data were screened for missing values and violations of the assumptions of multiple regression
254 analysis (Tabachnick & Fidell, 2013), the Kappa statistic was performed to test interrater reliability
255 (i.e., determine consistency or agreement among the researchers collecting data using the YPQA),
256 descriptive statistics were computed for study variables, and Pearson correlation coefficients among
257 study variables were examined. Following Edwards' (2002) and Cafri et al.'s (2010)
258 recommendations, polynomial regressions with response surface analysis was performed to examine
259 the discrepancy between researcher-assessed and coach-assessed YPQA scores and athletes' basic
260 needs support. This analytical approach is a superior approach to using difference scores when the
261 discrepancy between two variables is of central interest (Edwards, 2002). As outlined by Edwards,
262 using polynomial regressions analysis avoids problems associated with the use of difference scores
263 (i.e., effects of each of the component on the outcome is confounded) because the independent
264 effect of each component is retained. Further, the use of response surface methodology allows for
265 in-depth explorations into: (1) how agreement between assessments of program quality are related
266 to needs support, (2) how the degree of discrepancy between the assessment of program quality are
267 related to needs support, and (3) how the direction of the discrepancy between these assessment of
268 program quality are related to needs support.

269 Polynomial regressions with response surface values involved several sequential steps. First,
270 researcher-assessed and coach-assessed YPQA scores were mean-centered to facilitate
271 interpretation and reduce issues with multicollinearity. Mean-centering involved subtracting a
272 constant (the mean) from every value of a variable. The slope between that predictor and the
273 response variable does not change; however, the interpretation of the intercept does. Second, for
274 each of the four YPQA domains (i.e., safe environment, support environment, interaction,
275 engagement), three additional variables were created: (a) the square of the mean-centered
276 researcher-assessed YPQA domains, (b) the square of the mean-centered coach-assessed YPQA
277 domains, and (c) the cross-product of the mean-centered researcher-assessed and coach-assessed
278 YPQA domains. Third, four separate polynomial regression models were tested; one for each
279 YPQA domain. Separate models were tested to maintain power and avoid issues of multicollinearity
280 issues between the YPQA domains. In each model, the outcome variable of youth athletes'
281 perceived basic needs support was regressed on the centered independent variables of researcher-
282 assessed program quality (x_1), coach-assessed program quality (x_2), the square of each of these
283 centered variables ($x_1 \times x_1$ and $x_2 \times x_2$), and the cross-product of centered researcher-assessed and
284 coach-assessed program quality ($x_1 \times x_2$) to assess the linear, nonlinear, and joint relationships
285 between perceptions of program quality and youth athletes' basic needs support. Standardized beta
286 coefficients were calculated using Gelman's (2008) calculation of dividing each independent
287 variable by two standard deviations. For each of the four models, all five independent variables were
288 entered simultaneously in the regression model. The other three program quality domains were not
289 entered into the subsequent regression models as covariates, as this would have required entering 15
290 additional variables into the regression model, requiring 20 independent variables in the regression
291 of one dependent variable. A much larger sample would have been required for this analysis.

292 The data set is considered to be hierarchical consisting of two levels, as youth athletes are

317 assumptions of normality, linearity, and homoscedasticity were satisfied (Tabachnick & Fidell,
318 2013). The Kappa statistic between the different researcher-assessed YPQA scores was .61 (p
319 <0.001 , 95% CI [.58, .64]; range across subscales = .52-.62), indicating there was substantial
320 agreement between the researchers' ratings of program quality (Landis & Koch, 1977).

