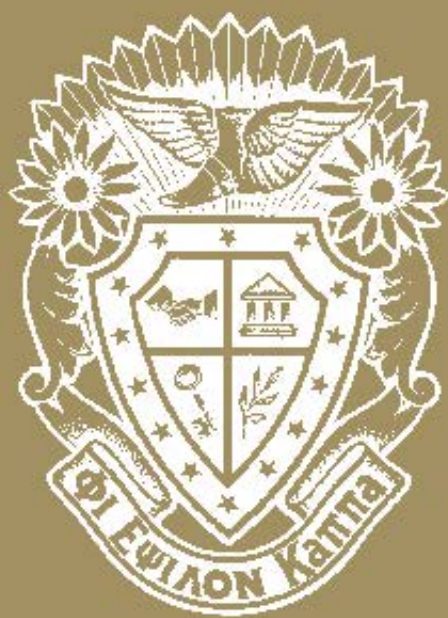


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## ADAPTED PHYSICAL EDUCATION

# Curricular Approaches Used by Adapted PE Teachers

Tacara Lovings, Steven Prewitt,  
Hester Henderson, Timothy Brusseau

## Abstract

*Within adapted physical education (APE), there is a lack of knowledge regarding content and attitudes toward curricular domains, which can influence student learning. This study assessed APE teachers' attitudes toward four curricular domains. Participants ( $n = 219$ ) completed a modified version of the Attitudes Toward Curriculum in Physical Education inventory. Results indicated that the importance of all domains, but higher for social development and physical activity. Understanding the content taught in APE will help teacher educators create programs that will provide preservice teachers with the content knowledge and pedagogy skills to meet the needs of their students.*

The Office of Special Education and Rehabilitative Services (2009) reported that over 3 million students in the United States receive adapted physical education (APE) services each year. This translates to an estimated 56,000 adapted physical educators delivering services to those students (Zhang et al., 2000). Because both APE and general physical education have not been considered “core” subjects, they traditionally have experienced more flexibility in the determination and delivery of curriculum compared to other sub-

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jects (Kulinna et al., 2010). There has also been a lack of knowledge regarding the content of APE instruction, as well as how this curriculum has been determined. Research has shown that the majority of APE teachers deliver instruction based upon their own belief system (Pajares, 1992), spending the majority of time engaged in motor skill development and physical activity and fitness activities (Jewett, 1989). However, this is not always true. Chandler and Greene (1995) reported that although educators have traditionally placed a higher value on motor skill development, it was ranked third in their investigation. Traditionally, students in an APE class receive content within the five curricular areas of physical education as defined in the Individuals With Disabilities Education Act (2004), which defines what is considered appropriate content and curriculum. With a current push to increase physical activity levels of all individuals (Centers for Disease Control and Prevention, 2013), there still is a question of what content should be taught during APE classes (“Should the Main,” 2003).

Pajares (1992) stated that a person’s beliefs can be assumed to influence their decisions and behavior. Preservice educators’ beliefs have been observed to originate in several sources: (a) their K–12 physical education experience, (b) early field experiences, (c) reflections on past experiences and field experiences, and (d) their ability to reflectively and cognitively organize physical education subject matter (Kulinna et al., 2010; Kulinna & Silverman, 2000; Matanin & Collier, 2003). Behets (2001) further suggested that these preservice beliefs do not change significantly over the individual’s career. Researchers have also found that a teacher’s attitude and orientation toward specific topics and activities in physical education have the ability to influence students’ physical activity levels and overall physical literacy (Pajares, 1992; Starc & Strel, 2012).

Curriculum for physical education has been noted to involve several interrelated factors. Generally speaking, curriculum development is placed into the hands of the educators. Ennis (1992) reported that teachers’ attitudes toward the different curricular domains influenced the outcome goals they created for their classes. Ennis continued to state that most physical educators have a repertoire of teaching methods (learned during preservice coursework) and values that may shift depending on the teaching situation. This

fluid concept of what should be taught lends to the lack of research in the literature regarding curriculum for APE.

With a wide range of job duties, experiences, and qualifications, it has been difficult to research exactly what an adapted physical educator teaches during the day. Therefore, the primary purpose of this study was to determine what content was taught in an APE class and to determine the attitudes of APE teachers toward what should be taught. A secondary purpose of this study was to generate a snapshot of the typical APE teacher as well as explore potential relationships between years of experience, type of student taught, and attitudes toward curricular domains.

## Method

### Participants

All public school districts with a minimum enrollment of 15,000 students were recruited from across the United States. For states that did not meet this requirement, the largest school district in that state was selected to participate. Emails requesting email addresses of the district's adapted physical educators were sent to the districts' special education administrators. Special education administrators were asked to reply to the email if they did not employ adapted physical educators in their district.

Initial participants ( $n = 416$ ) were recruited from 557 school districts across the United States. Of these, 219 surveys were completed (52.6%) with participants representing 33 states. Participants ranged in age from 23 years to 61 years and over ( $M = 44.34 \pm 17.31$ ) with the majority of respondents being female ( $n = 162$ ). This investigation was voluntary in nature and posed no threat to participants. Table 1 provides more demographic results. The Institutional Review Board for the university found this investigation to be exempt.

### Instrument

The survey used for this study combined Kulinna and Silverman's (2000) tool to measure teachers' attitude toward physical activity and fitness and Kulinna et al.'s (2010) assessment to measure preservice teachers' belief systems. This 36-item inventory used a 5-point Likert-type scale with 1 being *extremely important* to 5 being *not important*. Questions were divided into nine sets of items. Reliability

**Table 1**  
*Participant Demographic Information*

<b>Demographic information</b>	<b><i>n</i></b>	<b>%</b>
Grade level taught <sup>a</sup>		
Preschool	79	33
Elementary	206	87
Middle school	187	79
High school	177	75
Setting of school district <sup>a</sup>		
Suburban	148	57
Urban	76	29
Rural	49	19
Level of education		
Bachelor's	72	31
Master's	150	65
PhD	7	3
Years of experience		
0–4	38	16
5–10	71	31
11 or more	121	53

<sup>a</sup> More than one response possible.

and validity have been shown to be within normal levels (Kulinna & Silverman, 2000). A separate pilot study further evaluated the validity of the modified instrument. Participants ( $n = 20$ ) indicated that the survey was clear and easy to understand. Minor changes were suggested and incorporated. Reliability for each domain was calculated and determined to be appropriate: physical activity and fitness ( $\alpha = .82$ ), self-actualization ( $\alpha = .85$ ), motor skill development ( $\alpha = .86$ ), and social development ( $\alpha = .79$ ).

### **Protocol**

A two-phase approach was used for participant recruitment. Phase 1 identified 557 school districts from all 50 states that reported

at least 15,000 students enrolled. Special education administrators in those school districts were contacted for the email addresses of their APE teacher(s). From these contacts, 261 surveys were sent to the adapted physical educators via Qualtrics. Participants were sent weekly reminders to complete surveys. Phase 2 used a mailing list of adapted physical educators, resulting in 150 additional surveys sent for a total of 416 surveys sent to adapted physical educators throughout the United States.

### **Statistical Analysis**

Data were organized and analyzed using SPSS 20. Overall domain scores were calculated and compared using one-way repeated-measures testing. Multivariate testing, with Bonferroni adjustments if needed, established ranking of domains. One-way analysis of variance (ANOVA) determined significant differences in domain scores, years of experience, and levels of certification for educators teaching students with mild or moderate disabilities. Significance was set at  $p < 0.05$ .

## **Results**

### **Curriculum**

Because of the varied approaches of adapted physical educators, it was important to investigate curriculum being delivered in APE classes. In Section 1 of the survey, participants put in rank order the curricular areas they spent the most time engaged in. Results from this section show movement education, health-related fitness, sensory-motor integration, and lifetime leisure as the top responses (Table 2).

### **Domains**

The second section and third section of the survey allowed participants to rate the four curricular domains relative of teaching students with mild or moderate disabilities and severe disabilities, respectively. Both groups ranked the four domains similarly (Table 3). There were no significant differences between the rankings of the domains according to educators who taught students with mild or moderate disabilities.

**Table 2**  
*Ranking of Time Spent in Curricular Areas*

<b>Curricular area</b>	<b><i>M</i></b>
Movement education	3.66
Health-related fitness	4.40
Sensory-motor integration	4.65
Lifetime leisure	4.93
Sport skills	5.08
Individual and group games	5.08
Social development	5.84
Traditional games	6.66
Self-actualization	7.13
Dance	8.94
Aquatics	9.59

*Note.* The lower the value, the more time reported spent in that curricular area.

**Table 3**  
*Rankings of Curricular Domains*

<b>Domain</b>	<b>Mild or moderate disabilities</b>	
	<b>(<i>M</i><sup>a</sup> ± <i>SD</i>)</b>	<b>Severe disabilities</b>
	<b>(<i>M</i><sup>a</sup> ± <i>SD</i>)</b>	<b>(<i>M</i><sup>a</sup> ± <i>SD</i>)</b>
Social development	4.15 ± 0.53	3.98 ± 0.67*
Physical activity & fitness	4.13 ± 0.56*	3.67 ± 0.91*
Self-actualization	3.85 ± 0.68*	3.55 ± 0.83*
Motor skill development	3.76 ± 0.67*	3.10 ± 0.97*

<sup>a</sup>Higher value represents higher importance.

\* $p < 0.001$ .

The results showed significant differences in mean domain scores within the mild or moderate disability group,  $F(3, 216) = 58.26$ ,  $p < 0.001$ . A Bonferroni adjustment revealed significant differences ( $p < 0.001$ ) between physical activity and self-actualization, physical activity and fitness and motor skill development, self-actualization

and social development, and motor skill development and social development. There were also significant differences within the severe group,  $F(3, 181) = 74.40, p < 0.001$ . Again, a Bonferroni adjustment revealed significant differences in all combinations except for physical activity and fitness and self-actualization.

A third purpose of this study was to examine potential relationships between experience levels and whether the APE teacher was teaching students with mild or moderate disabilities and severe disabilities and the teacher's curricular beliefs. Overall domain scores for mild or moderate disabilities associated with years of experience appear in Table 4.

