

4-2018

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Publication Information

Anderson-Butcher, Dawn; Martin, Eric; Paluta, Lauren; and Gould, Dan. (2018). "Patterns of Social Skill development Over-Time Among Clusters of LiFEsports Participants". *Children and Youth Services Review*, 87, 17-25. <http://dx.doi.org/10.1016/j.childyouth.2018.01.044>

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Acknowledgements & Credits: The authors wish to thank Rebecca Wade-Mdivanian, Leeann Lower and Tarkington Newman for their involvement in data collection and management.

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Abstract

Although growing in prevalence, little is known about how and for whom sport-based positive youth development (PYD) programs make a difference. This study addresses two gaps: A lack of multi-year studies and limited research differentiating outcomes between groups of participants. Specifically, this study uses repeated measures ANOVAs and hierarchical and non-hierarchical modeling procedures to investigate outcomes among two clusters of underserved youth who participated in two consecutive LiFE*sports* summer camps. Two hundred and thirty one youth participated, with the majority African American (87%) and male (62%). The average age of participants was 10.71 years. Participants completed surveys to assess four skills: self-control, effort, teamwork, and transfer. Within the full sample, growth was seen over the course of each camp. Social skills returned to baseline levels between summers. Youth entering LiFE*sports* with high levels of social skills experienced some fluctuations but no significant changes in outcomes. Conversely, youth with relatively low social skills experienced more consistent and maintained growth between summers. Results support the positive impact of sport-based PYD programs on vulnerable youth and reiterate the need for a more complex understanding of the mechanisms affecting certain types of youth. Implications for sports-based PYD research and practice are drawn.

Keywords: Youth Sports; Positive Youth Development; Social Skills

1 Patterns of Social Skill Development among Clusters of LiFE*sports* Participants: Investigating
2 the Multi-Year Impact of a Sport-Based Positive Youth Development Program

3
4 Positive youth development (PYD) programs focus on increasing protective factors,
5 reducing risk factors, and preventing problem behaviors among youth (Anthony, Alter, &
6 Jenson, 2009; Eccles & Gootman, 2002). Reviews and meta-analyses exploring the benefit of
7 these programs demonstrate their value towards improving academic outcomes, decreasing
8 substance use and delinquency, enhancing social competence, and increasing mental health
9 (Catalano, Hawkins, Berglund, Pollard, & Arthur, 2002; Durlak, Weissberg, & Pachan, 2010;
10 Eccles & Gootman, 2002). Sport represents a particularly promising avenue for PYD, as
11 approximately 45 million youth in the United States participating in sport each year (The Aspen
12 Institute, 2017). In fact, several PYD programs already leverage the power of sport. Little is
13 known, however, about the long-term impacts of these programs and/or their relative impact on
14 youth from different demographic characteristics, especially those from marginalized or
15 underserved populations characterized by poverty and its correlates (Forneris, Bean, & Halsall,
16 2016; Martinek & Schilling, 2003). Better understanding the nuance of outcomes associated
17 with sport-based PYD programs will contribute to their ability to promote holistic, positive youth
18 development. To this end, this study examines one sport-based summer camp – Learning in
19 Fitness and Education through Sports (LiFE*sports*) – and explores outcomes among underserved
20 youth who attended two consecutive years of this program, as well as examines growth patterns
21 among clusters of youth participants.

22 **Introduction**

23 **Sport-Based PYD**

24 Sport-based PYD programs integrate evidence-based PYD practices into sport contexts
25 by intentionally teaching social and life skills while simultaneously promoting sport skills and
26 athletic competencies (Anonymous, 2014; Gould & Carson, 2008; Hedstrom & Gould, 2004;
27 Hellison, 2011; Holt, Neely, Slater, Camiré, Côté et al., 2017). For example, Girls On The Run,
28 Inc. promotes physical, psychological, and social development through a 10-week program
29 which also prepares young girls to participate in 5K run (girlsontherun.org; Iachini, Bell,
30 Lohman, Beets, & Reynolds, 2017). The First Tee teaches golf in a way that emphasizes key
31 values such as integrity, responsibility, and perseverance (thefirsttee.org; Weiss, Stuntz, Bhalla,
32 Bolter, & Price, 2013). Programs grounded in Teaching Personal and Social Responsibility
33 (Hellison, 2011) embed a humanistic approach in sport and physical education settings to teach
34 values and responsibility. Other programs, such as Sports United to Promote Education and
35 Recreation (SUPER; Danish, Forneris, & Wallace, 2005), provide curricular sessions that are
36 completed before or after sport-specific training sessions. These and other sport-based PYD
37 programs commonly embody key design principles such as being youth-centered, fostering
38 initiative, teaching skills or values, creating relationships and a sense of belong, fostering
39 climate, and having fun (Anonymous, 2016; Holt, Deal, & Smyth, 2017).

40 Previous research and systematic reviews demonstrate how sport-based PYD programs
41 contribute to positive youth development, revealing outcomes such as enhanced life and social
42 skills, moral development, goal-related skills, and personal values (Anonymous, 2016; Eime,
43 Young, Harvey, Charity, & Payne, 2013; Lubans, Plotnikoff, & Lubans, 2012). Of note are three
44 recent studies synthesizing research in this area. A meta data analysis of qualitative research in
45 sport-based PYD documented physical, social, and personal outcomes, as well as process related
46 factors such as relationships and parent involvement (Holt et al., 2017). Additionally, Hermens

47 et al. (2017) conducted a systematic review of life skill development sport programs for socially
48 vulnerable youth, demonstrating the value of these settings for promoting cognitive and social
49 life skills, but not emotional skills. Relatedly, a recent systematic review of TPSR physical
50 education programs found positive outcomes in relation to reduced problem behavior,
51 improvements on various academic indicators, and the development of other prosocial values
52 and skills (Pozo, Grao-Cruces, & Pérez-Ordás (2018).

53 Importantly, these contexts may be especially valuable for youth from vulnerable
54 circumstances, ones characterized by disadvantage, high exposure to risk and adversities, and
55 limited access to opportunities for prosocial involvement activities (Anonymous, 2014; Halpern,
56 2002; Hermens et al., 2017). Participation data, however, indicate youth from marginalized
57 populations participate at significantly lower rates as compared to their more advantaged
58 counterparts (Aspen Institute, 2017). Likewise, socio-political factors also often constrain access
59 to and opportunities for sport and sport-based PYD among low-income youth, in particular.
60 Promoting sport-based PYD in these settings, where there are limited opportunities yet increased
61 vulnerabilities, is increasingly important.

