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Tristan L. Wallhead, Alex C. Garn & Carla Vidoni

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Effect of a Sport Education Program on Motivation for Physical Education and Leisure-Time Physical Activity

Tristan L. Wallhead
University of Wyoming

Alex C. Garn
Louisiana State University

Carla Vidoni
University of Louisville

Purpose: The purpose of this study was to examine the effect of a high school sport education curriculum program on students' motivation for physical education and leisure-time physical activity. **Method:** Participants were 568 high school students enrolled in the required physical education programs at 2 schools, 1 taught using sport education and the 2nd using a multiactivity model of instruction. A motivational profile survey, which included student psychological need satisfaction, autonomous motives, perceived effort and enjoyment in physical education, and physical activity intention and behavior, was completed by all participants prior to and at the end of the 2-year physical education program. **Results:** Mixed-model analysis of variance tests revealed that the students in the sport education program reported greater increases in perceived effort and enjoyment of the program compared with the students taught within the multiactivity model. Hierarchical multiple regression analyses showed that these positive affective outcomes were facilitated by the development of more autonomous forms of motivation. Results revealed limited support for the direct transfer of motivation from a sport education program to increases in leisure-time physical activity behavior. **Conclusion:** Sport education facilitates more internalized forms of student motivation in required physical education programs, but without the provision of an appropriately designed extracurricular outlet, the potential of transfer to leisure-time physical activity may not be achieved.

Keywords: autonomous motivation, high school students, physical education

School-based physical education programs have been vaunted as an effective means of positively impacting physical activity behavior during adolescence and later life (Shephard & Trudeau, 2000). This support is premised on evidence that physical education programs reach the vast majority of adolescents and can make a direct and unique contribution to daily physical activity participation

(Morgan, Beighle, & Pangrazi, 2007). Patterns of decline in both enrollment in elective physical education programs (Centers for Disease Control and Prevention [CDC], 2004) and overall levels of daily physical activity (Pate et al., 2005) would suggest that programs are currently failing to motivate many adolescents to adopt more active lifestyles. Recent research has suggested that programs that foster high autonomous motivational profiles in students have a positive influence on their physical activity habits during leisure time (Haerens, Kirk, Cardon, De Bourdeaudhuij, & Vansteenkiste, 2010). Further research is required to examine this proposition and specifically examine the

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Correspondence should be addressed to Tristan L. Wallhead, Division of Kinesiology and Health, University of Wyoming, 113 Corbett Building, Laramie, WY 82071. E-mail: wallhead@uwyo.edu

effects of high school-required physical education programs on students' autonomous motivation in physical education and their subsequent motives to engage in leisure-time physical activity.

Autonomous Motivation

Autonomous, or self-determined, motivation reflects engaging in a behavior because it satisfies personally relevant goals (Deci & Ryan, 2000). Deci and Ryan (2000) posit that autonomous motivation lies on a continuum subdivided into three overarching categories: intrinsic, extrinsic, and amotivation. The highest form of autonomous motivation is intrinsic motivation, which represents behavioral engagement with no external contingency or reinforcement, either real or perceived. Individuals intrinsically motivated to perform an activity will participate in that activity spontaneously and without any overt contingencies (Deci & Ryan, 1985). Alongside intrinsic motivation lie three forms of extrinsic motivation: identified regulation, introjected regulation, and external regulation (Deci & Ryan, 2000). Identified regulation is a motivational construct that lies adjacent to intrinsic motivation and represents the most autonomous form of external regulation. This form of motivation reflects engaging in a behavior because it satisfies a personally relevant goal—for example, choosing to be physically active to be healthy. Introjected regulation reflects participating in a behavior to avoid negative affective states like shame, such as participating in physical education to avoid feelings of guilt toward a teacher. Introjected regulation may also be classified as fostering autonomous motivation as there is a slight level of internalization (Nicholls, 1984). Adjacent to introjected regulation is external regulation, which reflects the prototypical form of extrinsic motivation. External regulation reflects engaging in behaviors due to external reinforcement such as rewards or praise or through the avoidance of negative reinforcements such as punishment. Located at the opposite extreme to intrinsic motivation on the continuum, amotivation is the lack of desire to engage in or participate within a specific setting.

The form of autonomous motivation adopted within a context or activity is dependent on the satisfaction of the three basic and universal psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 2000). Autonomy refers to the basic need to experience one's behavior as volitional. Competence refers to the feeling of experiencing mastery in the physical domain. Relatedness is defined as having a connection with peers who are deemed significant to the student (Deci & Ryan, 2000). To the extent that the behaviors and activities fulfill the goals to satisfy those needs, individuals will experience higher forms of autonomous motives, which results in greater positive outcomes such as enjoyment of physical education (Haerens et al., 2010) and intention to participate in physical activity

(Ntoumanis, 2005). Students may prioritize one or a combination of needs as influential for their motivation so no single need can be deemed more beneficial than another. Therefore, providing students with a physical education program that supports all three psychosocial needs has been proposed to be a critical antecedent for more autonomous forms of motivation (Vallerand, 2001).