**Table 4**  
*Domain Scores for Mild or Moderate Disabilities by Experience*

<b>Domain</b>	<b>Low experience</b>	<b>Moderate experience</b>
Physical activity and fitness	37.08	36.42
Self-actualization	35.44*	32.98*
Motor skill development	35.42	33.25
Social development	38.28*	36.27*

\* $p < 0.05$ .

Differences were observed between those with little experience (0–4 years) and those with moderate experience (5–10) in regard to self-actualization,  $t(216) = 2.32, p = 0.021$ , and social development,  $t(216) = 2.43, p = 0.016$ , suggesting that teachers with little experience viewed teaching these curricular areas as more important than their more experienced counterparts did.

Investigation into the ranking of the curricular domains by those who taught students with severe disabilities revealed significant differences in the domain of physical activity and fitness,  $F(2, 181) = 3.084, p = 0.048$ . Further investigation showed that the difference lies between those with moderate experience and those with high experience,  $t(181) = 2.26, p = 0.025$ . These results suggest that those with 11 or more years of experience place more importance on physical activity and fitness than do those who have 5–10 years of experience.

## Demographics

Two hundred nineteen participants completed the entire survey. Table 1 shows demographic data collected. Through the survey, it was discovered that 50% of the school districts required some additional training or certification to be hired for an APE position. As depicted in the data, 114 participants noted that special training was a district requirement to be employed as an adapted physical educator. Of the 142 responses that indicated types of special training, 39% reported that their district required an APE certification. Of the 230 participants, 143 reported that they held a state-level endorsement, certification, or license, and 113 adapted physical educators reported being a Certified Adapted Physical Educator.

## Discussion

This study investigated what physical education content was being taught, the attitudes of adapted physical education teachers pertaining to curricular domains and their importance, and if years of teaching experience and level of certification affected attitudes toward curricular outcomes.

The results of the study provide an idea of what adapted physical educators may place as the highest importance for APE curriculum. Although from a potentially small representation of APE teachers across the United States, the data show that APE educators focus on the social development and the physical activity and fitness of their students. Kulinna and Silverman (2000) noted that educators might value all orientations and that one may emerge as a dominant value orientation at a given time.

## Physical Activity and Fitness

Similar to educators in other studies, adapted physical educators in this study reported high importance for all of the domains, including placing the highest importance on the physical activity and fitness domain. The field of physical education as a whole is trending in the direction of placing physical activity and fitness as an integral component in the foundation of physical education curriculum. Physical activity and fitness are seen as integral areas of physical education, especially since governmental agencies and national organizations have declared physical education as one of the best places

for students to satisfy their recommended amount of daily physical activity (Centers for Disease Control and Prevention, 2013; Kulinna & Silverman, 2000). For adapted physical educators, physical activity and fitness were rated highly across all levels of disability, certification, and years of experience. Yet the only real difference in attitude toward physical activity and fitness was between adapted physical educators with 5–10 years of experience and adapted physical educators with 11 or more years of experience.

### **Self-Actualization**

Self-actualization has been noted to be a natural by-product of success in physical education. Adapted physical educators have mentioned that those two domains tend to go hand in hand within the physical education environment (“Should the Main,” 2003). When a student is successful, self-esteem, self-efficacy, and self-concept increase, which raises the question, which came first, success or increases in self-esteem, self-efficacy, or self-concept? The aforementioned position statement questions why is there a need to choose self-esteem or motor skill development as a primary focus for their physical education class. It suggested that both domains should be considered primary domains, and both domains should be the focus of APE because a desired outcome of APE is student success in physical education, as are increases in student self-esteem and self-concept for physical activities. By its nature, APE tends to feature the development of self-esteem paired with motor skill development because increased self-concept and self-esteem within the physical environment will increase the likelihood that the students will be more physically active outside of the school environment.

### **Motor Skill Development**

Another discussion point within physical education is the balance of motor skill development and physical activity and fitness as primary objectives within physical education. Historically, physical education has been dominated by content and curriculum focus in these two areas (Jewett, 1989). Traditionally, motor skill development has been the foundation of physical education. As reported in the data from this study, participants rated motor skill development as third and, in some cases, fourth in terms of importance. These results agree with other studies of preservice and in-service

physical educators who rated motor skill development as the third most important domain in their respective studies (Kulinna et al., 2010; Kulinna & Silverman, 2000).

Interestingly, although participants in this study ranked motor skill development as third or fourth in terms of importance, they also reported that motor skill development was the physical education domain in which they spent most of their instructional time. Chandler and Greene (1995) found vastly different results in their study. Participants of that study reported spending 28% of their instructional time in motor skill development, ranking it the third domain out of five in terms of reported percentage of instructional time spent in that area. Adapted physical educators in this investigation demonstrated a disconnect between their belief system and their actions toward teaching motor skill development based on their reported time spent in motor skill development. Motor skill development had an average rank of 3.66 out of the 11 curricular areas, making it the highest ranked curricular area for adapted physical educators. Further research should be done to answer this question and to discover the amount of actual time spent and emphasis on physical activity and fitness and motor skill development in adapted physical education classes and to determine the correlation between time spent and the educators' reported belief system. Similar to physical activity and fitness, the selection of curriculum content is affected by many factors (Kulinna et al., 2000). Somewhere in the process of APE teachers selecting and delivering curriculum content for their belief system, interrelated factors may cause them to continue focusing on motor skill development despite what they may think is important for physical education.

### **Social Development**

When teaching students with mild and/or moderate disabilities, participants in this study ranked social development as the second most important domain after physical activity and fitness. Others have reported different results. Kulinna and Silverman (2000) stated that physical educators reported social development as the fourth most important physical education domain. Similar results have been reported with preservice physical educators (Kulinna et al., 2010). It has been reported that 1 in 68 children are diagnosed with autism spectrum disorder (Baio et al., 2014). With this increase,

the number of children with autism spectrum disorder in adapted physical education has risen as well. Autism as defined by law is a developmental disability that significantly affects verbal and nonverbal communication and social interaction (Individuals With Disabilities Education Act, 2004). Students with autism who are nonvocal may have difficulties expressing enjoyment, frustration, and comprehension of physical education content, as well as have difficulties comprehending traditional physical education direct instruction. Similar to a barrier between a teacher and a student who is an English language learner, a barrier between the student with autism and the teacher will require the teacher to modify and adapt this instruction to provide instruction to this student. The social needs for students with autism may explain the amount of importance that these adapted physical educators placed on this domain.

### **Years of Teaching Experience**

Results from this study showed that novice teachers of students with mild and/or moderate disabilities and minimal experience placed significantly more importance on self-actualization and social development than did teachers with moderate teaching experience who teach students with mild and/or moderate disabilities. For teachers who work with students with severe disabilities, results showed those with 11 or more years of experience placed significantly more importance on physical activity and fitness than did teachers with moderate experience. Novice teachers, on the other hand, might see all domains as important and equal objectives for physical education; they may also see basic classroom management as a much more important objective (Kulinna & Silverman, 2000). A teacher with more teaching experience, rooted in their belief system and having a firm grasp on classroom management, may shift their belief system to the foundations of physical education.

### **Conclusion**

Obtaining a snapshot into the field of APE allows the field to know itself better. The demographics gathered in this investigation provide a better idea of the “traditional” APE teacher. With this information, recommendations can be made to better prepare preservice general physical educators and adapted physical educators. Full preparation programs create better, more efficient teachers (Darling-Hammond,

2000). Instructing preservice adapted physical educators on how to represent all domains of physical education within their early lesson plan writing experiences will help to build and maintain the habit of focusing on all or some of the domains. This will also help to limit “rolling out the ball” and teaching only one physical education content area. Learning from practicing APE teachers can help preservice educators prepare for their future job duties. It is obvious that current adapted physical educators place importance on all domains and at most times they might be doing a combination of two, three, or even four domains at one time. Preservice adapted physical educators must be prepared for the multifaceted and individualized nature of the current job responsibilities to contribute to the field and be effective right away.

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## ATHLETICS

# Examination of Social Influence Toward Need Satisfaction of High School Student-Athletes

Michael Fraina, Donna Pastore,  
Dawn Anderson-Butcher, Tarkington Newman

## Abstract

*This study explored the independent and interactive effects of coach and peer influence on psychological need satisfaction (i.e., autonomy, competence, relatedness) among high school student-athletes from urban communities. Male and female student-athletes participating in high school sport ( $n = 136$ ) completed a paper-pencil survey related to their perceptions of autonomy, competence, and relatedness, and the degree of social support received from their coaches and peers. Three hierarchical regression analyses for each psychological need were conducted. The greatest amount of variability in autonomy was predicted by coach autonomy support ( $R^2$  change = .275). The set of demographic variables (i.e., gender, race/ethnicity, socioeconomic status, type of sport) predicted the greatest amount of variability in competence ( $R^2$  change = .184). The largest amount of variability in relatedness was predicted by peer relatedness support ( $R^2$  change = .181). Among the three models, only relatedness was significantly predicted by the interaction of coach relatedness support and peer relatedness support ( $R^2$  change = .037,  $p = .003$ ). This study sheds light on independent*

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*and interactive relationships among coaches and peers and their connections to need satisfaction.*

Within the United States, high school sport programs are designed to enrich the educational experience; encourage academic achievement; promote integrity, respect, and sportsmanship; and encourage enjoyment (National Federation of State High School Associations, 2016). Sport, which has become a popular developmental activity, involves “organized, recreational, and skillful physical activity that has an element of competition” (Anderson-Butcher, 2011, pp. 2835–2836). A recent systematic review revealed that adolescent sport participation promotes psychological (e.g., life satisfaction, self-control, self-esteem) and social (e.g., sportsmanship, teamwork) outcomes (Eime et al., 2013). Participation in high school sport may be particularly beneficial for adolescents living in urban communities. Notably, Riley and Anderson-Butcher (2012) reported that sport participants from urban communities realized the largest gains in social development indicators. Sport can seemingly provide a beneficial social context for adolescents from urban communities, offering an environment that can counteract some of their increased risk factors. Therefore, it seems beneficial to garner a fuller understanding and improve conditions for those in urban communities.