62 Although there has been an increase in research in sport-based PYD, there are still
63 notable limitations in the literature. Several researchers (Anonymous, 2014; Camiré & Trudel,
64 2013; Pozo et al., 2018) have noted that most of the research in this area involves qualitative
65 designs, using interviews and/or focus groups to explore stakeholder perceptions of program
66 design principles and perceived outcomes. Limitations have been identified in relation to the use
67 of post-test only or pre-post-test assessments without follow-up measures, as well as the need for
68 more rigorous research using mixed methods and longitudinal designs (Anonymous, 2014;
69 Anthony et al., 2009; Eccles & Gootman, 2003; Gould & Carson, 2008; Hermens et al., 2017;

70 Pozo et al., 2018). Questions also remain about whether certain youth benefit the most from
71 exposure to sport-based PYD (Anonymous, 2016; Forneris et al., 2016; Halpern, 2002). For
72 instance, there is some evidence to suggest some youth entering programs with poorer social
73 skills and limited assets may benefit the most from participation (Anonymous, 2014). Others
74 point to the value of serving youth from marginalized or underserved populations due to their
75 increased risk for negative outcomes (Forneris et al., 2016; Fraser-Thomas, Côté, & Deakin,
76 2005). In fact, a recent meta-analysis conducted by Hermens et al. (2017) suggests that although
77 “more and more research is being done...relatively few studies have been published that
78 investigate life skills development in sports programs serving vulnerable youth” (p. 420). To
79 make a practical difference in sport contexts, others suggests there is a need to focus on targeted
80 audiences, so that one can ensure the specific knowledge and skills desired are transferred into
81 real-life practice (Gordon & Doyle, 2015; Gould, 2016; Pierce, Gould, & Camiré, 2016). In light
82 of these gaps, researchers call for more studies examining the mechanisms at work for different
83 groups of youth and in different settings (Anonymous, 2014; Eccles & Gootman, 2003; Riley et
84 al., 2017). Related is the need for further research exploring outcomes associated with
85 participation in sports-based PYD programs among vulnerable groups of youth, including those
86 living in poverty and/or of color (Anonymous, 2014; Forneris et al., 2016). These young people
87 may benefit most from participation, yet often have limited opportunities as compared to their
88 more advantaged peers (Bouffard, Wimer, Caronongan, Little, Dearing, & Simpkins, 2006;
89 Pedersen & Seidman, 2005).

90 **LiFEsports**

91 *LiFEsports* (www.osulifesports.org) is a university- and sport-based PYD program that
92 has been the focus of several prior investigations. The mission of *LiFEsports* is “to foster social

93 competence in youth through their involvement in sport, fitness and educational activities”
94 (Anonymous, 2011, pp. 2852-2853). Youth between the ages of 9 and 15 enroll in this four
95 week long, summer day camp on a first-come, first-serve basis. Participants, primarily African-
96 American urban youth living at or below the federal poverty level, are provided with free
97 transportation and daily breakfast and lunch. Approximately 600 youth enroll on a first-come,
98 first-serve basis each year, and approximately 55% of youth return each year.

99 Each day, youth participate in six hours of programming. Across the four weeks of
100 camp, youth receive 5 hours of instruction in 9 different sport activities (basketball, football,
101 health and fitness, lacrosse, soccer, social dance, softball, swimming, and volleyball), as well as
102 engage in 15 hours of play-based social skill instruction called *Chalk Talk*. All activities
103 promote the development of four key components of social competence: self-control, effort,
104 teamwork, and social responsibility (SETS). These are key skills and attributes nested within
105 social competence (Foster & Bussmann, 2008; Gresham, 1997) and are easily generalized to
106 other social settings such as school and home (Sheridan, Maughan, & Hungelmann, 1999).
107 Evidence also showcases their relationship to key youth outcomes, especially ones among
108 vulnerable youth, such as academic achievement, positive mental health, effective coping, and
109 reduced problem behaviors (Beelman, Pfingston, & Losel, 1994; Buckner, Mezzacappa, &
110 Beardslee, 2009). Further, there is a specific focus throughout the curriculum on the transfer of
111 SETS to other social settings such as home, school, and the community. Transfer, or the
112 application of the skills outside of *LiFEsports*, is encouraged throughout the program, and youth
113 participants are regularly asked to debrief and provide specific examples of their transfer of
114 learning during daily program activities. During the final days of camp, youth participate in the

115 LiFE*sports* Games, a culminating event involving a team-based competition that allows the
116 youth to demonstrate their mastery of sport skills and SETS application.

117 During the initial years of LiFE*sports* curriculum development, Anonymous (2013)
118 examined pre- to post- changes in social and athletic competence among youth. Results
119 demonstrated significant improvements in perceptions of athletic competence in five sports, but
120 no significant changes in perceptions of social competence. As the program was further refined,
121 results have been more favorable. For instance, Anonymous and colleagues (2017) found
122 significant increases in self-control from pre- to post LiFE*sports* participation but did not show
123 significant differences in externalizing behaviors. Most recently, Anonymous (in review) found
124 significant improvements in all outcome variables over the course of the camp, with small effect
125 sizes found for self-control, effort, social competence and transfer and moderate effects for
126 teamwork and social competence.

127 To better understand the LiFE*sports* design and implementation processes, Riley and
128 Anderson-Butcher (2012) examined parent/caregiver perspectives using a grounded theory,
129 qualitative study. When asked about participation outcomes, parents/caregivers highlighted
130 benefits such as individual biopsychosocial development, family support, reduced risk exposure,
131 and newly fostered community norms and support. Parents/caregivers also were asked to
132 attribute these outcomes to program aspects, and noted example mechanisms such as positive
133 counselor-youth relationships, opportunities for positive and diverse peer-interactions, and the
134 exposure of youth to new, safe experiences and environments (Riley & Anderson-Butcher,
135 2012).

136 Later studies employed more rigorous research methods to explore pre- to post- camp
137 outcomes. Anonymous (2014) used growth curve modeling and found significant group-level

138 differences in perceptions of social responsibility but not in any of the other measured social
139 skills. Authors pointed to considerable individual-level variation in the rate and direction of
140 change as one reason why significant group level differences were not found. Additional
141 analyses suggested that youth who enrolled with less favorable perceptions of their social
142 competence demonstrated greater rates of positive change over the course of the program. As
143 youth gains were partially dependent on initial perceptions of critical constructs, findings suggest
144 that future research should investigate youth outcomes in relation to initial skill levels. Further,
145 in addition to more rigorous methods to pre- and post-data collection, standardizing the type of
146 data collected during camp over time will permit the investigation of how initial skill level
147 differences might be impacted over the course of multiple summers, something that has not
148 previously been possible.