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

334 **Main Results**

335 Results of the polynomial regression analyses using the Huber/White estimate to calculate
336 standard errors are presented in Table 2. Four models are presented based on the four subscales of
337 the YPQA that measures program quality. For each model, the R^2 value, p -value, as well as the
338 unstandardized (including standard error) and standardized beta values are presented. The p -values
339 from the F -tests for each of the four models were significant ($p \leq .001$). A total of 27%, 26%, 20%,
340 and 22% of the variance in youth athletes' basic needs support scores was explained by the five

341 variables created with the researcher-assessed and coach-assessed safe environment, supportive
342 environment, interaction, and engagement scores, respectively. Inspection of the regression
343 coefficients within model 1 showed that researcher- and coach-assessed safe environment, as well
344 as the interaction between these two variables, were significantly associated with youth athletes'
345 basic needs support. Researcher-assessed supportive environment and the product of researcher-
346 assessed and coach-assessed supportive environment were linearly associated with youth athletes'
347 needs support scores (model 2). Researcher-assessed supportive environment was also nonlinearly
348 associated with youth athletes' needs support scores (model 2). Researcher-assessed and coach-
349 assessed interaction were associated with needs support of youth athletes (model 3). Last, coach-
350 assessed engagement was linearly associated with youth athletes' needs support scores, whereas
351 researcher-assessed and coach-assessed engagement were nonlinearly associated with youth
352 athletes' needs support scores (model 4).

353 The response surface values (a_1 to a_4) calculated from the regression parameters are
354 presented in Table 3. These values are presented for each of the four subscales of the YPQA.
355 Results indicated that a_1 values were positive and significant for safe environment, supportive
356 environment, and engagement, demonstrating that as the degree of agreement increased between
357 researchers' and coaches' ratings of the safety of the environment, supportiveness of the
358 environment, and opportunities for engagement, so did athletes' needs support scores in a linear
359 fashion. Similarly, a_2 values were positive and significant for safe environment and engagement,
360 demonstrating that as the degree of agreement increased between researchers' and coaches' ratings
361 of the safety of the environment and opportunities for engagement, so did athletes' needs support
362 scores in a nonlinear fashion (a_2). This means athletes' needs support scores were highest when
363 coaches and researchers' ratings were similar either at the high or low end of the rating scales. As
364 well, a_3 surface values were positive and significant for safe environment and interaction, indicating

365 that athletes' needs support scores were higher when the direction of the discrepancy was such that
366 coaches' ratings were higher than researchers' ratings. Last, a_4 values were significant and positive
367 for supportive environment and engagement, indicating athletes' needs support scores increased as
368 the degree of discrepancy between researchers' and coaches' ratings increased. In contrast, a_4 values
369 were significant and negative for safe environment indicating athletes' needs support scores
370 decreased as the degree of the discrepancy between researchers' and coaches' ratings increased.

371

Discussion

372 The purpose of this study was to examine the associations between program quality and
373 youth athletes' basic needs support within a volleyball context. Specifically, the associations related
374 to agreement, discrepancy, and direction between researcher-assessed and coach-assessed program
375 quality were examined in relation to needs support of youth athletes. Results from the F -tests
376 indicate that all four domains of program quality significantly predicted needs support, outlining
377 that program quality assessed by both researchers and coaches is associated with youth athletes'
378 needs support in this context. Results also outline that examining the degree of agreement and
379 discrepancy between researcher-assessed and coach-assessed domains of program quality aided in
380 understanding needs support with these athletes, specifically as it relates to domains of safe
381 environment, supportive environment, and engagement. Therefore, this study provides merit for
382 having program quality assessed by two perspectives to identify where congruencies and
383 discrepancies exist in order to better understand how to deliver a sport program that facilitates needs
384 support in youth athletes. Specifically, findings from this paper outline that when coaches' ratings
385 of certain element of program quality were consistent with researchers' observations then basic
386 needs of athletes appear to be supported, which may lead to psychological well-being (Ryan &
387 Deci, 2012). However, by attaining both perspectives, it was evident that discrepancies did exist on
388 some subscales of program quality, which warrants further consideration in future research.

389 Moreover, as the measure used to assess program quality (YPQA) encompasses all eight program
390 setting features proposed by the NRCIM (Eccles & Gootman, 2002), this study provides initial
391 empirical evidence of these setting features within youth sport programs.