However, despite empirical evidence supporting the value of high school sport participation, the psychological and social benefits of participating in sport are not frequently realized. Several factors may contribute to the benefits of participation in sport not being reached. Many youth do not participate and/or continue their involvement into the adolescent years. For instance, Nache et al. (2005) observed that sport dropout rates among high school athletes approach 35% annually. Nationally, from 2007 to 2011, adolescent participation rates in wrestling, cheerleading, and touch football decreased between 26.8% and 40% (Sporting Goods Manufacturers Association, 2011). Brownson et al. (2005) reported that the percentage of physically inactive adolescents rose from 24.3% to 38.9% over the course of their high school career. Troiano et al. (2008) observed that only 8% of adolescents in the United States met the recommendation of 60 min/day of physical activity provided by the Centers for Disease Control and Prevention. Meanwhile, the rate of youth who met the

exercising recommendation was 42% (Troiano et al., 2008). Based on these statistics, the amount of individuals who exercise 60 min/day dropped by approximately 34% from youth to adolescence. Therefore, it is reasonable to surmise that the large population of adolescents who are discontinuing sport participation are not reaping the documented benefits.

A more concerning consequence is that lack of sport participation and physical activity may manifest in other negative occurrences. Physical activity has often been replaced by sedentary behaviors. Kann et al. (2016) determined that 24.7% of adolescents watch a minimum of 3 hr of recreational television daily. Furthermore, national obesity rates among the adolescent population have risen from 10.5% to 20.6% between 1988 and 2014 (Ogden et al., 2016). Obesity rates are increasing more rapidly among adolescents than any other demographic (Ogden et al., 2016). Based on these findings, high school students commonly fail to reap the benefits of sport participation.

In addition to systematic risk factors such as poverty and exposure to neighborhood violence, adolescents from urban communities face escalated challenges that often limit their engagement in sport. According to the Youth Risk Behavior Surveillance System, sport participation is lowest among adolescents from minority populations in urban communities (Centers for Disease Control and Prevention, 2016). Whereas 37.6% of White high school student-athletes did not play on at least one sports team in 2016, this percentage was higher among Black (42.4%) and Hispanic (51.5%) individuals. Holt et al. (2011) found that the most common barriers to sport participation among parents and high school students from lower income neighborhoods were time management, scheduling demands, and financial barriers. Parents especially identified that the weight of the financial barriers increased as their children progressed to more competitive environments.

In recent decades, scholars and practitioners have sought to identify factors that promote and diminish high school sport participation. A key strategies that studies have used to understand sport participation and dropout rates is the assessment of athletes' levels and types of motivation toward the activity. Self-determination theory (SDT; Deci & Ryan, 2000) has emerged as a widely utilized

theory toward examination of sport-based motivation. SDT suggests that motivation toward an activity exists along a continuum involving amotivation, extrinsic motivation, and intrinsic motivation (Deci & Ryan, 2000). Amotivation refers to a lack of motivation toward a particular activity, in which the participant is susceptible to discontinuing involvement (Deci & Ryan, 2000). Extrinsic motivation is the completion of an activity due to an external locus of control (e.g., pressure, pursuit of rewards; Deci & Ryan, 2000). Intrinsic motivation refers to participation in an activity due to genuine enjoyment of the pursuit (Deci & Ryan, 2000). The essential hypothesis of SDT is that intrinsic motivation is most positively correlated with positive physical and psychological outcomes. Since 2002, 47 studies have employed the theoretical framework of SDT within the domain of sport and recreation. However, a limited amount of studies (e.g., Amorose et al., 2016; Riley & Smith, 2011) have studied the topic solely with a sample of high school student-athletes in the United States.

Research adopting SDT to measure motivation in the context of sport has consistently shown support for the theory. Gucciardi and Jackson (2013) observed that high school and college athletes' levels of intrinsic motivation were associated with continued sport participation. Additionally, Amorose et al. (2009) reported a positive correlation between intrinsic motivation and well-being among female club volleyball players aged 13 to 18. Conversely, Sarrazin et al. (2002) detected that adolescent handball players who perceived a profile of amotivation were less persistent toward sport participation.

To more specifically measure psychological need satisfaction, Deci and Ryan (2000) also crafted basic psychological needs theory (BPNT). As a subtheory of SDT, BPNT purports that an individual's placement on the motivational continuum is determined by satisfaction of the basic psychological needs of autonomy, competence, and relatedness. Autonomy involves a person's ability to act of their own volition (Deci & Ryan, 2000). The theory classifies competence as "a propensity to have an effect on the environment as well as to attain valued outcomes within it" (Deci & Ryan, 2000, p. 231). It explains relatedness as "the desire to feel connected to others" (Deci & Ryan, 2000, p. 231). Studies related to sport have supported the

tenets of BPNT, similar to the overall theory of SDT. Mack et al. (2011) determined that perceived satisfaction of the needs for autonomy, competence, and relatedness promoted well-being among college volleyball players. Autonomy has also been associated with increased sportspersonship and diminished antisocial attitudes in a sample of club sport participants (Ntoumanis & Standage, 2009).

Commonly, scholars have employed SDT and/or BPNT to examine the influence of key social agents (i.e., parents/caregivers, coaches, peers) on athletes' levels of motivation. Research has indicated that influence from parents/caregivers (e.g., Fredricks & Eccles, 2005), coaches (e.g., Amorose & Anderson-Butcher, 2007), and peers (e.g., Jõesaar et al., 2012) is the foremost indicator of motivation among adolescent athletes. The following paragraph offers research conclusions related to the influence of these three social agents toward athletes' levels of psychological need satisfaction.

A variety of research initiatives have uncovered the influence of parents. Fredricks and Eccles (2005) observed that parents' perceptions of their child's athletic competence were significantly correlated with the athlete's competence beliefs. Additionally, need support from parents has been correlated with vitality, positive affect, self-esteem, performance self-concept, and skill self-concept (Felton & Jowett, 2013). Other studies have focused on the outcomes attributed to coach influence. High school and college athletes' perceptions of autonomy, competence, and relatedness were significantly predicted by coach autonomy support (Amorose & Anderson-Butcher, 2007). Furthermore, need support from coaches has been linked to increased intrinsic motivation (Sheldon & Watson, 2011) and reduced fear of failure (Coatsworth & Conroy, 2009). Scholars have also explored the influence of peers. Jõesaar et al. (2012) discerned that 362 high school-aged athletes in club sports associated positive peer motivational climates with intrinsic motivation. Additionally, Gucciardi and Jackson (2013) noted that psychological need support from peers is associated with future sport participation.

Recently, research has also begun to examine the influence of the interaction of key social agents. For example, Amorose et al. (2016) observed the three-way interaction of coach autonomy support, mother autonomy support, and father autonomy support. The interaction of these key social agents was significant toward male

and female high school student-athletes' levels of need satisfaction. Additionally, Ullrich-French and Smith (2009) investigated the influence of the interaction among mother relationship quality, peer acceptance, and friendship quality among travel soccer players. The interaction of these key social agents significantly predicted athletes' levels of motivation. The Riley and Smith (2011) study did not detect a significant interaction among athlete-coach relationship, peer acceptance, positive friendship quality for high school basketball players in the Midwestern United States. The majority of participants in the Riley and Smith study (89%) were White and were younger (between 12 and 15) than participants in this study. The other difference in this study is the focus on autonomy, competence, and relatedness rather than acceptance and friendship quality. These research initiatives demonstrate the value of incorporating the exploration of both independent effects and interactive effects of support received from multiple social sources.

However, although the aforementioned studies have uncovered great detail into the process of sport socialization, few attempts have measured the interactive effects of multiple sources of social influence. Moreover, only two studies (i.e., Amorose et al., 2016; Riley & Smith, 2011) have examined motivation among interscholastic student-athletes in the United States. Also, as articulated by Riley and Anderson-Butcher (2012), examination of need satisfaction in the context of athletics has rarely extended to urban communities. In summary, the three foremost gaps of literature that remain are research involving measurement of interaction among several sources of social influence, motivation of high school student-athletes in the United States, and sport experiences of athletes from urban communities.

Research has illustrated that key social agents, especially coaches, peers, and parents, are influential toward need satisfaction of athletes. Although studies have attempted to measure the independent examples of one of these social agents, few have explored the interactive effects of multiple social agents. Also, many of these studies have failed to incorporate a diverse sample population and have rarely addressed the venue of high school athletics. Therefore, utilizing the theoretical framework of BPNT, this study measured the

(a) independent effects and (b) interactive effects of coach and peer influence toward need satisfaction of high school student-athletes in urban communities. Four research questions guided this study:

1. What are overall perceptions of psychological need satisfaction (i.e., autonomy, competence, relatedness) among high school student-athletes from urban communities?
2. What are the (a) main effects and (b) interactive effects of coach autonomy support and peer autonomy support toward perceived autonomy among high school student-athletes from urban communities?
3. What are the (a) main effects and (b) interactive effects of coach competence support and peer competence support toward perceived competence among high school student-athletes from urban communities?
4. What are the (a) main effects and (b) interactive effects of coach relatedness support and peer relatedness support toward perceived relatedness among high school student-athletes from urban communities?

## Method

### Procedures

Our university institutional review board (IRB) granted approval for this study. Following IRB approval, through a convenience sample, Michael Fraina contacted via email 38 district coordinators representing high schools in urban locations in the Midwestern United States. Five district coordinators offered approval for the study within their school districts. Thereafter, school principals and athletic directors at each affiliated institution were asked to participate in the study. An initial email was sent to all principals and athletic directors, and one follow-up phone call was completed to each athletic director who did not respond. The study was conducted only at locations in which the principal and athletic director signed a written document of approval. In total, eight sets of principals and athletic directors consented for willing athletic teams to participate. Once the principal had signed the letter of approval, the school's athletic director provided Fraina with a list of sport coaches.