149 In reflection, LiFE*sports*-centric and other sport-based PYD research continue to have
150 limitations, as few studies have explored long-term outcomes among youth participants. To
151 better understand for whom these programs are most beneficial, further investigations need to
152 examine growth patterns among different youth, with specific attention paid to those who may
153 enter programs with deficiencies in certain areas. As such, the purpose of this study is to explore
154 outcomes among youth participating in LiFE*sports*, specifically examining changes in self-
155 control, effort, and teamwork. Patterns of change in self-reported transfer also were explored as
156 transfer is critical for the generalization of social skills (Gresham, 1997, Pierce, et al., 2016) and
157 a key curricular focus in LiFE*sports*. In the current study, these outcomes will be examined for
158 the first time over the course of two summer's involvement; therefore allowing for greater
159 understanding of how changes seen in youth during a single summer are influenced by
160 subsequent camp experiences. Finally, analyses were designed to allow for comparisons between

161 groups of youth. By seeking to understand long-term impacts and beginning to differentiate
162 those impacts among diverse youth, this study more broadly aims to advance the research
163 available about sport-based PYD programs.

164 **Methods**

165 Data were collected during the *LiFEsports* camps occurring in the summers of 2013,
166 2014, and 2015. Consistent with the design of the *LiFEsports* program, each summer's camp
167 lasted a month (19 week days), exposing youth to 60 hours of sport and social skill instruction.

168 **Procedure**

169 Each year parents and guardians of *LiFEsports* participants were given a verbal overview
170 of the study at program registration and asked if they were interested in having their child
171 participate. All campers who had parents provide consent completed pretest surveys on the first
172 day of camp and posttest surveys during the final two days of camp. Respondents took
173 approximately 30-45 minutes to complete the battery of instruments. All youth could ask
174 clarifying questions. Some participants required further assistance with reading the items. All
175 study procedures were approved by the University Institutional Review Board.

176 **Participants**

177 As the aim of the current study was to investigate campers' initial growth and
178 maintenance of skills over the course of two summer sessions, only campers who met the
179 following criteria were included in data analyses: (a) first attended camp in 2013 or 2014 (b)
180 returned to camp for a second year immediately following the first, (c) attended camp on at least
181 15 of the 19 days during each summer session, (d) completed surveys at all four time points, and
182 (e) reported being honest in completing the surveys. Also, it should be noted that youth 14 years
183 of age and older provided assent.

184 In the 2013, there were 751 *LiFEsports* participants, of which 711 had parent/guardian
185 consent (95%). Of these youth with consent, 528 were first year campers. Of these first year
186 campers, 201 returned to camp in 2014 (or 38.1% of first year campers). Of these youth who
187 attended in both 2013 and 2014, 122 youth had complete data at Time 1, Time 2, Time 3, and
188 Time 4. As such, these 122 youth represent the 2013-2014 cohort, and include 59.8% of the
189 youth with complete data attending both summers. In 2014, there were a total of 569 *LiFEsports*
190 participants, of which 531 had parent/guardian consent (93.3%). Of these youth with consent,
191 309 were first year campers. Of these first year campers, 201 returned to camp in 2015 (or 65.0%
192 of first year campers). Of these youth who attended in both 2014 and 2015, 109 youth had
193 complete data at Time 1, Time 2, Time 3, and Time 4. As such, these 109 youth represent the
194 2014-2015 cohort, and include 54.2% of the youth attending both summers. Please note 7 youth
195 across both cohorts total were removed from the study for reporting they were not honest when
196 completing their surveys.

197 The final participant sample totaled 231 youth, including 122 campers from the first
198 cohort (2013-2014) and 109 campers from the second cohort (2014-2015). The total sample
199 included 143 boys and 88 girls between the ages of 9-14 (M age at first collection = 10.71, SD =
200 1.48) and had on average just completed 5th grade (M grade completed at first collection = 4.92,
201 SD = 1.54). Participants self-reported a variety of ethnic backgrounds (87.0% African American,
202 6.9% Latino, 3.9% Caucasian, and 2.2% other). Prior to the start of each year's camp, youth
203 were stratified by age and gender and then randomly assigned to summer camp groups.

204 **Measures**

205 **Self-control.** Self-control in sport was assessed using the Social Sports Experience Scale
206 (Anonymous, 2010). The items assess participants' perceptions of their ability to regulate their

207 emotions in sports. Some example items include “I control my temper when I play sports,” and
208 “I play sports fairly even when an adult is not around.” Responses fell along a 5-point Likert
209 scale ranging from 1 (Not at all true) to 5 (Really true). The Social Sports Experience Scale
210 demonstrated acceptable internal consistency reliability in this study, with alphas ranging from
211 0.81-0.90 for each assessment period. Additional psychometric support for this measure was
212 found by McDonough, et al. (2013).

213 **Effort.** The commitment subscale of the Multidimensional Sportspersonship Orientations
214 Scale (MSOS-25) was used to measure effort in sport (Vallerand, Brière, Blanchard, &
215 Provencher, 1997). This subscale consisted of five items assessing participants’ perceptions of
216 their commitment to sports participation (i.e., “I don’t give up even after making many
217 mistakes”). Responses fell along a 5-point Likert scale ranging from 1 (Doesn’t correspond to
218 me at all) to 5 (Corresponds to me exactly). Internal consistency reliability was demonstrated in
219 this study, with alpha ranging from 0.74-0.87 for each assessment time.

220 **Teamwork.** Teamwork in sport was measured using The Teamwork Scale for Youth
221 (Lower, Newman, & Anderson-Butcher, 2015). The scale is comprised of items assessing
222 participants’ perceptions of different aspects of teamwork in the sport context. The stem “When
223 playing sports...” is followed by several items such as “I think teamwork is important” and “I
224 feel confident in my ability to work in a team.” The 8-item measure employs a 5-point Likert
225 scale ranging from 1 (Not true at all) to 5 (Really true). Internal consistency reliability was
226 demonstrated in this study, with alpha ranging from 0.78-0.87 for each measurement time.

227 **Transfer.** The scale used to measure transfer was designed for and used in previous
228 LiFE*sports* evaluations and research (Anonymous, 2013). The three items in this scale ask youth
229 about the extent to which they apply skills used in sports to other contexts in their lives (e.g.,

230 “The skills I learn in sport are useful to me in other parts of my life.”) Responses are given on a
231 5-point Likert scale ranging from 1 (Not true at all) to 5 (Really true). Internal consistency
232 reliability was demonstrated in this study, with alphas ranging from 0.71-0.87 for each
233 assessment period.