High School Physical Education Programs

In the United States, many compulsory secondary physical education programs operate within a multiactivity model of instruction (Ennis, 1999). This model of instruction, if delivered appropriately, is a teacher-centered approach to teaching games and physical activities in which direct styles of instruction are primarily employed and students participate in a logical and progressive series of practices and small-sided and parent games (Curtner-Smith, 2001). It is premised on the philosophy that exposing students to a variety of sports or physical activities will enable them to find one in which they are interested to help promote a lifetime of physical activity.

Unfortunately, evidence from research in urban schools in the United States has suggested that the multiactivity model has not always been implemented effectively (Curtner-Smith & Sofo, 2010; Ennis, 1999). Units of instruction are overly shortened, little instruction or game feedback is provided by teachers, students are not held accountable for learning, and little connection is made between experiences in physical education and extracurricular opportunities (Ennis, 1999). The resultant outcome of these practices has been the marginalization of subgroups of students, particularly girls and lower-skilled boys (e.g., Hastie, 2003). This program experience may serve to undermine students' psychological needs for autonomy, competence, and relatedness and thus may be problematic in fostering autonomous motivation for physical education. An alternative secondary sport-based curriculum and instructional model, which has received a lot of attention in the past two decades, is sport education (Siedentop, Hastie, & van der Mars, 2011).

Sport education is designed "to provide more authentic, educationally rich sport experiences for girls and boys in the context of school physical education" (Siedentop, 1994, p. 3). To achieve this "authenticity of experience," Siedentop (1994) integrated six key features of institutionalized sport within the model. These features included *affiliation*, *seasons*, *formal competition*, *recordkeeping*, *festivity*, and *culminating events*. Units of work are extended to reflect more similarities with a youth sport *season*. The *team affiliation* concept of youth sport is also replicated with students remaining on the same team for the duration of the season. The season is phased around levels of *formal competition*, with early lessons focused on preseason preparations including team management and game

practices and latter lessons devoted to game play. *Recordkeeping* is embedded within the season with points kept for team game scores, fair play, and team management. These points are promoted to develop a sense of *festivity* and contribute toward a *culminating event*. As the season progresses, the teacher shifts from using more direct teaching styles to student-centered pedagogies as responsibility is diverted to students through the use of roles such as coach, trainer, equipment manager, or referee. Through these features, Siedentop (1994) posited that sport education could “educate students to be players in the fullest sense and to help them develop as competent, literate and enthusiastic sportspeople” (p. 4).

Sport Education and Motivation

Throughout the sport education literature, a common theme of student engagement in the model has emerged (Hastie, Martínez, & Calderón, 2011). This high level of behavioral engagement within sport education has also been manifest in positive affective outcomes, including increased student perceptions of interest and enjoyment (Hastie & Sinelnikov, 2006; Perlman, 2010; Wallhead & Ntoumanis, 2004). Recent theoretical propositions have suggested that these positive affective consequences are facilitated by structural aspects of sport education, which move students along the autonomous motivation continuum through support for relatedness, competence, and autonomy (Perlman & Goc Karp, 2010). Recent evidence has suggested that sport education is most efficacious in satisfying students’ psychological need for relatedness (Perlman, 2011) and competence (Spittle & Byrne, 2009). Although encouraging, the design of these motivational studies remains limited in both scope and longevity. From a scope perspective, previous motivational research using sport education has failed to pursue a transformative agenda (Penney, Clarke, & Kinchin, 2002). In other words, assessed student motivational outcomes have been limited to the confines of the curricular context and have been devoid of an overt connection to students’ motives for leisure-time physical activity participation. The consequences of this overt connection between curricular motivation and leisure-time physical activity have increasing value within contemporary health-related discourse of the role of physical education in promoting youth physical activity. Initial evidence suggests that sport education has the potential to facilitate a positive transfer of autonomous motivation in physical education to a school-based extracurricular context, which facilitates active participation in physical activity (Wallhead, Hagger, & Smith, 2010). Further research is required to validate this relationship, specifically with older adolescents, who are close to a new life stage transition to either work or college and often have more volition in their choices to be physically (in)active.