Fraina then contacted via email the head coaches for all teams within approved high schools to explain the study and request participation. Data collection dates were scheduled with coaches who offered verbal approval for study involvement among their athletes. At an initial meeting, during a regularly scheduled practice session, assent and parental consent forms were distributed. At a future date, all necessary forms were collected and participants with proper documentation completed the study. In total, 144 high school student-athletes across eight institutions completed the survey. Survey completion lasted between 15 and 20 min, during which coaches left the survey area.

### Participants

Although 144 student-athletes completed the survey, there was missing data from eight participants. On the basis of the minimal percentage of missing data, the listwise deletion method (Cohen et al., 2003) was utilized. This resulted in the elimination of the eight participants who had missing data. As such, the final sample for the study was 136 participants, which included high school student-athletes from urban communities in the Midwestern United States. According to the U.S. Census, urban areas maintain higher levels of poverty. Approximately 16% of residents in urban communities live below the poverty level, nearly 3 percentage points higher than in rural areas. Furthermore, 42 states held higher rates of poverty in urban locations than rural areas (U.S. Census Bureau, 2017). Each of the high schools recruited for the study was categorized as being located in an urban area. The sample consisted of male ( $n = 102$ ) and female ( $n = 34$ ) student-athletes from a variety of individual sports (i.e., cross country, track and field, golf) and team sports (i.e., football, lacrosse, soccer, basketball, baseball, softball, volleyball, field hockey, cheerleading). All student-athletes actively participating in a spring sport through their high school were eligible to complete the study. The largest amount ( $n = 102$ ) of participants self-identified as White/Caucasian, followed by 22 Black/African American, 10 mixed race, 1 Hispanic, and 1 Native American. In terms of socioeconomic status, 93 paid full price for lunch, 29 were enrolled in the free or reduced lunch program, and 14 were unsure of their status.

## Measures

### *Independent Variables*

**Coach and Peer Autonomy Support.** The perceived level of autonomy support received from both coaches and peers was assessed via the six-item version of the Sport Climate Questionnaire (SCQ). Although the author(s) of the SCQ were not identifiable, the scale is available on <https://selfdeterminationtheory.org/pas-sport-climate/>. The initial form of the scale refers to the social agent as “physical education (PE) teacher.” In this study, all references of “PE teacher” were modified to either “coach” or “peer.” Response options to the SCQ included a 7-point Likert scale, in which higher responses corresponded with greater perceptions of autonomy support from coaches and peers. Sample items for the coach autonomy support scale included (a) “I feel that my coach provides me choices and options” and (b) “I feel understood by my coach.” Related to peer autonomy support, items included (a) “I feel that my peers provide me choices and options” and (b) “My peers convey confidence in my ability to do well in athletics.” The Cronbach’s alpha level of the SCQ was .928, indicating an acceptable level of reliability.

**Coach and Peer Competence Support.** Participants’ perceptions of the level of competence support provided by coaches and peers were measured through the four-item need support scale developed by Standage et al. (2005). As the scale was designed to measure competence support provided by the PE teacher, all references of “PE teacher” were replaced with either “coach” or “peer.” Higher responses on the aforementioned need support scale, measured through a 7-point Likert scale, indicate greater perceptions of competence support received from coaches and peers. Within the coach competence support scale, sample items included (a) “My coach helps me improve at sports” and (b) “My coach makes me feel like I am good at sports.” Sample items for peer competence support included (a) “My peers help me improve at sports” and (b) “I feel that my peers like me to do well at sports.” The Cronbach’s alpha level of the Standage et al. (2005) competence support scale was .923, demonstrating an acceptable level of reliability.

**Coach and Peer Relatedness Support.** Similarly, perceived coach relatedness support and peer relatedness support were measured through Standage et al.’s (2005) need support scale. Each scale

contained five items. As the scale was originally intended to measure relatedness support received from PE teachers, this terminology was changed to “coach” or “peer.” For each 7-point Likert scale developed in the need support scale (Standage et al., 2005), elevated responses illustrated higher perceptions of relatedness support received from coaches and peers. Sample items pertaining to coach relatedness support included (a) “My coach supports me playing sports” and (b) “My coach encourages me to work with others when playing sports.” In terms of peer relatedness support, items included (a) “My peers support me playing sports” and (b) “My peers have respect for me.” Standage et al.’s (2005) relatedness support scale generated a Cronbach’s alpha level of .925, indicating an acceptable level of reliability.

### *Demographic Variables*

Four demographic variables were measured through the survey. Participants indicated whether they were male or female. Six options were provided for race/ethnicity: White/Caucasian, Black/African American, Hispanic, Asian/Pacific Islander, Native American, or Mixed Race. Student-athletes identified whether they received free or reduced lunch or they were unsure. The final demographic variable was type of sport, for which respondents indicated the sports in which they participated. Classification of the type of sport (i.e., individual, team) was consistent with the approach adopted by Hutchinson (2014). Cross country running, track and field, and golf were coded as individual sports, whereas team sports consisted of football, lacrosse, soccer, basketball, baseball, softball, volleyball, field hockey, and cheerleading.

### *Dependent Variables*

**Psychological Need Satisfaction (Autonomy, Competence, Relatedness).** Student-athletes’ perceptions of autonomy, competence, and relatedness constituted the three dependent variables and were assessed through subscales of the 15-item Basic Needs Satisfaction in Sport Scale (BNSSS; Ng et al., 2011). In the Ng et al. (2011) study, the alpha coefficients of autonomy, competence, and relatedness were .83, .87, and .80, respectively. Each psychological need (i.e., autonomy, competence, relatedness) was measured through a five-item subscale. All 15 items from the BNSSS were

evaluated through a 7-point Likert scale, on which higher responses indicated enhanced perceptions of need satisfaction. Examples of autonomy measures included (a) “In my sport, I get opportunities to make choices” and (b) “In my sport, I have a say in how things are done.” Sample competence items included (a) “I can overcome challenges in my sport” and (b) “I am skilled at my sport.” Relatedness was evaluated through items such as (a) “In my sport, I feel close to other people” and (b) “I show concern for others in my sport.” The method of calculation for each variable was the sum of scores method, in which the possible score for each subscale ranged from 5 to 35. In this study, the Cronbach’s alpha levels for autonomy, competence, and relatedness were .915, .916, and .907, respectively.

### **Data Analyses**

Data were inputted via IBM SPSS version 21. Prior to data analysis, we accounted for missing data and tested for necessary assumptions. The listwise deletion approach toward missing data, as recommended by Cohen et al. (2003), resulted in elimination of eight cases. Statistical tests for the assumptions of independence, homogeneity of variance, linearity, normality, and multicollinearity were conducted. It appeared that there were no violations of these assumptions.

The preliminary research question, investigating student-athletes’ perceptions of psychological need satisfaction, were tested through descriptive statistics. The main analyses, examining the influence of coaches and peers toward student-athletes’ perceptions of need satisfaction, were measured through three hierarchical regression analyses. The demographic variables (i.e., gender, race/ethnicity, socioeconomic status, type of sport) were entered at Block 1 in each analysis related to autonomy, competence, and relatedness. At Block 2, the independent effects of either coach autonomy support, coach competence support, or coach relatedness support were entered to predict their related psychological need. The independent effects of (a) peer autonomy support, (b) peer competence support, and (c) peer relatedness support were added at Block 3 to determine student-athletes’ perceptions of (a) autonomy, (b) competence, and (c) relatedness. The interaction effects (Coach × Peer Influence) were entered at Block 4 to predict student-athletes’ levels of autonomy, competence, or relatedness. Based on the recommendations of

Aiken and West (1991), all predictor variables were centered and the interaction terms were calculated as a product of the centered variables.

## Results

### Psychological Need Satisfaction

The first research question was designed to investigate athletes' perceptions of psychological need satisfaction. The extent to which athletes perceived their psychological needs to be satisfied was measured through mean scores of autonomy, competence, and relatedness; item ranges; standard deviation rates; and variable correlations. Table 1 shows these descriptive statistics. The purpose of assessing these values was to determine whether this population of high school athletes maintained high levels of need satisfaction. On the basis of the mean scores, athletes generally held high perceptions of autonomy, competence, and relatedness. Among levels of need satisfaction, perceived relatedness slightly exceeded competence and strongly rated above autonomy. Specifically, each variable allowed for ranges between 5 and 35, with the mean scores of relatedness, competence, and autonomy being 30.30, 29.65, and 24.70, respectively.

**Table 1**  
*Descriptive Statistics (N = 136)*

Variable	Range	<i>M</i>	<i>SD</i>
Autonomy	5–35	24.70	7.01
Competence	5–35	29.65	4.89
Relatedness	5–35	30.30	4.77
Coach Autonomy Support	6–42	31.96	8.15
Coach Competence Support	4–28	23.68	5.15
Coach Relatedness Support	5–35	30.12	6.01
Peer Autonomy Support	6–42	32.95	6.74
Peer Competence Support	4–28	23.29	4.31
Peer Relatedness Support	5–35	29.85	4.97
Valid <i>N</i> (listwise)			

*Note.* The final sample size was determined following the listwise deletion approach to address missing data (Peugh & Enders, 2004).

Table 2 provides correlations among variables. Satisfaction among all psychological needs (i.e., autonomy, competence, relatedness) was positively related. All measures of need support from coaches and peers were positively correlated with need satisfaction. The strongest positive correlations were between autonomy and coach autonomy support ( $r = .66$ ) and between relatedness and peer competence support ( $r = .66$ ). One of the weakest positive correlations ( $r = .24$ ) was between competence and coach competence support.

**Table 2**  
*Correlations*

Variable	1	2	3	4	5	6	7	8	9
1. Auto	1								
2. Comp	.35*	1							
3. Relat	.42*	.51**	1						
4. CAS	.66*	.26**	.35**	1					
5. CCS	.61*	.24**	.45**	.73**	1				
6. CRS	.65*	.22*	.45**	.79**	.83*	1			
7. PAS	.40*	.55**	.51**	.49**	.27*	.29*	1		
8. PCS	.48*	.50**	.66**	.34**	.48*	.41*	.64**	1	
9. PRS	.35*	.52**	.60**	.42**	.32*	.39*	.72**	.70**	1

*Note.* Auto = autonomy; Comp = competence; Relat = relatedness; CAS = coach autonomy support; CCS = coach competence support; CRS = coach relatedness support; PAS = peer autonomy support; PCS = peer competence support; PRS = peer relatedness support.