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

403 Within this study, there was little discrepancy between scores for safe and supportive
404 environment with smaller ranges that tended to be at the higher end of the scale for these two
405 domains. This is similar to previous research that has utilized the YPQA within youth programming
406 (Smith & Hohmann, 2005). Larger discrepancies were present between researcher and coach
407 assessments of interaction and engagement, outlining much larger ranges and mean scores. As
408 noted, interaction measured opportunities provided within the program related to belonging,
409 collaboration, leadership, and adult partners and the domain of engagement assessed aspects related
410 to planning, choice, and reflection. This finding also supports previous research in which youth
411 programs tended to score lower on opportunities for interaction and engagement (Akiva, 2005;
412 Bean & Forneris, 2016b; Flett et al., 2012), as these higher-order items require the delivery of more

413 intentional strategies. It is important to note that the purpose of examining the discrepancies
414 between researchers and coaches was not to determine which stakeholder was more accurate, but to
415 understand whether there were congruencies or incongruences between these two stakeholders’
416 perceptions, as limited research exists on this topic within the field. Results of the current study
417 support findings from a previous study conducted by Camiré and colleagues (2012) who found that
418 coaches rated themselves higher in their perceived ability to facilitate positive developmental
419 outcomes than what athletes and administrators rated these coaches on. Evidence from this study
420 outlines that there may be discrepancies with coaches rating themselves highly, particularly on
421 aspects program quality related to interaction and engagement which measure various aspects of
422 positive youth development. Therefore, it is important to understand both why these exist and how
423 to minimize these discrepancies. One potential hypothesis is that there is limited training and
424 education available to youth sport coaches related to program quality (Strachan, McDonald, & Côté,
425 2016) and therefore coaches may believe they are doing what is expected as they are not aware of
426 what constitutes a high quality program. Many people believe that sport can implicitly support basic
427 needs and foster positive outcomes through the notion of that ‘sport builds character’ (Docheff,
428 1997; Fullinwider, 2006). Specifically, McCallister and colleagues (2000) outlined that participants
429 assumed “coaching at the youth sport level required minimal knowledge or preparation” (p. 42). As
430 such, coaches may equate other elements, such as a winning record or the development of talented
431 athletes, to a program of high quality. Such climates are often ego-oriented, where the focus is
432 associated with performance and success over effort (Duda, 2013; Smith et al., 2015) and can
433 ultimately influence whether youth athletes’ basic needs are supported.

434 Integrating information related to program quality such as strategies to foster a high quality
435 program would be useful within coach education programs. Many researchers have highlighted the
436 need to train coaches to deliberately integrate strategies relating to the positive development of

437 youth in sport (Strachan et al., 2016; Vella, Odes, & Crowe, 2011). Moreover, intervention work
438 with coaches would provide opportunities to bridge the gap between research and practice, as the
439 collaboration and feedback attained from coaches would help contribute to understanding best
440 practices within the academic field.

441 As the degree of agreement increased between researchers' and coaches' ratings of the
442 safety of the environment, supportiveness of the environment, and opportunities for engagement, so
443 did athletes' basic needs support scores. Moreover, athletes' perceptions of needs support were
444 highest when coaches and researchers' ratings were similar either at the high or low end of the
445 rating scales for safe environment and engagement. It is not the congruence of scores that supports
446 the needs of youth, but rather when coaches and researchers are congruent there must be an aspect
447 of the environment created by the coach(es) that lead to higher scores on needs support as reported
448 by the youth. However, it should be noted that ceiling effects may have occurred within the safe
449 environment domain, as low scores were still considered relatively high (lower bound range was
450 4.44 and 4.20 for researcher- and coach-assessments respectively), which is why perceptions of
451 needs support were high at both low and high levels of agreement. Providing a safe environment,
452 both physically and psychologically, has been outlined in the literature as a fundamental element for
453 needs support (Eccles & Gootman, 2002; Smith & Hohmann, 2005). Therefore, youth need to
454 experience a safe environment in order to experience needs support. Research examining program
455 quality and needs support within one youth leadership program found that providing a safe and
456 supportive environment was more essential for supporting youth's basic needs within the program
457 over opportunities related to interaction and engagement (Bean, Harlow, & Forneris, 2016). As a
458 result, the lower scores and large discrepancies on the domain of engagement may not influence
459 youth athletes' perceptions of basic needs. This also supports an argument by Yohlem and Wilson-
460 Ahlstrom (2010) stating that providing youth with opportunities for higher-order elements