234 **Data Analysis**

235 Data analysis involved several steps. Descriptive statistics for all relevant study variables
236 were computed and screened for linearity and normality, and Cronbach's alpha analyses were
237 conducted to assess the internal consistency of each subscale at each time point. Additionally,
238 hierarchical and non-hierarchical modeling procedures were employed for cluster analysis. After
239 determining the appropriate number of clusters, cases were placed into appropriate groups and
240 four repeated measures ANOVAs were conducted for each of the outcome variables in question
241 (Self-control, Effort, Teamwork, and Transfer). For each repeated measures ANOVA, the four
242 time points served as the within subject variable and cluster served as the between subject
243 variable. For each of these initial repeated measures ANOVAs, a test of sphericity was
244 conducted. If the assumption of sphericity was met, the multivariate tests were reported. If the
245 assumption of sphericity was not met, within-subject effects were reported. If the interaction
246 between time and cluster was significant, additional repeated measures ANOVAs were
247 conducted for each cluster individually to determine where, if any, changes occurred over the
248 four time points. In these additional repeated measures ANOVAs, follow-up Bonferroni post-
249 hoc tests were used to understand where differences in the clusters existed while also adjusting
250 for multiple comparisons. It is important to note that for each of the repeated measures
251 ANOVAs, the number of individuals in each analysis differed as only youth who had completed
252 subscales for each of the four time points were included.

Results

Descriptive Statistics and Scale Reliabilities

Means and standard deviations are presented in Table 1. All measures showed adequate reliability ($\alpha > 0.70$). Visual inspection of the means for the total sample suggested that for each outcome variable, the total sample experienced a gain across each year of camp with scores returning to pre-Time 1 scores for the pre-Time 2 testing period. This change indicates that the growth of each construct was lost across the school year when examining data among the entire sample. When investigating growth effects across the youth clusters, it appeared that the clusters of at-risk youth experienced consistent growth across the two years in several variables, while the high-achieving clusters either maintained their high levels or experienced slight decreases in perceptions of the constructs. Further analyses were warranted for the total sample, as well as for each cluster.

Table 1: Means and Standard Deviations for all study variables at each time point for Total Sample, Cluster 1, and Cluster 2.

Variable	Total (N = 232) Mean	Total SD	Cluster 1 (n = 159) Mean	Cluster 1 SD	Cluster 2 (n = 73) Mean	Cluster 2 SD
Self-Control T1	4.26	.72	4.63	.35	3.49	.72
Self-Control T2	4.29	.73	4.52	.57	3.77	.77
Self-Control T3	4.21	.70	4.39	.63	3.83	.74
Self-Control T4	4.26	.64	4.35	.59	4.02	.71
Effort T1	4.11	.74	4.43	.48	3.40	.74
Effort T2	4.26	.81	4.49	.66	3.73	.87

Effort T3	4.13	.74	4.24	.73	3.92	.74
Effort T4	4.26	.67	4.32	.65	4.14	.70
Teamwork T1	3.95	.70	4.31	.41	3.19	.55
Teamwork T2	4.11	.77	4.39	.57	3.53	.81
Teamwork T3	3.97	.67	4.13	.63	3.70	.64
Teamwork T4	4.09	.70	4.22	.66	3.75	.72
Transfer T1	4.02	.86	4.34	.65	3.33	.87
Transfer T2	4.22	.87	4.47	.71	3.66	.95
Transfer T3	4.06	.90	4.25	.82	3.63	.96
Transfer T4	4.14	.83	4.23	.78	3.82	.92

268

269

270 **Cluster Analysis**

271 Both hierarchical and non-hierarchical cluster techniques were used to determine the best
272 cluster solution (e.g., Hair & Black, 2000) with the four initial variables (Self-control, Effort,
273 Teamwork, and Transfer) serving as the grouping variables. First, a hierarchical cluster analysis
274 — using Ward's linkage method and squared Euclidean distance as the similarity measure —
275 was conducted to provide guidance as to the number of clusters that best represented the data.
276 Examination of the agglomeration coefficients resulting from this analysis showed that the
277 percentage change in coefficient was smallest following the two-cluster analysis, suggesting that
278 the two-cluster solution was ideal for this sample. Next, k-means cluster analysis was used to

279 finalize the cluster solution. This two-cluster solution identified conceptually coherent groups
280 with good variability in the groups, thus meeting both statistical and common-sense criteria.

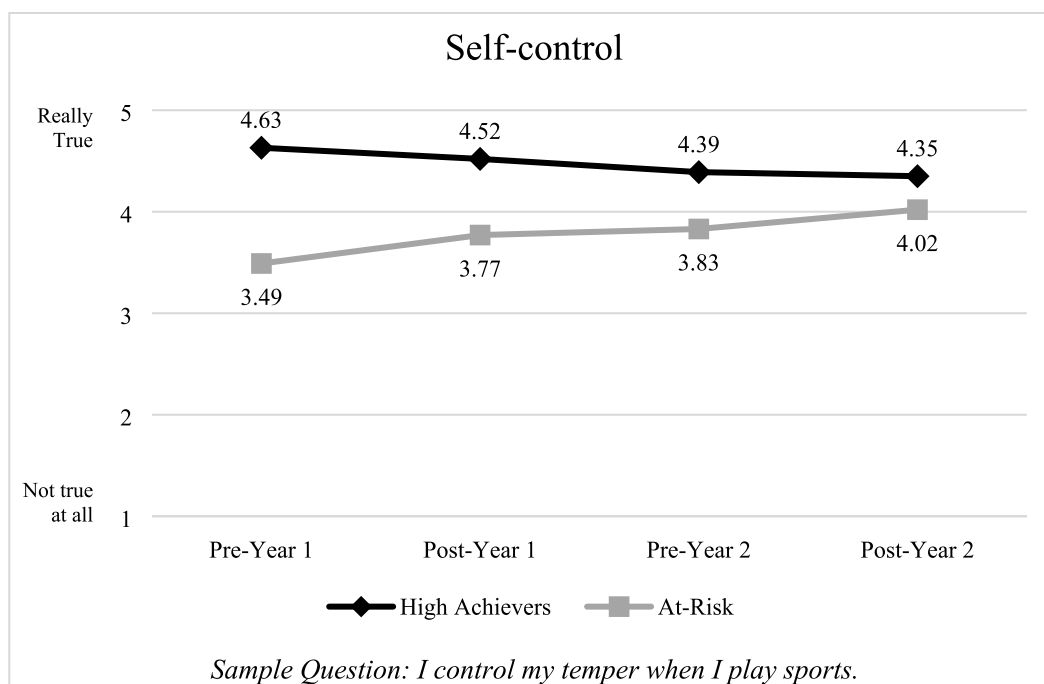
281 Means and standard deviations for both clusters for all time points are represented in
282 Table 1. Label names were assigned to profiles based on the initial scores on the self-control,
283 effort, teamwork, and transfer scales. Two clear clusters emerged with one group scoring high
284 on all four variables (“high achievers”) and one group scoring lower on all four variables (“at-
285 risk”). The reader is cautioned that the labels employed are designed to ease the negotiation of
286 the remaining sections and are not intended to characterize the groups in absolute terms. As is
287 often the case in research with youth participants, relatively low or high scores on constructs may
288 not correspond to low or high response set values. For example, the profile for the at-risk group
289 still exhibits scores above the mean average for each of the four grouping variables. This group
290 was named “at-risk” because even though the scores were above the mid-point, the cluster was
291 clearly differentiated from the other group labelled “high achieving.” These groups were entered
292 into each of the following repeated measures ANOVA as a between subjects variable and, in
293 addition to the total sample, results will be discussed in relation to these clusters.