\*Correlation is significant at the 0.05 level (2-tailed). \*\*Correlation is significant at the 0.01 level (2-tailed).

### **Influence of Coaches and Peers**

Three hierarchical regression analyses examined the independent and interactive influences of coaches and peers on the psychological need satisfaction of athletes.

The second research question measured the influence of coach autonomy support and peer autonomy support on perceived

autonomy. Block 1 introduced the demographic variables (i.e., gender, race/ethnicity, socioeconomic status, type of sport). Block 2 added the independent effects of coach autonomy support. Block 3 added the independent effects of peer autonomy support. Block 4 added the interaction of Coach Autonomy Support  $\times$  Peer Autonomy Support. Table 3 offers the model summary of this regression analysis. Individually, coach autonomy support explained the largest amount of variance toward autonomy ( $R^2$  change = .275,  $p < .001$ ). However, as the unique component of this study, the interaction of Coach Autonomy Support  $\times$  Peer Autonomy Support did not significantly increase the amount of variance explained ( $R^2$  change = .006,  $p = .236$ ).

**Table 3**

*Model Summary: Autonomy*

Model	<i>R</i>	<i>R</i> <sup>2</sup>	Adj. <i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> change	<i>F</i> change	<i>df</i> 1	<i>df</i> 2	Sig. <i>F</i> change
1	.445	.198	.148	.198	3.92	8	127	< .001
2	.688	.473	.435	.275	65.63	1	126	< .001
3	.692	.479	.437	.006	1.45	1	125	.236
4	.699	.488	.442	.009	2.26	1	124	.136

*Note.* Block 1 includes Gender, Race/Ethnicity, Socioeconomic Status, and Type of Sport. Block 2 includes Coach Autonomy Support. Block 3 includes Peer Autonomy Support. Block 4 includes Coach  $\times$  Peer Autonomy Support.

The second hierarchical regression analysis, addressing in the third research question, pertained to the influence of coach competence support and peer competence support on athletes' perceptions of competence. Block 1 introduced the demographic variables (i.e., gender, race/ethnicity, socioeconomic status, type of sport). Block 2 added the independent effects of coach competence support. Block 3 added the independent effects of peer competence support. Block 4 added the interaction of Coach Competence Support  $\times$  Peer Competence Support. As Table 4 shows, the demographic variables of gender, race/ethnicity, socioeconomic status, and type of

sport explained the largest amount of the variance in competence ( $R^2$  change = .184,  $p = .001$ ). Unlike the analysis of autonomy, this analysis showed that the presence of coach competence support explained a small amount of variance toward perceived competence ( $R^2$  change = .03,  $p = .03$ ), whereas the independent effects of peer competence support was more predictive ( $R^2$  change = .162,  $p < .001$ ). Again, the two-way interaction of Coach Competence Support  $\times$  Peer Competence Support did not uniquely explain a significant amount of the variability in perceived competence ( $R^2$  change = .001,  $p = .662$ ).

**Table 4**  
*Model Summary: Competence*

Model	<i>R</i>	$R^2$	Adj. $R^2$	$R^2$ change	<i>F</i> change	<i>df</i> 1	<i>df</i> 2	Sig. <i>F</i> change
1	.429	.184	.132	.184	3.57	8	127	.001
2	.462	.214	.158	.03	4.83	1	126	.03
3	.613	.376	.326	.162	32.47	1	125	< .001
4	.614	.377	.322	.001	.19	1	124	.662

*Note.* Block 1 includes Gender, Race/Ethnicity, Socioeconomic Status, and Type of Sport. Block 2 includes Coach Competence Support. Block 3 includes Peer Competence Support. Block 4 includes Coach  $\times$  Peer Competence Support.

The fourth research question corresponded to the influence of coach relatedness support and peer relatedness support on athletes' levels of relatedness. Block 1 commenced with the four demographic variables (i.e., gender, race/ethnicity, socioeconomic status, type of sport). Block 2 provided the independent effects of coach relatedness support. Block 3 contributed peer relatedness support. The interaction of Coach Relatedness Support  $\times$  Peer Relatedness Support was examined in Block 4. Table 5 presents the results from the relatedness regression analysis. Among the four blocks, the largest amount of explained variance was through peer relatedness support ( $R^2$  change = .181,  $p < .001$ ). This analysis was the only in which the influence of coaches and peers were similar, with coach relatedness support explaining 16.9% ( $p < .001$ ) of the variance in

relatedness. The model associated with relatedness was also the sole inquiry that resulted in a statistically significant interaction effect ( $R^2$  change = .037,  $p = .003$ ). Although the results indicated a statistically significant interaction effect, the 3.7% of variability would not seem to produce practical significance.

**Table 5**  
*Model Summary: Relatedness*

Model	<i>R</i>	$R^2$	Adj. $R^2$	$R^2$ change	<i>F</i> change	<i>df</i> 1	<i>df</i> 2	Sig. <i>F</i> change
1	.344	.119	.063	.119	2.13	8	127	.037
2	.536	.287	.236	.169	29.82	1	126	< .001
3	.684	.468	.425	.181	42.34	1	125	< .001
4	.711	.505	.461	.037	9.34	1	124	.003

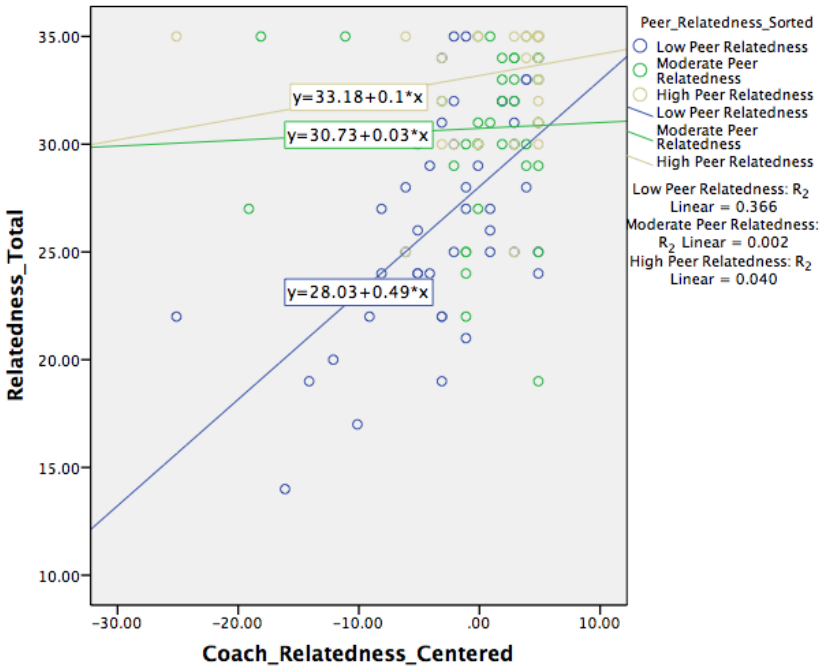
*Note.* Block 1 includes Gender, Race/Ethnicity, Socioeconomic Status, Type of Sport. Block 2 includes Coach Relatedness Support. Block 3 includes Peer Relatedness Support. Block 4 includes Coach  $\times$  Peer Relatedness Support.

As the interaction of Coach Relatedness Support  $\times$  Peer Relatedness Support was the only significant result, the regression lines were plotted and examined, as recommended by Aiken and West (1991). Through this approach, levels of peer relatedness support were distinguished into groups of low peer relatedness, moderate peer relatedness, and high peer relatedness. As Figure 1 shows, the correlation between relatedness and coach relatedness support was .60 for athletes with low peer relatedness support. For those with moderate peer relatedness support, the correlation between relatedness and coach relatedness support was .04. The correlation between relatedness and coach relatedness support was .20 for athletes perceiving moderate peer relatedness support.

## Discussion

This study examined the independent and interactive influences of coaches and peers on need satisfaction among high school athletes from urban communities. Through descriptive statistics, athletes' perceptions of need satisfaction were assessed. Ratings of

**Figure 1**  
*Regression Lines of Relatedness*



relatedness and competence substantially exceeded those of autonomy. The pattern of these responses garnered similarities to those in similar studies conducted by Amorose and Anderson-Butcher (2007) and Riley and Smith (2011). The results in relation to need satisfaction seem to indicate that participants in interscholastic athletic programs feel socially connected to those around them and hold high valuations of their athletic abilities. However, they may not be provided sufficient opportunity to act of their own volition. This may be concerning, as Jõesaar et al. (2011) observed that autonomous athletes were more persistent toward athletic competition and Mack et al. (2011) concluded that increased autonomy was associated with vitality and positive affect. Thus, the findings would support efforts through which high school athletic programs promote satisfaction more consistently to foster overall motivation.

Further, in terms of autonomy support, findings emphasize the importance of coach autonomy support. In fact, among each of the three hierarchical regression analyses, coach autonomy support predicted the largest amount of variance toward its associated outcome variable. Meanwhile, peer autonomy support did not explain a significant amount of the variance in autonomy. Seemingly, athletes in this study value autonomy support from their coaches but may perceive that satisfaction of the need for autonomy is lacking. Within the realm of sport, this could include allowing the athletes options in drills, scrimmages, or practice times. Although interscholastic athletes lean toward an autocratic approach, the results support the benefits for coaches to incorporate elements of democracy. Perhaps high school coaches should be required to complete workshops in which they learn methods to provide autonomy support to their athletes. As peer autonomy support was not linked to perceived autonomy, these findings suggest a limited amount of worth in educating athletes about how to offer autonomy support to their teammates.

Conversely, peer competence support was more predictive of athletes' perceptions of competence than was coach competence support. The minimal correlation of coach competence support toward athletes' levels of perceived competence was likely the most surprising result of this study. As this observation does not align with the findings of Standage et al. (2005) and Viira and Koka (2012), further investigation of this topic is necessary. Meanwhile, the strong results of peer competence support highlight the merit of this behavior. This finding highlights the imperative nature of creating environments of peer competence support. Perhaps, administrators and coaches could provide acknowledgment or rewards to athletes who congratulate and foster self-confidence among their teammates.