In common with the predominance of sport pedagogy motivation research, the sport education literature has also been limited by its deficiencies in design longevity. Much of the discussion of the attractiveness of sport education has been based on reflections of data from students’ experiences with one or two seasons of sport education. Little is currently understood of the potential changes that may occur in students’ motivation for physical education/physical activity after more prolonged participation in a sport education curricular program. Siedentop (1994), in one of his original goals for the model, eluded to these longer-term participation outcomes: “I do not pretend that a one semester Sport Education experience in the 10th grade is going to have any far reaching implications for our collective life. On the other hand, I would be most distressed if students who experienced Sport Education repeatedly over several years of schooling were not somehow changed in ways that eventually impact on the larger sport culture” (p. 9). Perlman and Goc Karp (2010) reflected on this concern through a motivational lens and suggested that “longitudinal studies are needed to examine the concerns of model novelty and ability of students to maintain and/or enhance internalization of the model” (p. 415). More recent studies are beginning to address this dearth in knowledge. Through the use of autobiographical accounts, Sinelnikov and Hastie (2010) found that students who participated in multiple seasons of sport education internalized features of affiliation, authentic competition, and perceived learning beyond initial exposure to the model.

This study was designed to address these concerns and to examine the effect of a 2-year compulsory high school sport education program on student motivation for physical education and leisure-time physical activity. Specifically, the purposes of this study were to: (a) examine the effect of a high school-required program taught using sport education on students’ perceived effort and enjoyment in physical education, physical activity intentions, and leisure-time physical activity; and (b) explore the relationships these affective outcomes had with changes in students’ perceived autonomy, relatedness, competence, and autonomous motivation.

METHODS

Setting and Participants

Participants in the study were 568 high school students from two high schools, Romulus ($n = 281$) and Remus ($n = 287$; pseudonyms), in the Midwestern United States. The two high schools were selected based on similar location and student demographics. Participants at both high schools consisted of adolescents from predominantly middle- to high-income households, with only 20% of the student population eligible for receiving free lunch. The average age

of the participants was 14.75 years ($SD = 0.48$). There were slightly more girls ($n = 310$) than boys ($n = 258$) and the representation of ethnic-minority students within each school ranged from 20% to 30%, which was reflective of the community in which each school was located. All participants were enrolled in the required physical education program at each school site. These programs required the successful completion of two semesters of sport-based physical education for graduation. Each semester of physical education included the equivalent of 45-min daily lessons of physical education organized within a block schedule. This block schedule often included double (90-min) lessons, which occurred either twice or three times per week.

Sport Education Program

The Romulus high school required program included four 25-lesson seasons of team sports-based activity taught using the sport education model. Specific seasons included floor hockey, volleyball, team handball, and basketball. Average class size was 30 students per teacher, but classes were often combined within the seven teaching periods to produce larger groups ($n = 60$ – 80) with a lead teacher and a coteacher facilitating the sport education seasons across multiple gymnasiums. The lead teacher at Romulus high school had 8 years of teaching experience at the school and had taught the required physical education program using sport education throughout that period. Unit plans for all sport education seasons were designed by the lead teacher with each unit following a recognized format for sport education (Hastie, 2000). The format of each unit was very similar across the program with the early stages dedicated to team selection and role responsibilities, skills practices, and tactics and the latter lessons being committed to scrimmage and formal game-play situations (Hastie, 2000). Lessons 1 and 2 of each season focused on team management. Across all seasons, the student coaches were responsible for team selection with the intent that teams would persist for a single season and then change for subsequent seasons. This team selection process was flexible within the early phases of each season with the teacher helping student coaches adjust teams based on any attendance issues that arose. Student role responsibilities used across all seasons included coach, referee, and scorer. The teacher selected the coach for the first season of the program and other roles were self-selected by team members. In all subsequent seasons, students were responsible for the selection of team roles, with repetition of roles permitted across seasons. Following the initial management phase, each season followed a protocol of teacher-directed skill development (Lessons 3 through 6), a preseason coach-directed phase (Lessons 7 through 13), and a formal tournament and postseason culminating event (Lessons 14 through 25). The preseason phase (Lessons 7 through 13) was designed primarily for students to fulfill

their roles in their teams to develop content knowledge and refine performance within peer-teaching instructional tasks and game scrimmage. Inter-team game play predominated within the formal tournament phase (Lessons 14 through 25) of the season. More than 300 peers attended the culminating event and postseason game playoffs.

To evaluate sport education model fidelity, a sample season (team handball) was videotaped and the sport education benchmark observational instrument (Ko, Wallhead, & Ward, 2006) was used to code teacher pedagogical behaviors. The benchmark checklist included the five structural features of sport education—namely, “season,” “affiliation,” “responsibility,” “formal competition,” and “recordkeeping” (Siedentop, 1994, p. 4). Within these features, specific teacher behaviors were identified that were judged to sufficiently reflect a pedagogy that emphasized each of the core principles. Analysis revealed 100% compliance with season, affiliation, formal competition, and culminating event benchmarks. For the responsibility structural feature, analysis revealed a 50% benchmark congruency. This incongruence was explained by the teacher incorporating student duty roles but failing to provide coaching task cards and a consistent accountability for role performance. Although revealing some lack of fidelity with the benchmarks of “responsibility” delineated by Ko et al. (2006), these pedagogical behaviors are nonprescriptive and were a function of the logistics of large class sizes operating within the program. The reliability of benchmark identification was obtained through a peer debrief of sample lessons. Interobserver agreement was found to be .92 for the coding of sport education benchmarks across lessons.