294 **Self-Control.** A two-way repeated measures ANOVA was conducted to compare the
295 effect of time on self-control at Pre-year 1, Post-year 1, Pre-year 2, and Post-year 2. The initial
296 test of sphericity was not met, therefore the within-subjects effects are reported. The main effect
297 of time was not significant, $F(3, 150) = 1.32, p > .26, \eta^2 = .01$. This finding indicates that the
298 sample as a whole did not experience any differences in self-control at any of the four time
299 points. Investigation of the main effect for cluster was significant, $F(1, 152) = 72.11, p < .001,$
300 $\eta^2 = .32$. As expected, the high achievers had higher levels of self-control than the at-risk youth.
301 Finally, the Time X Cluster interaction was significant, $F(3, 150) = 15.65, p < .001, \eta^2 = .09$.

302 The change in self-control over the two-year time period varied as a function of cluster. In
303 general, youth in the high achieving group experienced decreases in self-control while youth in
304 the at-risk group experienced increases in self-control (see Figure 1).

305 To investigate if these time-point differences in self-control were statistically significant
306 in each of the two groups, a one-way repeated measures ANOVA was conducted for each group.
307 The repeated measures ANOVA for the at-risk group was significant, $F(3,39) = 5.34, p < .01,$
308 $\eta^2 = .29$. Follow-up Bonferroni post-hoc tests indicated that self-control at Time 1 was
309 significantly less than at Time 3 and Time 4. No other Time points differed. The repeated
310 measures ANOVA for the high achieving group also was significant, $F(3,109) = 9.03, p < .001,$
311 $\eta^2 = .20$. Follow-up Bonferroni post-hoc tests indicated that self-control at Time 1 was
312 significantly higher than at Time 3 and Time 4. Further, self-control at Time 2 was significantly
313 higher than at Time 4. In sum, these results indicate that youth in the at-risk group achieved
314 significant growth during camp and maintained that increase across time. Youth in the high
315 achieving group maintained high levels of self-control across the first year of camp but saw a
316 significant decline following the first year of camp that stayed at this lower level through the
317 second year of camp.

318

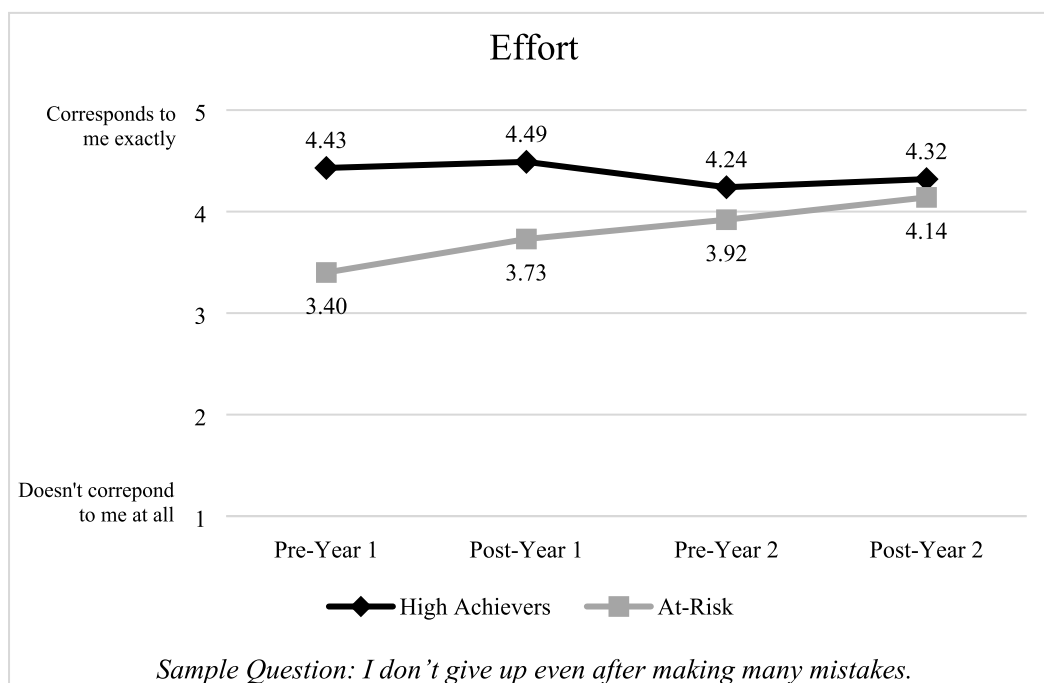


319 Figure 1. Changes in self-control over two years for at-risk and high achieving groups.

320

321 **Effort.** A two-way repeated measures ANOVA was conducted to compare the effect of
 322 time on effort at Pre-year 1, Post-year 1, Pre-year 2, and Post-year 2. The initial test of
 323 sphericity was met, therefore the multivariate tests are reported. The main effect for time was
 324 significant, $F(3, 153) = 7.79, p < .001, \eta^2 = .13$. Follow-up Bonferroni comparisons indicated that
 325 Time 1 was significantly lower than Time 2, Time 3, and Time 4. No other differences in Time
 326 were significant. The main effect for cluster also was significant, $F(1, 153) = 41.81, p < .001, \eta^2 = .21$. As
 327 expected, the high achievers had higher levels of effort than those youth classified as at-risk.
 328 Finally, the Time X Cluster interaction was significant, $F(3, 153) = 13.76, p < .001, \eta^2 = .21$.
 329 Youth in the at-risk group saw a consistent increase in their effort levels across the two-year
 330 period, where youth who were high achieving saw maintenance or slight decreases in their effort
 331 across the two-year time period (see Figure 2).