The final analysis yielded conclusions toward the influence of coach and peer relatedness support. Unlike the other models in this study, the relatedness model produced significant levels of prediction from both coaches and peers and their interaction. Essentially, these high school athletes based their level of social connectedness on their relationships with coaches and peers. As results demonstrated that participants indicated relatively high perceptions of satisfaction of the need of relatedness, programs must continue to promote backgrounds of relatedness support. As the interaction of

coach relatedness support and peer relatedness support was the only significant interaction, the regression lines were analyzed. For athletes with a high level of peer relatedness support, the effect of coach relatedness support lessened. Thus, athletes' psychological needs can be satisfied by either of the social agents.

Although this study yielded conclusions related to motivation and social influence within high school sport, it has some limitations. The cross-sectional design limits the ability to determine causality of the relationships. Perhaps, athletes' perceptions of psychological need satisfaction affected the level of social influence received from coaches and peers. Additionally, athletes were asked to reflect upon their relationships with coaches and peers during the current season. However, a large percentage (89 of 136 athletes) participated in multiple sports. This result creates the potential that athletes could attribute relationships to previous seasons. Also, the scope of variable selection was limited to the basic psychological needs of autonomy, competence, and relatedness and social influence from coaches and peers. This strategy limits the ability to determine other sources of motivation and potential alternative sources of socialization.

There are numerous compelling areas for future research of motivation among competitive athletes. Longitudinal analysis of the temporal properties of coach and peer influence could provide a more thorough representation of their effects on the athletes. Further exploration of other social sources, especially from parents/caregivers could also offer a more comprehensive assessment of interpersonal socialization. Additionally, measurement of the influence of need satisfaction toward actual participation is warranted.

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## PEDAGOGY

# Making a Case for Physical Education Teacher Education as a Viable Degree Program in Colleges and Universities

Charity Bryan and Sandra K. Sims

## Abstract

*Physical education teacher education (PETE) programs are responsible for the development and preparation of future physical education teachers and, at the K–12 level, physical education is an essential part of a curriculum that promotes the whole child. PETE programs in colleges and universities are therefore critical to the future of K–12 physical education programs, because it is the PETE program and faculty who will prepare the next generation of physical educators in the United States. Quality physical education programs benefit students both academically and physically; K–12 students who are healthy and active are better prepared to learn and grow. Physical education programs must provide students with the knowledge and skills needed to participate in a lifetime of physical activity and healthy habits. Quality PETE programs graduate certified physical educators who are equipped to be successful in schools and who understand the value of creating a culture of health and wellness within the school setting.*

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Quality physical education (PE) programs in schools can be a major contributor to each student's health, physical fitness, and academic performance. Furthermore, PE is a critical component in teaching the whole child. Therefore, universities that prepare future physical educators have a vital role in educating those who will equip students with the knowledge and skills to have a healthy body and a healthy mind.

## **Physical Education Is a Critical Component in Schools**

Numerous national organizations and groups have proclaimed the need for physical activity and PE in schools. One such organization, SHAPE America, strives to empower today's youth to participate at the highest possible level in PE and strives to support participation in activity outside of schools. SHAPE America's (n.d.-a) initiative 50 Million Strong (50MS) brings awareness to the health-related challenges of childhood overweight and obesity that face children today and lead them to a healthier life by high school graduation in 2029. An important goal of this initiative is for schools to offer quality PE provided by certified PE teachers.

Quality PE "provides a planned, sequential, K-12 standards-based program of curricula and instruction designed to develop motor skills, knowledge and behaviors for healthy, active living, physical fitness, sportsmanship, self-efficacy and emotional intelligence" (SHAPE America, 2015). Every student in elementary school should participate in 150 min of PE weekly, and students in middle and high schools should have 225 min of PE weekly, throughout the academic year (SHAPE America, n.d.-b).

PE is an important part of educating the whole child. In 2014, the Association for Supervision and Curriculum Development and the Centers for Disease Control and Prevention developed the Whole School, Whole Community, Whole Child model to ensure that students are healthy, safe, supported, engaged, challenged, and poised for success. This model encourages integration and collaboration between education and health to improve cognitive, physical, social, and emotional development in students (Association for Supervision and Curriculum Development, n.d.). PE is a central tenet of the Whole School, Whole Community, Whole Child approach

and PE teacher education (PETE) programs must prepare future teachers to meet this commitment.

## **Student's Health, Physical Fitness, and Academic Performance**

In 1996, the U.S. Department of Health and Human Services released the first-ever Surgeon General's report. This seminal report clearly indicates that both health status and quality of life can be improved through physical activity. Although health statistics for children and young adults have not improved since 1996, it is likely that the Surgeon General's report may have initiated a discourse regarding the contributions of physical activity and PE programs on the health status of Americans (Cone, 2004). The report contains a thorough review of research related to physical activity and its impact on a healthful lifestyle (McKenzie & Kahan, 2004). For these reasons, the 1996 release of the Surgeon General's report was critical in recognizing the role and potential of PE programs in addressing the childhood overweight and obesity crisis.

In 2008, the Physical Activity Guidelines for Americans (Office of Disease Prevention and Health Promotion, 2008) stated that children and adolescents should participate in 60 min (1 hr) or more of physical activity daily. Schools play an important role in helping to foster lifelong physical activity habits and improving the health of young people by providing quality instruction, programs, and services that promote enjoyable lifelong physical activity. Multiple opportunities exist before, during, and after school to enable students to accumulate at least 60 min of physical activity daily.

A Comprehensive School Physical Activity Program is a multi-component approach for students to be physically active; to meet the recommended amount of physical activity each day; and to develop the knowledge, skills, and confidence to be physically active for a lifetime (Centers for Disease Control and Prevention, 2013). Active Schools is a national initiative that recognizes three distinct components as part of a Comprehensive School Physical Activity Program: First, children are less active than ever. Second, children who are physically active perform better in school. Third, the program seeks to provide positive physical activity experiences for children while integrating physical activity into tasks of daily living. The Active

Schools (n.d.) plan advocates for schools to provide quality PE; classroom-based physical activity opportunities; opportunities for students to be active before and after school; physical activity for staff; and engaged parents and community to help ensure that the school becomes a vehicle for community-wide physical activity.

In 2010, the National Physical Activity Plan revealed the first federal guidelines to address physical activity. One of the plan's education strategies is to "provide access to and opportunities for high-quality, comprehensive physical activity programs, anchored by PE, in pre-kindergarten through grade 12 educational settings. Ensure that the programs are physically active, inclusive, safe, and developmentally and culturally appropriate" (*National Physical Activity Plan*, 2010, p. 14).

Healthy People 2020 (Office of Disease Prevention and Health Promotion, n.d.) lists six physical activity objectives designed to increase physical activity through the schools:

- **PA-3:** Increase the proportion of adolescents who meet current federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity.
- **PA-4:** Increase the proportion of the nation's public and private schools that require daily PE for all students.
- **PA-5:** Increase the proportion of adolescents who participate in daily school PE.
- **PA-6:** Increase regularly scheduled elementary school recess in the United States.
- **PA-7:** Increase the proportion of school districts that require or recommend elementary school recess for an appropriate period of time.
- **PA-10:** Increase the proportion of the nation's public and private schools that provide access to their physical activity spaces and facilities for all persons outside of normal school hours (i.e., before and after the school day, on weekends, and during summer and other vacations).

The Institute of Medicine (IOM, 2011) indicated a need to

help adults increase physical activity and decrease sedentary behavior in young children. Recommendation 3-4: Health and education professionals providing guidance to parents

of young children and those working with young children should be trained in ways to increase children's physical activity and decrease their sedentary behavior, and in how to counsel parents about their children's physical activity. (IOM, 2011, p. 2)

One potential action included "colleges and universities that offer degree programs in child development, early childhood education nutrition, nursing, PE, public health, and medicine requiring content within coursework on how to increase physical activity and decrease sedentary behavior in young children" (IOM, 2011, p. 2).

In May 2013, the IOM released the report *Educating the Student Body*, making six recommendations to address the role of schools in increasing physical activity in youth. One of the six recommendations (#5) specifically addressed colleges and universities. That recommendation stated, "Colleges and universities and continuing education programs should provide preservice training and ongoing professional development opportunities for K-12 classroom and PE teachers to enable them to embrace and promote physical activity across the curriculum" (IOM, 2013, S-9).

PETE programs are largely responsible for the entire research base of knowledge related to PE pedagogy. A growing body of research shows a relationship between physical fitness and academic performance.

The Centers for Disease Control and Prevention (2010) reviewed 50 studies about school-based PE and physical activity and their effect on academic performance. The review found evidence of improved academic performance; a positive relationship with student attention and concentration and on-task behavior; and improved classroom behavior. A certified PE teacher providing a quality PE program is prepared to design a curriculum and teach children in a way that these benefits can be realized.

### **Need for Universities to Prepare Future Physical Educators**

Increasing physical activity and PE in schools is a common theme in the reports and recommendations over the last few decades. For schools to meet these recommendations, a highly effective physical educator needs to lead this school-wide effort. The goal of

all PETE programs should be to graduate highly competent students who will become effective teachers (Hill & Brodin, 2004). Without PETE-prepared physical educators, the activity needs of students in schools today are likely to go unmet.

Students who are fit and healthy are more ready to learn (Bogden, 2012). However, far too many students go to school in less than optimal health. This reality makes the PE program a vital part of providing students with the knowledge and skills needed not only to be good students but also to enjoy a lifetime of physical activity and good health. A certified PE teacher can effectively lead the charge to increase physical activity in schools. Through the guidance of a certified physical educator, schools can become more effective in increasing physical activity throughout the school day. Classroom teachers can be taught to integrate activity into the teaching of core academic subjects and to cease the practice of withholding activity as a punishment. The PE teacher can also help the school provide quality recess and free-play time by organizing PE equipment to be used by each class. Schools need the certified PE teacher to be an advocate and ensure that students receive maximal opportunity for physical activity throughout the day.