461 (interaction, engagement) tend to influence positive developmental outcomes and therefore may not
462 have as critical of an influence on needs support. However, further research is necessary to tease out
463 the influence of these lower- versus higher-order elements of program quality and youth
464 development.

465 There is value of external and observational assessments when conducting program quality
466 evaluations (Fitzpatrick, Sanders, & Worthen, 2004). The discrepancies observed in this study may
467 be due, in part, to a self-serving bias from coaches completing the YPQA; a common limitation of
468 self-report measures (Van de Mortel, 2008). Conversely, coaches may truly believe they are
469 fostering opportunities for higher-order elements of program quality (interaction and engagement),
470 as previously noted that stakeholders may perceive mere participation in sport allows youth to foster
471 development (Omar-Fauzee et al., 2012; Theokas, Danish, Hodge, Heke, & Forneris, 2008). For
472 example, coaches may rate program quality higher than researchers as they view opportunities for
473 belonging, collaboration, and leadership, which are all subscales within the interaction domain, as
474 inherent in sport. However, many researchers have argued against this outlining that the context of
475 sport must be intentionally structured in order for such opportunities to exist (Bean & Forneris,
476 2016b; Danish et al., 2004; Gould & Carson, 2008). As a result, when researchers, particularly those
477 who have expertise in youth development programming, conduct observations within the sport
478 context, they may associate higher program quality scores with strategies delivered by a coach to
479 foster deliberate opportunities for these elements instead of inherently occurring within the sport
480 context. It is important to recognize these discrepancies exist, highlighting a practical implication
481 related to coach training. Specifically, training would also be valuable for sport coaches to
482 understand how to facilitate high levels of program quality, particularly related to levels of
483 interaction and engagement.

484 **Strengths, Limitations, and Future Directions**

485 This study makes important contributions to youth sport, needs support, and program quality
486 literatures, responding to calls for empirical research conducted on program quality in youth
487 programming (Holt & Jones, 2008; Roth & Brooks-Gunn, 2015), particularly as it relates to the
488 NRCIM eight program setting features (Côté et al., 2008). This study also utilized observational
489 research to assess program quality instead of relying solely on self-report data that addressed a call
490 for research utilizing observational data, and specifically the YPQA within the sport context (Flett
491 et al., 2012; Holt & Jones, 2008). Although there is no way to tell whether researcher or coach
492 perceptions of program quality are more accurate, this extends the field by moving beyond solely
493 self-report measures and utilizing external observational data (Holt & Jones, 2008). Attaining both
494 perspectives allowed for triangulating perceptions and understanding congruencies and
495 discrepancies between stakeholders related to program quality. Moreover, the interrater reliability of
496 researchers was good, indicating an objective measure of program quality. Further, this study
497 provided an account of how program quality can affect basic needs support of youth athletes.
498 Lastly, this is one of the first studies to utilize three different subjects to assess the dependent and
499 independent variables, as previous research using polynomial regression analyses has tended to
500 focus on same-subject or two-subject designs (e.g., Castonguay, Brunet, Ferguson, & Sabiston,
501 2012; Surya, Eys, & Benson, 2015).