Multiactivity Program

The Remus high school program was organized into shorter units where students were exposed to a greater breadth of sport-based activities including volleyball, badminton, team handball, soccer, basketball, Ultimate Frisbee, and cooperative games. Average class size was 30 students per teacher, but classes were sometimes combined to produce larger groups ($n = 60$), with a lead teacher and a coteacher facilitating lessons. Units of instruction varied in duration from four- to nine-block lessons. Lesson observations revealed a common lesson format of 20 min to 25 min of teacher-directed warm-up and fitness activities, 15 min to 20 min of skill development, and 30 min of scrimmage game play. As units progressed, more lesson time was devoted to tournament game play and less time was devoted to skill development. Specific instructions were provided by the teacher for fitness activities and skill practices; however, feedback during game play was limited and students were not generally made accountable for game performance. The Remus physical education program represents a version of the multiactivity model that is highly indicative of how

sports-based content is traditionally presented to high school students in the United States.

Procedures

Permission to conduct the study was obtained from the university's institutional review board. Consent for data collection procedures was provided by the school principal and teachers, while assent was granted by the students prior to data collection. The study utilized a nonequivalent control-group design (Thomas, Nelson, & Silverman, 2011), which signifies that the groups of students at each school site may be nonequivalent prior to intervention due to some systematic difference between the two schools. Participants completed the survey at the beginning of their 9th-grade year prior to the start of the required physical education program and at the end of their 10th-grade year upon completion. The dependent variables on this survey were student psychological need satisfaction, autonomous motives, perceived effort and enjoyment in physical education, and physical activity intention and leisure-time physical activity behavior. Data collection occurred during a 2-year period as this time was required for all students to complete their required two semesters of physical education. Survey data were collected by a research assistant in quiet conditions and students were isolated from each other so that they could not copy or discuss responses. Students were assigned a confidential code such that survey responses could be matched from preprogram to postprogram intervention. Survey attrition rates from preintervention to postintervention were 17% and 19% for the Romulus and Remus high schools, respectively.

Motivational Profile Survey Measures

Autonomous Motivation

Type of autonomous motivation was assessed using the Perceived Locus of Causality Questionnaire presented by Goudas, Biddle, and Fox (1994). This questionnaire includes an adaptation for physical education of the Academic Self-Regulation Questionnaire, which measures intrinsic motivation, external regulation, introjected regulation, and identified regulation in physical education (Ryan & Connell, 1989). Amotivation was assessed using the Amotivation subscale of the Academic Motivation Scale adapted for physical education (Goudas et al., 1994). Participants were presented with the question, "Why do you take part in physical education?" followed by 22 reasons—5 from each intrinsic motivation (e.g., "because [physical education] is fun") and external regulation (e.g., "because important others want me to do [physical education]"), and 4 from each of the other regulation styles, including identified regulation (e.g., "because I value [physical education]"), introjected regulation (e.g., "because I will feel ashamed if I

do not do [physical education]"), and amotivation (e.g., "but I can't see what I'm getting out of physical education"). Responses were measured on 7-point scales ranging from 1 ("not at all true") to 7 ("very true"). A relative autonomy index (RAI) was calculated to determine the overall level of autonomous motivation for each student (Wilson, Sabiston, Mack, & Blanchard, 2012). The following equation was used to determine the RAI: $([3 \times \text{Intrinsic Motivation}] + [2 \times \text{Identified Regulation}] + [-1 \times \text{Introjected Regulation}] + [-2 \times \text{External Regulation}] + [-3 \times \text{Amotivation}])$. High positive RAI scores represent greater feelings of autonomous motivation, while low negative scores equate to greater feelings of controlled or amotivation. Past research with high school-aged students has demonstrated the instrument to be valid and reliable (Ntoumanis, 2005).

Psychological Needs

The Basic Psychological Needs Scale adapted for physical education (Ntoumanis, 2005) was used to measure autonomy (four items) and relatedness (six items). Example items for autonomy included, "I am free to express my ideas and opinions in physical education," and for relatedness, "I get along with students in physical education." To assess perceived competence, five items were taken from a version of the Intrinsic Motivation Inventory reworded for use in physical education settings by McAuley, Duncan, and Tammien (1989). Sample items included, "I am pretty skilled at physical education" and "I am satisfied with my performance in physical education." All items were measured on 7-point scales ranging from 1 ("not at all true") to 7 ("very true"). Past research with secondary-aged students has demonstrated the three subscales to be valid and reliable with this age group (Ntoumanis, 2005).