Certified PE teachers matriculate through an accredited program at the undergraduate level. Graduate students in other degrees may choose to become certified to teach through an initial certification process that includes completing their master's degree. The critical goal for PETE programs is to graduate students who are highly competent and have the ability to become effective educators by applying the knowledge of appropriate instruction and student assessment. PETE programs are essential to ensuring highly qualified, certified PE teachers who will provide quality, daily PE and opportunities for lifetime physical activity in schools. PETE programs also provide the most viable path to PE teacher certification.

Many state departments of education have legislation requiring accreditation through an external accrediting body for education programs. Advocates believe that the certification process will develop teachers who are more aware of their own practices (Buday & Kelly, 1996; National Board for Professional Teaching Standards, 2012; Serafini, 2002) and thus more effective educators. The Council for the Accreditation of Educator Preparation (n.d.) "advances equity and excellence in educator preparation through evidence-based

accreditation that assures quality and supports continuous improvement to strengthen P–12 student learning” (Mission section, para. 1). The overarching premise of these accreditation bodies is to ensure that PETE programs in higher education are utilizing best practices and that there is alignment with standards set forth by the accrediting body. Usually, these standards attempt to ensure that teacher candidates possess the needed content knowledge and pedagogical content knowledge. In addition, there is emphasis on candidate’s skills and dispositions, as well as their impact on student learning, all of which must be documented to achieve accreditation or reaccreditation.

Across the United States, enrollments in teacher education are down. In fact, from 2010 to 2012, enrollments in teacher education dropped 11% (Koenig, 2014). Low enrollment was also reported in an informal survey of PETE programs in the United States. Of the programs completing the survey, 61% reported either small decreases or large decreases in their enrollments since 2010 (van der Mars, 2015). The issue of low enrollment has led to PETE program elimination in numerous small and large colleges and universities across the country. SHAPE America and the National Association for Kinesiology in Higher Education (2018) found that, over the last decade, 42% of states had a decrease in PETE and health education teacher education programs. Many of these programs were well-respected teacher education programs in their state or region and some were nationally recognized programs.

In the 2018 joint position statement, SHAPE America and the National Association for Kinesiology in Higher Education stated,

Reduction in and elimination of PE/HETE programs threaten not only the future of physical education and health education teacher certification and research in higher education, but also the availability of qualified physical education and health education teachers to fill shortages in schools. (p. 4)

Faculty in PETE programs need to identify the reasons for the low enrollment and create a plan of action to address the issue.

## Reasons for Low Enrollment in PETE

The fact is clear: Student enrollment in PETE programs is declining. It is difficult to state one specific reason for the drop in enrollment across the United States. However, the following are possible reasons: the emergence of unconventional certification/certification by exam, more rigorous entrance and exit assessments, marginalization of PE, changes to the required curriculum in state public schools, changes in PETE programs due to university restructuring, and competition from other kinesiology subdisciplines (i.e., exercise science, athletic training, etc.).

## Possible Strategies to Protect PETE Programs

Even with the need for accredited PETE programs to produce effective educators for K–12 schools, many universities face financial exigency issues that require addressing the dilemma of keeping or eliminating various programs. With the future of PETE programs in jeopardy, some programs are reinventing themselves. Here are several examples: universities dropped the undergraduate programs but retained the graduate programs to create a focused recruitment plan, one university dropped their undergraduate program but added the Alternative Master's Degree program, and another university that dropped the program created a wellness and activity endorsement for Elementary Education majors.

Changing programs may be an answer for some universities; however, the bottom line is universities must find ways to recruit and retain quality teacher candidates. Student recruitment is not easy and most PETE faculty are not trained recruiters. This was evident at one prominent university that recently eliminated their PETE program. The faculty at the university attempted several years of recruitment but were not able to increase the numbers high enough to keep the program. SHAPE America and the National Association for Kinesiology in Higher Education in their 2018 joint statement made the following recommendations to PETE programs:

- Educate university admission officers to ensure they have up-to-date information on the demand for physical education and health teachers in their state.



The most important reason that PETE programs should be viable degree programs in colleges and universities is for the health and fitness needs of students in K–12 schools. Quality health and PE programs can be life-changing for today’s youth and, in many cases, already are (Kelso, n.d.). Universities that prepare future physical educators have a vital role in educating those who will equip students with the knowledge and skills to have a healthy body for a healthy mind. Without quality PETE programs, K–12 students across the United States will lose the opportunity to learn how to be skillful and fit for life.

## Conclusion

A certified PE teacher prepared by a quality PETE program is critical to the health and well-being of school children and school staff in the United States. Schools are the most logical place to provide children with daily physical activity opportunities and a certified PE specialist is the most qualified person to do so. While universities face financial uncertainties, budget cuts, and program reviews, retaining PETE programs becomes “mission critical” to the health and welfare of all K–12 school children. Educating the whole child is not optional and PETE graduates have the skills and abilities necessary to ensure that K–12 students have both the cognitive ability and the psychomotor ability to participate in a lifetime of physical activity.

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## PHYSICAL ACTIVITY

# Analysis of Instruction on a University Strength Training Activity Course

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## Abstract

*This research examined the effects of instruction on experiential knowledge, fitness, self-efficacy, and adherence to strength training of a university weight lifting activity course. Participants ( $n = 35$ ) were enrolled in two introductory-level university strength training activity courses, which met for 85 min twice a week for 15 weeks. The intervention group was exposed to student-centered instructional strategies based on the Personalized System of Instruction (PSI), which included personalized feedback on each student's individualized fitness plan. The control group experienced traditional activity course instruction with direct instruction to the whole group. Pre- and posttest assessments were collected and statistical analyses were conducted ( $p < .05$ ). One-way repeated-measures ANOVA tests revealed univariate statistical differences in fitness measures (push-up, curl-up, and flexed-arm hang), perceived knowledge scores, and the weight management motivation factor of the Exercise Motive and Gains Inventory. Additional differences were observed between groups; however, due to the low number of participants, these differences were not statistically significant. The findings suggest that student-centered instruction in a strength training activity course can benefit student knowledge, fitness, and adherence to a strength training plan. Further research in this area should replicate this study with a greater sample size to determine if the observed differences are statistically significant within a larger research population.*

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Research supporting physical activity (PA) has become widespread within the past few decades. The Centers for Disease Control and Prevention (CDC, 2011) has verified that PA increases life expectancy and reduces the chance of developing several leading causes of death (CDC, 2011). The CDC and American College of Sports Medicine (CDC, 2007) recommend 30 min of moderate PA on most days, yet research has revealed that males and females fall below 50% in terms of the prevalence of regular PA (CDC, 2007). Thus, the reasons to exercise appear bountiful; however, most adults do not meet recommended PA levels.

In addition to PA recommendations not being met, the prevalence of strength training is significantly lower than the already low PA levels. The CDC (2006) reported that 21.9% of men and 17.5% of women engage in strength training activities at least twice per week. Hass et al. (2001) asserted that strength training is “the most effective method available for maintaining and increasing lean body mass and improving muscular strength and endurance” (p. 953). Strength training has also shown positive results with ailments such as osteoporosis, sarcopenia, and lower back pain (Winett & Carpinelli, 2001). Therefore, strength training is an effective method for development of musculoskeletal strength and should be prescribed in all fitness programs.

According to the CDC (2010) in the *State Indicator Report on Physical Activity*, Tennessee has the lowest percentage of both physically active adults and highly active adults in the United States. In addition to Tennessee being at the bottom in terms of PA, over one quarter of Tennessee adults do not participate in leisure-time PA. This information is consistent with a later CDC (2012) study stating that over one fourth of Tennessee adults have not engaged in PA within the past month (CDC, 2012). The CDC (2014a) stated that “individuals living in the South are more likely to be less physically active” (para. 7) than individuals living in other regions. Similarly, the nearby states of Mississippi and Arkansas have fairly low PA rates among adults (CDC, 2012). A 2014 CDC report shows that Tennessee still has the lowest percentage of adults who meet the PA guidelines and that the percentage of active adults has dropped by over 10% (CDC, 2014b). Mississippi now has the highest percentage of adults who do not engage in leisure-time PA, and Tennessee ranks

tied for the second highest percentage of adults who are inactive. Together, Arkansas, Mississippi, and Tennessee converge to form the Greater Memphis area. A large proportion of the targeted population for this study resides in this area.

Although the prevalence of PA hovers below 50% according to the CDC (2007), the figures for resistance training are significantly lower. A 2006 CDC study reported gender-related resistance training prevalence near 20% for both males and females, with males having a higher prevalence. The *2014 State Indicator Report on Physical Activity* (CDC, 2014b) reported a national average of 29.3% of adults meeting the muscle-strengthening guidelines. Although it appears muscle strengthening has increased nationally, the three states included in the Greater Memphis area fall below the national average. Furthermore, Tennessee ranks last among states, with 20.6% of adults meeting the strength guidelines (CDC, 2014b).

Although regular PA of assorted variety strengthens bones and muscles, resistance training is the most effective means of developing lean mass (Hass et al., 2001). Lean mass is also described as fat-free mass, which includes muscle, bone, and components of the body not including fat. Resistance training also makes performing daily activities less demanding for an individual because of the enhanced muscularity (Hass et al., 2001). Hong et al. (2014) analyzed the effects of resistance training on male college students. The participants engaged in an 8-week resistance program, and the results had a profound impact on body composition. The results showed body fat decreased while muscle mass increased (Hong et al., 2014). Whereas Hong et al. investigated muscle and fat masses, Almstedt et al. (2011) looked at another aspect of lean mass. Almstedt et al. found that a 24-week resistance training program can produce improved bone mass density. This finding is consistent across multiple studies showing that bone mass density improves with resistance training. The results, in general, are consistent in that resistance training is effective at improving musculoskeletal systems, be it muscular strength or bone mass density.

