Examining Program Dosage as a Mediator of Youth Outcomes in Sport-Based Positive Youth Development

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Sport for Development - Other (Youth Sport) Friday, June 2, 2017
20-minute oral presentation (including questions) 8:55 AM
Abstract 2017-092 Room: Wilson

Sport-based positive youth development (PYD) programs are intentionally designed to develop sport and social skills, while simultaneously address risk factors found in the individual, social, and environmental systems (Anderson-Butcher et al., 2013; Hartmann, 2003; Petitpas et al., 2005). The organizational effectiveness of sport-based PYD programs for urban youth is especially imperative, as these social settings address the needs of vulnerable youth who often have limited options to engage in prosocial activities. Organizational effectiveness within sport-based PYD evolves from theoretical explanations of the program design, and also incorporates empirical evidence of the relationship between program design and youth outcomes. The quality of youth exposure to the program intervention also is dependent on implementation fidelity and staff practices, as well as the behavioral engagement of the youth. Lack of implementation fidelity has been identified as a limitation in PYD approaches (Gottfredson & Gottfredson, 2002; Hallfors & Godette, 2002; Pausell, Kisker, Love, & Raikes, 2002), and little empirical evidence exist to determine which programmatic mechanisms mediate growth in youth outcomes in sport (Gould & Carson, 2008; Wright & Burton, 2008). A greater understanding of the relationships between program dosage, design features, and outcomes can inform program development, staff training, and future research. Therefore, the purpose of the current study is to examine how program dosage mediates the development of sport and social competencies among youth participating in a sport-based PYD program.

This study investigated a sport-based PYD program housed at a post-secondary institution in the Midwest Region of the United States. The program consisted of a 19-day summer camp, with 15 days of curriculum in which the youth were exposed to 15 hours of play-based social skill instruction, 9 sport-related activities (i.e., basketball, football, etc.), followed by a culminating Olympic Games event. The program is designed based primarily upon social cognitive theory (Bandura, 1971), as youth learn through observation and modeling, and intervention strategies use praise, reinforcement, consequences, and specific, contingent feedback to alter thinking and behavior. Additionally, sport and social competencies are targeted through a three-step process of briefing and teaching the skills using quality instruction and cues, facilitating opportunities to practice the skills and providing reinforcement and feedback, and debriefing the skills learned to support the transfer of learning (Anderson-Butcher et al., 2015; Schoel, Prouty, & Radcliffe, 1998). Other theories inform the program design, including experiential learning theory (Kolb, 1984), the Teaching Personal and Social Responsibility model (Hellison, 2003), and the Sport Education model (Siedentop, 1998).

For the current study, youth were randomly assigned into 24 groups, stratified by age, with a counselor assigned to each group. The study included both staff and youth participants, for which a census sampling technique was employed. The staff sample (N = 52) consisted of 24 counselors, 22 youth sport leaders, and 6 education leaders (100% response rate). The staff demographic reflected 53.8% females and 46.2% males, 63.5% White/Caucasian, 32.7% Black or African American, and 3.8% Multiple Races. The majority of staff were college students, with 84.6% between the ages of 18 and 24 years old. Additionally, 92.3% of staff reported previous high school athletic experience, with 34.6% of staff current collegiate student-athletes. The youth sample included 417 youth, ages 9 to 15 (77.4% response rate). Of the 417 youth, 59% reported a household income at or below the national poverty line (USDHHS, 2014). The youth demographic reflected 62.6% males and 36.9% females, 81.1% Black or African American, 11% Multiple Races, 4.3% White/Caucasian, and 3.6% Some Other Race.
The staff research instrument, developed and pilot tested for the current study, included a total of 33 items within 5 primary sections: demographics (3 items), adherence to program structure (13 items), use of curriculum (4 items), establishment of a caring, mastery goal-oriented climate (7 items), and descriptive questions regarding the session evaluated (6 items). The staff tool, assessing implementation of prescribed staff practices, was completed at the conclusion of each curriculum session (60 sessions total). The youth outcomes measured included the Perceived Social Competence Scale II (5 items; Anderson-Butcher, Amorose, Lower, Riley, Gibson, & Ruch, 2016), modified Multidimensional Sportspersonship Orientation’s Scale’s commitment subscale (5 items; Vallerand, Briere, Blanchard, & Provencher, 1997), Teamwork Scale for Youth (8 items; Lower, Newman, & Anderson-Butcher, 2015), Social Sports Experiences Scale (8 items; Anderson-Butcher, Wade-Mdivanian, Riley, & Davis, 2010), Perceived Athletic Competence (3 items; Amorose, 2002), modified Sense of Belonging Scale (6 items; Anderson-Butcher & Conroy, 2002), modified Psychological Sense of School Membership teacher support subscale (8 items; Goodenow, 1993), and modified Engagement versus Disaffection with Learning behavioral engagement subscale (5 items; Skinner, Kindermann, & Furrer, 2009). Demographic information and attendance were collected as program data. Youth completed measures on the first and last day of intervention.

To establish the internal validity of the scales, a Principal Component Analysis (PCA) was conducted on the developed staff tool, Confirmatory Factor Analysis (CFA) on youth scales measured at pre-test, and a Longitudinal CFA was conducted on established youth scales measured at two time-periods. Reliability of each scale was confirmed through Cronbach’s alpha. Factor scores were calculated and normality examined. Staff data assessing program implementation were matched with the corresponding youth exposed to the program session assessed to enable subsequent analysis. The two-step approach to structural equation modeling (SEM) was employed to examine the relationships between program dosage and outcomes (Kline, 2005). The measurement models tested included: social competence, sport competence, and program dosage. The social competence measurement model consisting of the social competence, effort, teamwork, and self-control observed variables was found a good fit at pre-test \( \chi^2(2) = 7.44, p = .024; \text{NC} = 3.72; \text{RMSEA} = .08; \text{CFI} = .99; \text{GFI} = .99; \text{SRMR} = .02 \) and post-test \( [\chi^2(1) = 0.78, p = .378; \text{NC} = 0.78; \text{RMSEA} < .01; \text{CFI} = 1.00; \text{GFI} = .99; \text{SRMR} < .01] \). The sport competence measurement model was determined saturated, thus a perfect fit at pre-test and post-test \( [\chi^2(0) = 0, p = 1.0] \). Lastly, a two-factor program dosage measurement model consisting of a program implementation latent variable, reflecting adherence to program structure and establishment of a caring, mastery goal-oriented climate, and program engagement latent variable, reflecting behavioral engagement, sense of belonging, and leader support, was found a good fit \( [\chi^2(8) = 11.584, p = .17; \text{NC} = 1.45; \text{RMSEA} = .03; \text{CFI} = .99; \text{GFI} = .99; \text{SRMR} = .03] \). Once the measurement models were established, final SEM models examined social and sport competence separately. More specifically, the SEM models specified program engagement as a mediator of change in social/sport competence and found program implementation to be an antecedent of program engagement. While program engagement was found to be a significant mediator in both models, program implementation was only found a significant predictor of program engagement in the sport competence model. Findings suggest that verbal instruction and experiential learning is critical for developing sport skills, while social skill development may be best learned through observation and live modeling of staff and peers. Overall, the dimensions of program dosage were found to be significant mechanisms of PYD in sport, which will inform future program design and evaluation, staff training, and research. Practical implications and future research will be discussed.