Effort and Enjoyment

Perceived effort and enjoyment were assessed with two subscales again taken from a version of the Intrinsic Motivation Inventory and reworded for use in physical education settings by McAuley et al. (1989). Sample items for enjoyment included, "I enjoy participating in physical education very much" and "I put a lot of effort into physical education classes" for the Perceived Effort subscale. Each item was answered on a 7-point scale ranging from "not at all true" (1) to "very true" (7). Prior research has demonstrated adequate validity and reliability of the subscales when utilized with adolescents within physical education (Goudas et al., 1994).

Physical Activity

The Physical Activity Intention Scale followed Ajzen's (2003) guidelines and contained two items (e.g., "I intend to do active sports and/or vigorous exercise, for at least 20 min, 3 days per week during my free time, over the next 4

TABLE 1
Pearson Correlations and Descriptive Statistics of Variables at Pretest (T1) and Posttest (T2)

	Variable	1	2	3	4	5	6	7	8
1	Autonomy	—	.56	.39	.55	.49	.45	.29	.10
2	Competence	.61	—	.42	.63	.66	.61	.49	.14
3	Relatedness	.45	.39	—	.46	.36	.28	.23	.02
4	RAI	.59	.65	.45	—	.76	.67	.38	.12
5	Enjoyment	.59	.71	.39	.83	—	.80	.45	.17
6	Effort	.49	.60	.33	.69	.73	—	.34	.12
7	PA Intentions	.41	.58	.33	.48	.51	.47	—	.30
8	Leisure PA	.29	.51	.28	.32	.42	.32	.75	—
	T1 Mean	4.44	5.18	5.12	1.31	4.34	4.98	5.12	3.87
	T1 SD	1.18	1.37	1.07	11.52	1.77	1.50	1.84	1.62
	T1 α	.70	.90	.76	—	.95	.89	.95	—
	T2 Mean	4.49	5.41	5.28	1.45	4.57	4.58	5.25	4.12
	T2 SD	1.36	1.33	1.12	11.48	1.37	1.37	1.80	1.56
	T2 α	.75	.88	.69	—	.82	.71	.95	—

Note. Correlations for Time 1 (T1) are presented below the diagonal; correlations for Time 2 (T2) are presented above the diagonal. RAI = relative autonomy index; PA = physical activity; SD = standard deviation; α = internal reliability estimate. See the interpretations of the correlations in the Results section.

weeks”) on 7-point scales anchored by 1 (“strongly agree”) to 7 (“strongly disagree”). Self-reported leisure-time physical activity behavior was assessed using an adapted version of Godin and Shephard’s (1985) Leisure-Time Exercise Questionnaire (LTEQ). Participants rated their weekly behavioral frequency on a single item: “In the course of the past 7 days, outside of physical education class, how often have you participated in active sports and/or vigorous exercise lasting more than 20 min at a time?”) using a 6-point Likert scale with scale endpoints of “not at all” (1) to “most days of the week” (6). The LTEQ exhibits satisfactory validity and reliability statistics when administered concurrently with more “objective” behavioral measures (e.g., Jacobs, Ainsworth, Hartman, & Leon, 1993).

Data Analyses

Data were initially screened for outliers (i.e., z scores $-3/+3$) and distribution characteristics (i.e., skewness, kurtosis). Findings revealed that factors at Time 1 (T1) and Time 2 (T2) showcased distribution trends that were approximately normal. Descriptive statistics and Pearson correlations for variables at T1 and T2 were calculated. Paired-sample t tests were used to examine possible mean differences across schools at T1. Perceived enjoyment in physical education, perceived effort in physical education, physical activity intentions, and leisure-time physical activity were the outcome variables. Possible mean differences between groups and across time (i.e., interactions) were examined using 2 (group: sport education, multiactivity) $\times$ 2 (time: pretest, posttest) mixed-model analysis of variance (ANOVA) tests with the four outcome variables. To reduce the potential for family-wise error, all mixed-model ANOVAs were tested at an alpha level of .0125 (0.05/4). Follow-up univariate tests using the

Greenhouse-Geisser criterion were used to explore and interpret significant interactions.

Hierarchical multiple regression analyses were implemented to examine possible mechanisms of change in the outcome variables of the sport education group. Specifically, changes in students’ need satisfaction of autonomy, competence, and relatedness (Block 1) and autonomous motivation (RAI; Block 2) from T1 to T2 (i.e., residual gain scores) were used to predict the outcome variables at T2. Residual gain scores were created by using each T1 variable to predict the same variable at T2 (e.g., RAI at T1 predicts RAI at T2). In self-determination theory, satisfaction of autonomy, competence, and relatedness and autonomous motivation are theorized as facilitators of psychological and behavioral change in the physical domain (Deci & Ryan, 2000).