502 The current study must be considered in light of the limitations. First, two standardized beta
503 scores within safe environment were over the value of 1.0 and therefore should be interpreted with
504 caution. However, Kraha et al. (2012) outline standardized regression coefficients greater than 1.0
505 can legitimately occur, yet is often due to multicollinearity, as suspected to be the case within this
506 study despite mean-centring the scores to minimize this risk. As researcher and coach scores were
507 quite similar on this domain of program quality, these are preliminary analyses that need to be
508 interpreted cautiously. Second, as this study was conducted solely within the youth volleyball

509 context, study findings may not be generalizable to other youth sport contexts. As such, future
510 research is needed to understand if similar findings exist within other sport types (e.g., ice hockey,
511 basketball, soccer) and contexts (e.g., individual/team; recreational/competitive). Third, the majority
512 of participants within this study were female; however, participation in the study was voluntary and
513 therefore out of the researcher's control. Future research would be useful to examine if such
514 findings differentiate across male and female youth athletes. Fourth, biases common to self-report
515 measures (e.g., social desirability) may play a role in the coach self-assessment as social desirability
516 can have effects on the validity of self-report research (Van de Mortel, 2008). Moreover, coaches
517 provided an assessment of program quality at solely one-time point (season end), thus these scores
518 reflected their overall impression of an entire season. In contrast, researchers completed
519 assessments of program quality at the sessional-level and therefore, the difference in timing of
520 assessment should be acknowledged as a limitation. Last, it should be recognized that researchers
521 did not observe every program session and therefore there is potential for certain elements of
522 program quality to not be observed. Nevertheless, the number of observed hours in this study
523 exceeded recommendations put forward by Yohalem et al. (2009) that raters must observe 4 hours
524 of programming to generate sound data. Within the current study, the average number of
525 observations per team was 6.14, outlining an average of 12 hours of programming per team was
526 observed as each session lasted 2 hours.

527 Findings from this study can be used to guide future research. As this was the first study to
528 utilize polynomial regression and response surface analysis to understand the relationship between
529 program quality and youth athletes' needs support, research is needed to further confirm these
530 relationships within other youth athlete samples. Specifically, the large discrepancies between
531 researcher- and coach-assessments of the interaction and engagement subscales of program quality
532 warrant future research to better understand why these exist. Qualitative research may be useful in

533 understanding how and why such discrepancies exist between researchers and coaches' assessment
534 of program quality, as well as understanding strategies to facilitate program quality in the sport
535 context that supports the basic needs of youth athletes. Although previous research has explored
536 program quality within youth programming from the youth perspective (e.g., Bean & Forneris,
537 2016a; Silliman & Schumm, 2013), measures completed by youth are quite different from the
538 YPQA making a discrepancy analysis unfeasible. Future research is needed to measure program
539 quality for youth and coaches on the same or similar scales so that coach and youth perceptions can
540 be analyzed using polynomial regression, as youth are critical agents of the youth programming
541 context in which they participate, their perceptions provide valuable insight (Powers & Tiffany,
542 2006). As this was the first study to use polynomial regression to examine this relationship,
543 researchers should integrate additional dependent variables into the model. Specifically, examining
544 the relationship between program quality and the needs of autonomy, competence, and relatedness
545 individually would be of value to tease out how these three variables are individually influenced by
546 program quality. It would be beneficial for researchers to integrate additional outcome measures
547 (e.g., needs satisfaction, trust, developmental outcomes, engagement) into similar models to provide
548 greater insight into the links between program quality elements and youth development.
549 Specifically, a measure of positive developmental outcomes would be useful to better understand
550 how scores of higher-order program quality elements (e.g., interaction, engagement) influence these
551 outcomes.

552 There are several practical implications that can be taken from this research, in addition to
553 those discussed previously. As noted, due to the discrepancies between researchers and coaches
554 relating to program quality assessments, there is a need for increased knowledge translation
555 between academia and the sport context, namely establishing and/or strengthening collaborations
556 between scholars and sport administrators. Findings from this study further support BNT as an

557 important theoretical framework for both coaches and researchers to utilize within the sport context
558 as it can provide guidance about specific coaching behaviors that can be adopted in order to
559 increase motivation and enhance psychosocial development in the context of youth sport. Moreover,
560 coach training on strategies related to delivering high quality sport programs that also foster basic
561 needs is critical. As such, it is hoped that this research can help inform training youth sport coaches
562 in regards to strategies to deliver high quality programs that can foster basic needs support.