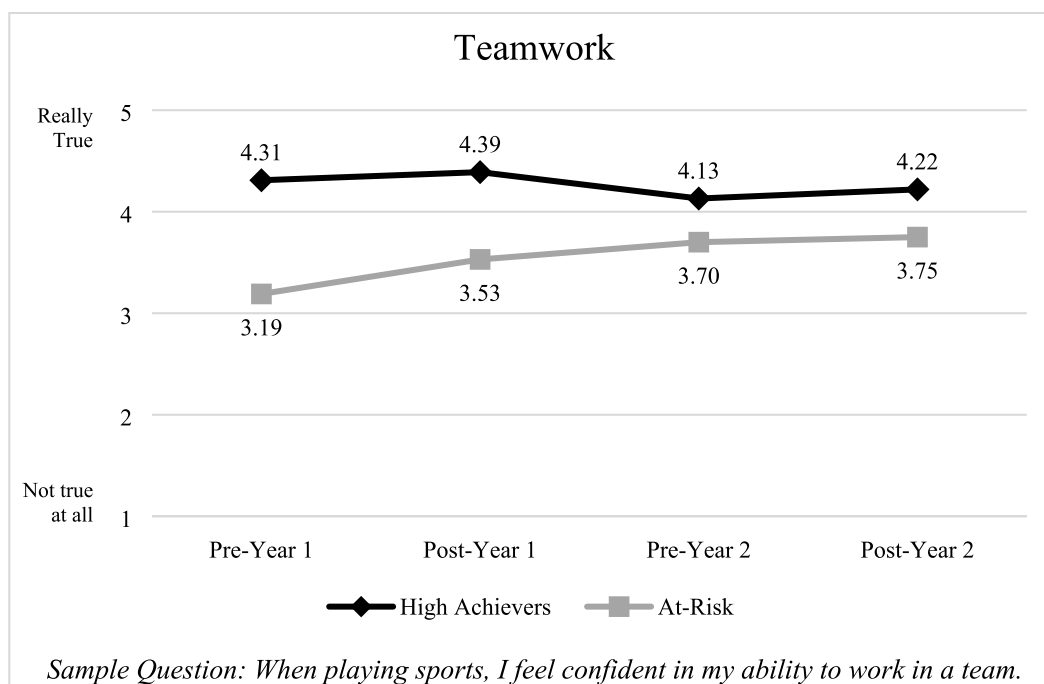
332 To investigate if these differences in effort were statistically significant in each of the two
 333 groups, a one-way repeated measures ANOVA was conducted for each group. The repeated
 334 measures ANOVA for the at-risk group was significant, $F(3,43) = 7.75, p < .001, \eta^2 = .35$.
 335 Follow-up Bonferroni post hoc tests indicated that effort at Time 1 was significantly lower than
 336 at Time 2, Time 3, and Time 4. No other Times were significantly different. The repeated
 337 measures ANOVA for the high achieving group also was significant, $F(3, 108) = 5.00, p < .01,$
 338 $\eta^2 = .04$. Bonferroni follow up tests indicated that the only difference in the four time points was
 339 at Time 2. Time 2 effort was higher than Time 3, however no other times differed from each
 340 other. These results indicate that those individuals classified at-risk experienced an increase
 341 from Time 1 to Time 2 and maintained the higher levels of effort, while the group classified as
 342 high achievers maintained a relatively stable level of effort across the two years.



343
 344 Figure 2. Changes in effort over two years for at-risk and high achieving groups.
 345
 346

347 **Teamwork.** A two-way repeated measures ANOVA was conducted to compare the effect
348 of time on teamwork at Pre-year 1, Post-year 1, Pre-year 2, and Post-year 2. The initial test of
349 sphericity was met, therefore the multivariate tests are reported. The main effect of time was
350 significant, $F(3, 152) = 5.25, p < .01, \eta^2 = .09$. Follow-up Bonferroni comparisons indicated
351 that Time 1 was significantly lower than Time 2, Time 3, and Time 4. No other differences in
352 Time were significant. Investigation of the main effect for cluster was significant, $F(1, 152) =$
353 $80.22, p < .001, \eta^2 = .34$. As expected, the high achievers had higher levels of teamwork than the
354 youth classified as at-risk. Finally, the Time X Cluster interaction was significant, $F(3, 152) =$
355 $13.17, p < .001, \eta^2 = .21$. The change in teamwork over the two-year time period varied as a
356 function of cluster. In general, youth in the high achieving group experienced decreases in
357 teamwork while youth in the at-risk group experienced increases in teamwork (see Figure 3).

358 To investigate if these differences in teamwork were statistically significant in each of the
359 two groups, a one-way repeated measures ANOVA was conducted for each group. The repeated
360 measures ANOVA for the at-risk group was significant, $F(3,41) = 6.21, p < .001, \eta^2 = .31$.
361 Follow-up Bonferroni post-hoc tests indicated that teamwork at Time 1 was significantly less
362 than at Time 3 and Time 4. No other Time points differed. The repeated measures ANOVA for
363 the high achieving group also was significant, $F(3,109) = 7.78, p < .001, \eta^2 = .18$. Follow-up
364 Bonferroni post-hoc tests indicated that teamwork at Time 1 was significantly higher than at
365 Time 3. Additionally, teamwork at Time 2 was significantly higher than teamwork at Time 3
366 and Time 4. In sum, these results indicate that youth in the at-risk group achieved a significant
367 growth during camp and maintained that increase over time. Youth in the high achieving group
368 maintained a high level of teamwork in the first year of camp, but then saw a significant decline
369 between years of camp with lower levels of teamwork during their second year of camp.