RESULTS

Descriptive Statistics and Pearson Correlations

Descriptive statistics, Pearson correlations, and internal reliability estimates for all variables at T1 and T2 are reported in Table 1. All variables had mean scores above the midpoint of their respective scale. The pattern of Pearson correlations revealed, in general, weak to moderate positive relationships among variables. A nonsignificant correlation between relatedness and leisure-time physical activity at T2 was the one exception. Weak correlations (.20 or less), although statistically significant, may be a reflection of sample size and hold limited practical significance. It should be noted that a simplex pattern of relationships was present across the different types of motivation (Vallerand, 2001). In other words, types of motivation adjacent to one another

TABLE 2
Means and Standard Deviations of Outcome Variables
by Group Across Time

Variable	Sport Education		Multiactivity	
	<i>M (SD) T1</i>	<i>M (SD) T2</i>	<i>M (SD) T1</i>	<i>M (SD) T2</i>
Enjoyment ^a	4.16 (1.83)	4.66 (1.80)	4.51 (1.69)	4.48 (1.11)
Effort ^a	4.88 (1.53)	4.86 (1.59)	5.08 (1.46)	4.30 (1.06)
PA Intentions	4.73 (1.91)	5.00 (1.93)	5.48 (1.70)	5.49 (1.65)
LTPA	3.62 (1.51)	4.02 (1.61)	4.11 (1.67)	4.17 (1.52)

Note. *M* = mean; *SD* = standard deviation; T1 = Time 1; T2 = Time 2; PA = physical activity; LTPA = leisure-time physical activity. Sport education (*n* = 261); multiactivity (*n* = 277).

^aDenotes statistically significant Group $\times$ Time interaction.

on the continuum had stronger positive relationships (e.g., intrinsic motivation and identified regulation, $r = .79$) than did nonadjacent types of motivation (e.g., intrinsic motivation and introjected regulation, $r = .41$). Similarly, types of motivation on opposite ends of the continuum were negatively related (i.e., intrinsic motivation and amotivation, $r = -.62$). Internal reliability estimates were all greater than .70, except relatedness at T2 (.69).

Mean Comparisons

Results of paired-samples *t* tests revealed that students in the multiactivity group reported higher levels of self-reported enjoyment, $t(565) = -2.30$, $p < .05$, $d = -0.19$, physical activity intentions, $t(545) = -4.53$, $p < .01$, $d = -0.41$, and leisure-time physical activity, $t(543) = -3.67$, $p < .01$, $d = -0.30$, than did students in the sport education group at T1. Mean scores and standard deviations by group and time are presented in Table 2.

Assumption tests for the mixed-model ANOVAs suggested minor violations of homogeneity of variance in some cases. Therefore, Pillai's Trace tests were used because of their robust nature under this circumstance (Tabachnick & Fidell, 2013). Significant interaction effects were present for enjoyment, $F(1, 564) = 17.78$, $p < .01$, $\eta^2 = .03$, and perceived effort, $F(1, 562) = 42.46$, $p < .01$, $\eta^2 = .07$, in physical education. Students in the sport education group reported an increase in enjoyment in physical education, while students in the multiactivity group stayed relatively stable. In terms of self-reported effort in physical education, students in the sport education group remained stable over time, while students in the multiactivity group reported declines.

There was no interaction for physical activity intentions (Pillai's Trace = .01), $F(1, 536) = 3.12$, $p = .08$, or leisure-time physical activity (Pillai's Trace = .01), $F(1, 536) = 4.45$, $p = .04$, although results did border on significance. In both cases, trends suggested small increases over time in physical activity intentions and leisure-time

TABLE 3
Hierarchical Multiple Regression Analysis With Sport
Education Group

	Enjoyment		Effort		PA Intentions		LTPA	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Block 1	.29		.25		.09		.01	
Δ Autonomy		.24		.11		.14		.07
Δ Competence		.31		.33		.17		.09
Δ Relatedness		.16		.20		.07		.04
Block 2	.15		.16		.02		.01	
Δ RAI		.46		.47		.17		.11
Total R^2	.44		.41		.11		.02	

Note. Δ = residual gain score from Time 1 to Time 2; RAI = relative autonomy index; PA = physical activity; LTPA = leisure-time physical activity. Sport Education (*n* = 261). See the interpretations of significant β values in the Results section.

physical activity for the sport education group, while these factors remained stable over time for the multiactivity group.