563

Acknowledgements

564 Support for the writing of this manuscript was given through a doctoral research grant from
565 the Social Sciences and Humanities Research Council of Canada.

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739

740 Table 1.

741

742 *Descriptive Statistics and Correlations of All Study Variables*

743

	1	2	3	4	5	6	7	8	9
1. <i>Researcher-Safe Environment</i>	-								
2. <i>Coach-Safe Environment</i>	.72**	-							
3. <i>Researcher-Supportive Environment</i>	.51**	.32**	-						
4. <i>Coach-Supportive Environment</i>	.52**	.61**	.54**	-					
5. <i>Researcher-Interaction</i>	.24**	-.10	.70**	.46**	-				
6. <i>Coach-Interaction</i>	-.20*	.08	-.28**	.30**	-.13	-			
7. <i>Researcher-Engagement</i>	.23**	.24**	.78**	.29**	.66**	-.37**	-		
8. <i>Coach-Engagement</i>	-.05	-.13	.23**	.46**	.43**	.24**	-.06	-	
9. Youth Reported Basic Needs Support	.27**	.19*	.39**	.34**	.35**	-.30**	.37**	.09	-
Mean	4.88	4.69	4.20	4.45	3.30	4.29	1.86	3.17	4.65
SD	.15	.27	.33	.35	.38	.39	.39	.82	.75
Range of scores ^a	4.44- 5.00	4.20- 5.00	3.58- 4.81	3.78- 4.90	2.81- 4.14	3.67- 4.75	1.34- 2.98	1.38- 4.38	2.70- 6.00

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

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

747 * $p < .05$.

748 ** $p < .01$.

749 Table 2
 750
 751 *Polynomial Regression Analyses between Researcher Assessed and Coach Assessed Program*
 752 *Quality by Subscale*
 753

	R ²	b	SE	β
Model 1	.27***			.754
Researcher SE		7.11	1.10	1.46**
Coach SE		-1.76	0.52	-.625*
Researcher SE squared		-7.52	5.40	-.4858
Researcher SE x Coach SE		20.82	5.50	1.569*
Coach SE squared		-2.61	1.51	-.360
Model 2	.26***			.761
Researcher SuE		0.68	.19	.3072
Coach SuE		0.34	.23	.1663
Researcher SuE squared		2.15	.54	.39764
Researcher SuE x Coach SuE		-2.42	.95	-.4165
Coach SuE squared		0.56	.91	.09766
Model 3	.20***			.767
Researcher INT		0.65	0.22	.33768
Coach INT		-0.60	0.19	-.3169
Researcher INT squared		0.07	0.51	.02770
Researcher INT x Coach INT		-0.17	0.41	-.0471
Coach INT squared		-0.73	0.51	-.1472
Model 4	.22***			.773
Researcher ENG		.23	.27	.92774
Coach ENG		.29	.10	.32775
Researcher ENG squared		1.13	.32	.48776
Researcher ENG x Coach ENG		.41	.30	.16777
Coach ENG squared		.20	.10	.22778

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

785
 786 * $p < .05$.

787 ** $p < .01$.

788 *** $p < .001$.

789 Table 3

790
791 *Surface Values of Assessed Program Quality Subscales as Related to Basic Needs Support*
792

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

793
794 *Note.* $a_1 = b^1 + b^2$, where b^1 is the beta coefficient of researcher assessed program quality and b^2 is
795 the beta coefficient for coach assessed program quality. $a^2 = b^3 + b^4 + b^5$, where b^3 is the beta
796 coefficient of researcher assessed program quality squared, b^4 is the beta coefficient for the cross-
797 product of researcher assessed program quality and coach assessed program quality, and b^5 is the
798 beta coefficient for coach assessed program quality squared. $a^3 = b^1 - b^2$, $a^4 = b^3 - b^4 + b^5$.
799 Significance depends partially on standard errors; as such values of equivalent magnitude may not
800 be significant.

801 * $p < .05$.802 ** $p < .01$.803 *** $p < .001$.