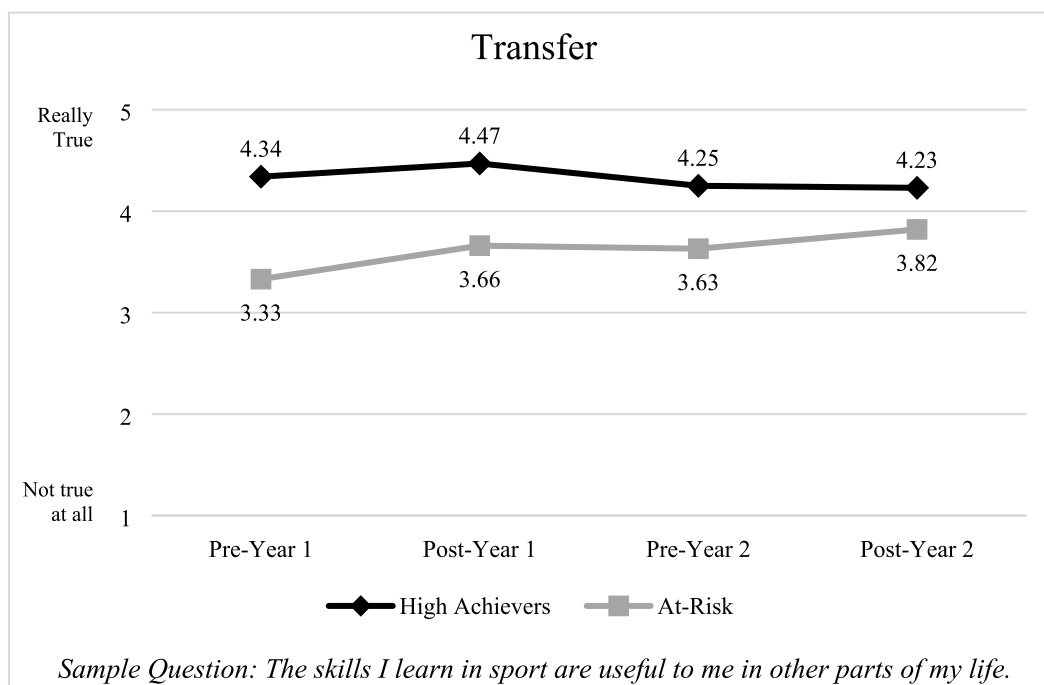
370
371 Figure 3. Changes in teamwork over two years for at-risk and high achieving groups.

372

373 **Transfer.** A two-way repeated measures ANOVA was conducted to compare the effect
374 of time on transfer at Pre-year 1, Post-year 1, Pre-year 2, and Post-year 2. The initial test of
375 sphericity was not met, therefore the within subjects effects are reported. The main effect of
376 time was not significant, $F(3, 157) = 2.50, p > .05, \eta^2 = .02$. This finding indicates that the
377 sample as a whole did not experience any differences in self-reported transfer at any of the four
378 time points. Investigation of the main effect for cluster was significant, $F(1, 157) = 43.23, p <$
379 $.001, \eta^2 = .22$. As expected, the high achievers had higher levels of self-reported perceived
380 transfer than the youth classified as at-risk youth. Finally, the Time X Cluster interaction was
381 significant, $F(3, 157) = 6.87, p < .001, \eta^2 = .04$. The change in transfer over the two-year time
382 period varied as a function of cluster. In general, youth in the high achieving group experienced

383 decreases in transfer while youth in the at-risk group experienced increases in transfer (see
384 Figure 4).

385 To investigate if these differences in transfer were statistically significant in each of the
386 two groups, a one-way repeated measures ANOVA was conducted for each group. The repeated
387 measures ANOVA for the at-risk group was non-significant, $F(3,42) = 2.16, p > .10, \eta^2 = .13$.
388 The at-risk group did not differ in their perspectives of transfer over the two years. The repeated
389 measures ANOVA for the high achieving group was significant, $F(3,111) = 5.30, p < .01, \eta^2 =$
390 $.13$. Follow-up Bonferroni post-hoc tests indicated transfer perceptions at Time 2 were
391 significantly higher than transfer at Time 3 and Time 4. In sum, the at-risk group did not
392 experience growth or decline over the two years of camp while the youth in the high achieving
393 group experienced a decrease following the first year of camp that stayed at these lower levels



394 across the second year of camp.

395
396 Figure 4 Changes in transfer over two years for at-risk and high achieving groups.

397

Discussion

398 Altogether, this study captured a more nuanced picture of the impact of sport-based PYD
399 programs than was previously available. Survey responses from participants attending two
400 consecutive LiFE*sports* summer camps were analyzed to understand the program's impact on the
401 development of four social skills (self-control, effort, teamwork, and transfer). The descriptive
402 statistics among the full sample demonstrate a jump in each skill over the first summer, followed
403 by a drop back to pre-camp levels by the beginning of the second year of camp, and then a
404 similar jump during the second summer. This observation supports the increasingly accepted
405 observation that sport-based PYD programs can have short-term, positive outcomes
406 (Anonymous, 2016; Eime et al., 2013; Lubans et al., 2012).

407 While most research has stopped here, this study went further to explore the patterns in
408 outcomes across two years and tease apart differences between participant clusters in the
409 development of key social skills (self-control, effort, teamwork, and transfer). Analysis of
410 hierarchical and non-hierarchical cluster groups offered a detailed picture of what happened to
411 two groups during their time in LiFE*sports*. Youth who were identified as at-risk, or who
412 entered camp with lower perceptions on the constructs, experienced an increase during camp in
413 self-control, effort, and teamwork which was then maintained across the two-year time period.
414 Conversely, the high-achieving group, or group that entered camp with higher perceptions on all
415 constructs, experienced some fluctuations across the variables and in some cases experienced a
416 decrease in perceptions following the first year of involvement.

417 The trends observed within the cluster identified as 'at-risk' showcase the long-term
418 importance of participation among youth with poorer social skills. For three of the four social
419 skills measured (i.e., self-control, effort, and teamwork), these youth improved during their first

420 camp, maintained growth between summers, and then maintained skills or continued to grow
421 during their second year of participation. This finding is consistent with other research
422 demonstrating the greatest effects of social skills interventions on youth from the most at-risk
423 groups (Beelman et al., 1994). As continued growth during the second year's camp was
424 observed in only one social skill (i.e., effort), it may be beneficial for *LiFEsports* and other sport-
425 based PYD programs to consider differentiating programming for long-term and repeating
426 participants as a way to further enhance their impact.

427 Youth who entered the program with more favorable perceptions, when teased apart, did
428 not grow in social skills and also showed some reductions in skills over the measurement period.
429 Further investigation is needed to understand these patterns, as they might reflect methodological
430 limitations (*e.g.*, ceiling effects, regression to the mean) and/or differences in the experience of
431 and mechanisms affecting these youth.

432 The conclusion that program outcomes differed by cluster resonates with past research
433 suggesting multiple and varied paths to PYD (Fraser-Thomas, Côté, & Deakin, 2005;
434 Anonymous, 2014). Côté and colleagues (2014) demonstrated that different sports impact youth
435 via different mechanisms. Even with a single sport setting, individual experiences and outcomes
436 can vary, for example as a function of staff practices (Riley et al., 2017). Anonymous and
437 colleagues (2014) also found that individual variability in perceptual changes across the course
438 of camp appeared to help explain the lack of significant group-level change. This same pattern
439 was noted in the current study, with no overall group differences noted in self-control or transfer.