Hierarchical Multiple Linear Regression

A series of four hierarchical multiple linear regression analyses was used to better understand potential factors related to students' experiences in sport education (*n* = 261). Prior to analyses, multicollinearity was determined to be acceptable based on tolerance (0.69–0.84) and variance inflation factor (1.19–1.43) values (Cohen, Cohen, West, & Aiken, 2003). Results of the regression models are presented in Table 3. For reports of enjoyment in physical education at T2 (total $R^2 = .44$), positive changes in autonomy ($\beta = .24$), competence ($\beta = .31$), and relatedness ($\beta = .16$) were all predictors ($R^2 = .29$). Positive change in autonomous motivation (RAI) was also a predictor of T2 enjoyment ($\beta = .46$, $R^2 = .15$). For reports of effort in physical education at T2 (total $R^2 = .41$), changes in competence ($\beta = .33$) and relatedness ($\beta = .20$) were predictors accounting for a quarter of the overall variance ($R^2 = .25$). Change in RAI ($\beta = .47$, $R^2 = .16$) was also a predictor of effort. For reports of intentions for physical activity at T2 (total $R^2 = .11$), changes in autonomy ($\beta = .14$) and competence ($\beta = .17$) were weak predictors and accounted for a small amount of variance ($R^2 = .09$). Finally, changes in need satisfaction variables and RAI in physical education did not predict leisure-time physical activity at T2.

DISCUSSION

The purpose of this study was to examine the effect of a high school sport education program on students' motivation for physical education and leisure-time physical activity. The results of this study revealed that the students in the sport

education program reported greater increases in enjoyment of the required physical education program than did the students taught within the multiactivity model. These results are consistent with the findings of several previous studies that have reported increases in students' enjoyment of physical education after participating in sport education (e.g., Perlman, 2010; Wallhead & Ntoumanis, 2004). This affective outcome remains pertinent to the contemporary health-related discourse of the role of physical education in promoting youth physical activity. Previous evidence has shown that enjoyment of physical education class is a robust predictor of physical activity in older adolescents (Sallis, Prochaska, & Taylor, 2000). Findings from this study confirm that high school students completing a required sport-based physical education program find sport education more enjoyable than do students completing a more traditional multiactivity modality of instruction.

A second positive motivational outcome of this study was the maintenance of students' perceived in-class effort across multiple experiences of sport education. In contrast, the students in the multiactivity model of instruction reported a significant decline in perceived in-class effort as their program evolved. Using an ecological framework, Hastie (2000) suggested that students within sport education are motivated to engage as the structural features facilitate a positive program of action. This program of action is driven by "inherent content-embedded accountability" (p. 369) where role responsibility fulfillment and games "count" toward a season outcome and "students tend to take seriously only that work for which they are held accountable" (p. 370). The findings of this study lend some support to this proposition as students maintained their level of in-class perceived effort throughout the program. This finding also highlights some of the challenges faced with the continued utilization of a multiactivity model of instruction, where accountability for student performance and learning are minimized (Ennis, 1999). Despite the fact that the curriculum was required for graduation, it would seem that students enrolled in the multiactivity model were able to negotiate the demands of this curriculum with a minimal level of perceived effort. The fact that these physical activity experiences come at a critical juncture between required and elective physical education programming remains a concern and may provide some insight into the continuing pattern of decline in elective high school physical education enrollment (CDC, 2004).

Findings from this study provide further evidence that the positive affective outcomes of the sport education program were facilitated by the development of autonomous motivation. Postprogram regression analyses revealed that increases in autonomous motivation significantly predicted sport education students' perceived effort and enjoyment of the program. Perlman and Goc Karp (2010) have suggested that the movement along the autonomous motivation continuum in sport education is a function of various

structural components of the model satisfying the students' psychological need for relatedness, competence, and autonomy. Results of this study add further support to validate this claim. Positive change in all three psychological constructs explained a significant amount of variance in students' perceived enjoyment, and a positive change in perceived competence and relatedness predicted students' perceived effort in the sport education program. The variance in these prediction values would suggest that students experiencing prolonged exposure to sport education differentially prioritize one or a combination of these needs as influential for their autonomous motivation and subsequent positive affective responses. Perlman (2011) recently provided evidence that increases in students' perceptions of relatedness are the mechanism for positive changes in autonomous motivation and the assertion that sport education provides an environment that allows for positive social connections between peers and teacher. Results of this study lend support to this claim and also highlight that autonomy support may be an important yet underutilized facet of the model. To foster more internalized student motivation, future iterations of sport education could include more overt use of autonomy-support teaching behaviors that consistently prioritize students' levels of choice and control within tasks.

A key thesis of this study was the examination of the influence of the sport education program on students' self-reported leisure-time physical activity intentions and behavior. This outcome is important as contemporary discourse on the role of physical education in promoting youth physical activity shifts beyond the confines of curricular space and into the mechanisms of transfer to leisure-time physical activity contexts. From a theoretical standpoint, this transfer of motivation is premised on Vallerand's (2001) hierarchical model of motivation, which suggests that there is cross-contextual interplay within motivation at the contextual level, suggesting that motives in one context can affect motivation in others. For example, if an individual exhibits a high level of autonomous motivation in an educational context, such as physical education, this may also influence the formation of an autonomous motivational orientation in another related context outside of school, such as leisure-time physical activity.

Findings of this study provide limited support for the assertion that there is cross-contextual interplay between positive change in motivation from a sport education program and increases in adolescent leisure-time physical activity motives and behavior. The results revealed small increases over time in physical activity intentions and leisure-time physical activity for the sport education group, while these factors remained stable over time for the multiactivity model group. Explanations for this lack of transfer may reside within both theoretical and/or curricular lenses of interpretation. From a theoretical standpoint, the low proportion of variance in leisure-time physical activity

behavior explained by students' autonomous motivation and need satisfaction in physical education highlights the complexity of predicting this behavior. Contemporary multidimensional motivational theories, such as the transcontextual model of motivation (Hagger, Chatzisarantis, & Harris, 2006), have provided empirical support to the proposition that autonomous motivation needs to be channeled into intentions for the appropriate need-satisfying behavior to be enacted. This channeling of intention requires the formation of more proximal determinants of behavior such as attitudes, subjective norms, and perceived behavioral control. For example, a student may develop the intention to engage in a community volleyball club after a motivating sport education volleyball experience; however, if the club is perceived to be too competitive or too expensive, these perceived behavioral control threats will override the intended change in behavior. The resultant outcome is that positive changes in motivation in physical education may act as an informative precursor involved in the formation of judgments and expectations regarding future leisure-time behavior; however, their direct relationship may be difficult to discern.

Curricular connection issues may begin to explain the small change in physical activity intention and the lack of transfer of motivation from sport education to a leisure-time context. Penney et al. (2002) suggested that to achieve "real" or sustainable connections demands action that embraces and engages with agencies beyond the curriculum. Students who are developing into competent, literate, and enthusiastic participants must be provided with an outlet to activate their skills; otherwise, we may be "setting children up for rejection and failure as they attempt to move from their school-based Sport Education experiences to the 'real world of adult sport'" (Penney et al., 2002, p. 61). Previous research using the transcontextual model of motivation has suggested that for transfer to occur, this outlet should be similar in context and activity type (Wallhead et al., 2010). The seasons students experienced within the sport education program were a combination of traditional (basketball and volleyball) and nontraditional (team handball and floor hockey) invasion games. Although extracurricular opportunities for participation in basketball and volleyball were available within both the school varsity and local community settings, both of these outlets were competitive and relatively elitist. For many students, these opportunities may have represented the "real world of adult sport" and are not a reflection of their experiences in the sport education program. In addition, the provision of an extracurricular outlet for participation in the nontraditional games of team handball or floor hockey was generally not available. The resultant outcome was that students were left devoid of an outlet to activate their motives and skills beyond the confines of the curriculum program. It is, perhaps, not surprising that motivation from an effectively delivered team sport-based physical education program did not translate into

increases in leisure-time physical activity. To elicit transfer of motivation from physical education to leisure-time contexts, teachers must be proactive in providing innovation not only within the confines of lesson time, but also within the larger curricular space of the school day.

This study is not without its limitations. First, changes in student motivation were aggregated across the course of the whole curriculum program. It is possible that different types of activities (e.g., cooperative games vs. team sports vs. individual sports) may have elicited temporal fluctuations in student motivation for physical education/physical activity that were not effectively captured within this type of research design. Second, the iteration of the model presented at Romulus high school, although consistent across seasons, may not have utilized pedagogies that maximize autonomy support. Sport education is by no means prescriptive in its implementation, and teacher pedagogies need to focus on relinquishing teacher control to students through the use of autonomy-support strategies. Perlman (2012) has recently suggested that this is possible within sport education; however, teachers must be proactive in fostering this instructional environment within the constraints of a highly structured model. Third, the self-report, single-item physical activity measures utilized in this study may not have been sufficiently sensitive to detect any changes in leisure-time physical activity behavior. Future studies should attempt to validate any changes in physical activity behavior with the concurrent use of more objective measures of leisure time physical activity (Trost, 2001).

WHAT DOES THIS ARTICLE ADD?

The present study contributes to the extant literature on the effect of sport education on student motivation in physical education in three main ways: (a) It provides evidence that longitudinal exposure to sport education within a high school-required program elicits positive student affective outcomes including increased perceived effort and enjoyment; (b) it demonstrates that these positive affective outcomes are explained by features of sport education satisfying students' basic psychological needs for relatedness and competence and moving the students toward more autonomous forms of motivation; and (c) it highlights the challenges that high school curriculum designers face in adopting a transformative agenda and pursuing the goal of translating increased motivation in physical education into leisure-time physical activity intentions and behavior. Designing a required high school physical education program around the structural features of sport education, by itself, seems insufficient to foster increased motives for leisure-time physical activity. Without the provision of an appropriately designed extracurricular outlet, the potential for transformation may not manifest. Further research is required to validate this claim.

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