440 In general, transfer was the least influenced of the target skills measured in this study.
441 Although transfer is not one of the official SETS emphasized at *LiFEsports*, debriefing activities
442 at camp do encourage the application of skills in other settings outside of camp. The limited

443 change in transfer observed, however, may reveal a need to more explicitly identify transfer as a
444 program goal, as other research has revealed that transfer is not automatic but must be taught
445 (Foster & Bussmann, 2008; Gresham, 1997; Ogilvey, 2006). In fact, a recent review and model
446 of life skills transfer through sport programming reveals that life skills transfer is influenced by
447 personal assets and autobiographical experiences of participants, the learning environment with
448 distinctive demands, program designs, and coach characteristics and strategies, and the transfer
449 context itself (Pierce et al, 2016). Future studies should explore this important issue.

450 **Implications**

451 Results support the importance of sports-based PYD for underserved youth, as scores
452 across the entire sample grew during camp, returned back to pre-camp levels, and then jumped
453 again during the second year of involvement. These findings point the short-term value of
454 programs for promoting social competence. Investments in programs are important for
455 promoting PYD among youth in the summer months. Because favorable perceptions do not
456 sustain over-time for the entire group and there was no growth in transfer, staff implementing
457 programs should consider implementing follow-up booster sessions after camp is over to help
458 sustain learning and promote application. Additionally, findings suggest there are different
459 program effects for at-risk versus high-achieving clusters of youth. More specifically, the at-risk
460 group (i.e., cluster with less favorable scores at Time 1) grew over-time in their perceptions of
461 the various SETS. The high-achieving group's perceptions, however, remained stable (such as
462 with effort) or decreased over-time. These findings have implications for serving more socially
463 competent youth who enter sport-based PYD programs. Staff running programs need to take
464 engage returning youth with different curriculum, ones with lesson plans targeting more
465 advanced social skill development. Strategies may also include designing the programs so that
466 more socially competent youth may be involved as leaders with identified learning goals focused

467 on being mentors and/or role models. In the end, however, the current results demonstrate how
468 the LiFEsports program had the most impact on these vulnerable youth (i.e., the ones who need
469 the program the most).

470 While this study did not measure risk exposure, other research would suggest that youth
471 with poorer social skills often are exposed to greater levels of risk than their peers with higher
472 levels of social skills (Beelman, et al., 1994). In fact, researchers (e.g., Anonymous, 2013;
473 McDonough et al., 2013) have found high levels of social skills among sport-based PYD
474 participants, which may showcase selection effects if indeed youth with greater resources (and
475 more favorable social skills) are more likely to attend. Certainly this necessitates attention from
476 program providers, who may not be reaching the youth who both need and might benefit most
477 from their programs as currently designed.

478 Additionally, broader environmental and family risks experienced by many vulnerable
479 youth also may constrain access to opportunities for PYD. For example, economically
480 disadvantaged neighborhoods are often characterized by structural barriers such as limited
481 physical space and facilities, poor lighting, high crime rates and safety concerns, and inadequate
482 funding (Ainsworth, Wilcox, Thompson, Richter, & Henderson, 2003; Casey, Ripke & Huston,
483 2005; Pedersen & Seidman, 2005). Because of such factors, lower participation rates in
484 traditional sport and sport-based PYD programs are noted among youth from lower income
485 and/or less-educated families (Aspen Institute, 2017) . Although rarely a component of sport-
486 based PYD programs, efforts focused on strengthening communities and their infrastructures,
487 promoting social justice, addressing social and economic inequalities, and fostering
488 empowerment are needed within program designs to address the broader social, political, and
489 economic contexts where these youth live (Coakley, 2016).

490 Limitations

491 This study has limitations which must be weighed when interpreting the findings. For
492 example, this study examined youth enrolled in a single, ‘real-life’ program context with no
493 control or comparison group, and youth self-selected into both the program and the research.
494 Even so, the sample included an often understudied group of youth, and the cluster analyses
495 permitted some degree of comparison among participants. Likewise, selection criteria only
496 included youth with complete data over the four measurement times. Missing data was an issue.
497 As in many youth programs (Hellison & Wright, 2003), retention also was a concern. Further,
498 this study expanded on the traditional pre- and post-study design by considering two years of
499 data for participants. The longitudinal nature of this study, however, also increased the
500 possibility of attrition, as some youth did not return for a second summer or did not have consent
501 for a second year of research. Combining two cohorts allowed for a larger sample size, though
502 also introduces an uncontrolled source of variability in program exposure, as camp is not a
503 controlled environment, constant from year to year. In addition, it was not possible to account
504 for the experiences of the youth during the academic year between camps. An additional possible
505 limitation deals with the changes seen in the two groups across the two summers. It is possible
506 that the changes seen in each group, that is increases in a majority of the skills for the at-risk
507 group and relative stability or slight decreases in the high-achieving group, may be due in part to
508 regression to the mean. As the at-risk group seemed to consistently gain in a majority of the
509 constructs while only slight decreases were seen in the high-achieving group we feel this is
510 unlikely, but the results should be interpreted cautiously until further studies can help understand
511 these changes. Finally, there were some limitations related to the measures. Foremost, the
512 measures relied on youth self-report and did not assess one of the four main skills targeted by

513 LiFE*sports* (i.e., social responsibility). Assessments by significant others such as parents and/or
514 coaching staff may be more objective assessment of skills and competencies, and development of
515 a reliable, valid measure of social responsibility in youth is needed. Additionally, ceiling effects
516 were evident, especially among the youth who entered the program with more favorable
517 perceptions of their skills. Future scale construction work should work to further improve the
518 measures, especially for use within research on youth with more developed social skills.

519 **Conclusions**

520 Implications can be drawn from this study despite its limitations. Foremost, this study
521 adds to a growing body of literature demonstrating that different mechanisms work for different
522 youth within the broad context of sport-based PYD. As the general conclusion that sport-based
523 PYD programs are impactful is consistently upheld, researchers should shift their focus to
524 understanding and leveraging these differential mechanisms. For example, experimental studies
525 with treatment and control conditions are needed to better understand what aspects of program
526 design make a difference and for whom. Qualitative research is also warranted in order to
527 explore how specific groups experience and ascribe meaning to program participation, including
528 youth entering programs with both high and low levels of targeted skills.

529 Even as the mechanisms behind these programs need to be further teased apart, this study
530 affirms that sport-based PYD programs can promote social skills development among youth with
531 otherwise low levels of these skills. Programs should intentionally recruit youth from high risk
532 communities who may lack pro-social opportunities, employ retention strategies to maintain
533 long-term youth involvement; and tailor programming to account for the skill level and past
534 participation of youth. Adopting evidence-based practices such as these will contribute to the

535 ability of sport-based PYD programs to increase protective factors, reduce risk, and generally
536 promote the well-being of youth.

537

538

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