Sullum et al. (2000) investigated predictors of exercise relapse among college students. Their research suggests that the decisional balance factors largely into maintenance of exercise. Decisional balance consists of a cost–benefit analysis in which an individual

assigns either a positive viewpoint or a negative viewpoint to exercise. The findings of the Sullum et al. study suggest that relapse in exercise is associated with a higher proportion of con statements as opposed to pros within the cost–benefit analysis. Sullum et al. also suggested that educators focus on reducing cons first to reduce the risk of relapse. Netz et al. (2008) reached a similar conclusion within their study of exercise omission. Individuals who did not sufficiently engage in exercise cited more reasons for omission than those who were sufficiently active. Another interesting conclusion was that individuals who do not adequately engage in exercise present more internal-trait reasons than their counterparts. Netz et al. provided an example of an internal-trait reason for omitting exercise: “I’m not the sporty type” (p. 18). They explained that this reasoning is more indicative of individuals who avoid exercise entirely as opposed to engaging in inadequate levels.

In the Bryan and Rocheleau (2002) study, participants responded to questionnaires about exercise habits and attitudes, and the researchers used the collected data to predict exercise behaviors. From their questionnaires, Bryan and Rocheleau found that nearly half of the respondents did not participate in resistance training because “they simply did not know how” (p. 92). Information like this demands further research. Common responses among barriers for exercise included lack of time and apathy. Motivation and time management are complex concepts that are difficult to manipulate, whereas knowledge of resistance training is rather simplistic. Thorough education should eliminate lack of knowledge as a barrier. With the majority of American adults not meeting the general and strength-enhancing PA recommendations, eliminating barriers to PA should be a goal of physical educators.

In an attempt to improve exercise adherence, specifically resistance training adherence, educators may consider the fitness/wellness curriculum model. This model incorporates instruction aimed at improving individual’s knowledge of PA, including resistance training. Within this educational approach is Concepts-Based Fitness Education (CFE). Lund and Tannehill (2015) explained that CFE seeks to meet three needs of the individual: to engage in lifetime physical activities, to learn the importance of maintaining adequate levels of PA and fitness, and to “develop the knowledge base and skills necessary to plan and execute personal activity programs” (p. 370).

As these needs are met, individuals move along Corbin's Stairway to Lifetime Fitness. Corbin's Stairway to Lifetime Fitness has three levels: dependence, decision making, and independence. Within the level of dependence, individuals rely upon an external source for knowledge to provide instruction. Moving toward the independence level, individuals can apply acquired knowledge to achieve lifelong fitness (Lund & Tannehill, 2015). This is indicative of the process that exercise novices will encounter when engaging in resistance training for the first time. The fitness/wellness model relies on the idea that individuals with the knowledge and skills associated with PA will engage in activity. This assumption is being applied to resistance training with the similar goal of adherence. The fitness/wellness model is an underresearched curriculum model. Therefore, research specifically utilizing the fitness/wellness curriculum model to inspire greater adherence to resistance training regimens is lacking. One such study investigated the development of a fitness curriculum in conjunction with achievement goal theory. Repovich (2011) found that positive self-efficacy was the largest predictor of activity behavior. Repovich implemented a new curriculum focused on enhancing PA among K–12 students. The curriculum was consistent with CFE and linked the various aspects of the study to examine adherence of resistance training based upon achievement goal theory and fitness/wellness curriculum–based instruction.

In terms of an instructional approach, Pritchard et al. (2012) found the Personalized System of Instruction (PSI) model to be an “ideal instructional model for fitness and weight training courses” (p. 356). The PSI instructional model is characterized by benchmarks including minimal managerial time and high rates of individualized instructional interactions (Prewitt et al., 2015). The intent of the model is to personalize instruction for each and every student in the class. By consequence, students can manage their own progress and learning may be enhanced. PSI was developed by Keller in 1968 for psychology courses, and it was later adapted to physical education courses by Siedentop (Hannon et al., 2008). The Pritchard et al. study investigated the effect of instruction on knowledge and fitness as tested by Fitnessgram within a college-aged population, while following a true PSI model, which utilizes training modules and mastery tests.

Therefore, this research examined the effects of instruction on experiential knowledge, fitness, self-efficacy, and adherence to strength training of a university weight lifting activity course. Specifically, this study examined elements of PSI that were implemented, such as individualized instruction and following a personalized exercise plan. The results of this study may provide effective instructional practices for resistance training classes with the goal of increasing adherence among university students. A university setting provides an opportunity for learning to occur before students transition into the workforce. With improved learning outcomes and the potential to increase adherence, this study may help improve the low activity levels of individuals living in the greater Memphis area.

## **Method**

### **Participants**

Participants were students enrolled in an activity course entitled “Free Weights and Machines” at a university in the Southeastern United States. Students in the course met for 85 min on 2 days/week for 15 weeks (27 total meetings). The participants were grouped by course section. The control group consisted of 18 students (6 female, 12 male), whereas the experimental group consisted of 17 students (3 female, 14 male). Approval was obtained from the institutional review board of the university from which the study was conducted. The students volunteered for the study and signed a letter of informed consent prior to participation.

### **Procedure**

The control group followed a traditional activity course curriculum in which the students learned resistance training exercises and performed the exercises dictated by the instructor during each meeting. The instructor implemented a direct instruction approach for the control group throughout the study. A direct instruction approach is characterized by the teacher being in control. The experimental group learned the benefits of resistance training as well as information needed to design a personal workout plan, in addition to learning and performing the resistance training exercises. The experimental group eventually progressed to following personally

developed exercise plans the final four weeks of the course. A major element of the intervention within the experimental group was the use of individualized instruction consistent with PSI. Table 1 explains differences between the instructional approaches.

**Table 1**  
*Comparison of Instructional Approaches*

<b>Group</b>	<b>Control</b>	<b>Experimental</b>
Instructional component	Traditional	PSI-inspired
Length of season	27 lessons (85 min)	27 lessons (85 min)
Workout	Entire group followed the same workout.	Workouts were individualized to participants' goals, abilities, and preferences.
Feedback	Feedback was only provided to ensure safety of participants. Questions from participants were answered, but the instructor did not provide participants with queries.	Instructor constantly provided feedback to improve exercise form and knowledge. Participants were frequently provided with questions on topics to inspire further introspection or to produce enhanced understanding.
Student independence	Students were given minimal independence.	Participants progressed to developing and following self-developed individual workout plans with guidance from instructor.

Throughout the semester, the instructor provided personalized feedback to the experimental group students at a very high rate compared with feedback provided to the control group students. In addition to the constant feedback, the instructor assisted in adapting exercises to meet students' abilities and preferences. This transitioned into the students developing their workouts with assistance and guidance from the instructor, which followed a student-centered approach. Variations of workouts tailored to the individual within the experimental group were created, whereas the control group completed workouts prepared for the collective group. The participants in the control group arrived to class, received the necessary instructions to perform the workout, and completed the workout with only necessary feedback provided by the instructor to maintain safety. To ensure fidelity of instructional implementation, four randomly selected lessons for each class were selected for observation with 100% accuracy being met with regard to each instructional approach implemented.

For experimental control, participants who did not complete both the pre- and posttests nor attend 75% of class meetings were excluded from the data analyses. Of the 35 initial participants, 19 (9 intervention) finished the study with one of the nine intervention participants unable to complete the fitness posttest due to injury (dropout rate = 45.7%).

### **Data Collection**

Data were collected pre, post, and 1-month post through a survey assessing students' perceptions of self-efficacy and knowledge of strength training. The survey included demographic questions (age, previous weight lifting experience, etc.) that were added to the Exercise Motives and Gains Inventory. This inventory added gains scales to the Exercise Motives Inventory II, and it was confirmed to be able to determine exercise motivation levels (Strömmer et al., 2015). In addition to the survey, participants completed pre- and posttests on fitness measures. The fitness measures included the push-up and curl-up tests from Fitnessgram, as well as a flexed-arm hang and a wall sit. The flexed-arm hang and wall sit were measured in duration (seconds) of maintained proper form of exercise. The push-up and curl-up measures adhered to Fitnessgram specifications, in which satisfactory repetitions were counted. Fitnessgram is

a criterion-referenced fitness evaluation program that has been consistently reviewed and revised over the past 30 years (Plowman et al., 2006). Fitnessgram tests are frequently used in young adult populations such as college students (Hashim, 2013). The push-up and curl-up tests provide indication of an individual's dynamic muscular strength, whereas the flexed-arm hang (Rutherford & Corbin, 1994) and wall sit (Lohse & Sherwood, 2011) show isometric muscular endurance. Collectively, the fitness measures provide a varied scope of an individual's muscular fitness. As a supplement to research measures, field notes were also recorded, providing further observations and analysis of the study.

### Data Analysis

One-way repeated-measures ANOVAs compared scores on the fitness tests, knowledge Likert scores, and Exercise Motive and Gains Inventory based upon both the pretest and the posttest. Due to a high dropout rate from posttest to 1-month posttest, the 1-month posttest was excluded from statistical analysis. Data were analyzed via SPSS 22.0 for Windows.

### Results

After exclusion of participants who did not meet all of the criteria for complete participation in the study ( $n = 16$ ), the final sample sizes for the control and experimental groups were 10 and 9, respectively. Overall, several large differences in data between groups were observed. For example, descriptive data from the pretest questionnaire showed a control group mean of experience in strength training of 40.40 months ( $SD = 5.23$ ), whereas the experimental group mean was 22.39 months ( $SD = 5.10$ ). The experimental group mean for the duration of a typical strength training session was 75.22 min ( $SD = 5.03$ ), whereas the control group mean was 57.3 min ( $SD = 4.52$ ).

The one-way repeated-measures ANOVA test on the fitness measures revealed a near significant difference,  $p = .052$ , Wilks' lambda = .51,  $F(1, 17) = 3.125$ , multivariate partial  $\eta^2 = .49$ . When univariate tests were analyzed, significant statistical differences were observed for the push-up test,  $F(1, 18) = 7.47$ ,  $p = .015$ ; curl-up test,  $F(1, 18) = 15.72$ ,  $p = .001$ ; and flexed-arm hang test,  $F(1, 18) = 4.69$ ,  $p = .046$ . The experimental group mean for the curl-up test increased

by 66% from pretest to posttest, but the control group mean only increased by 30%. Table 2 presents descriptive statistics for these measures.

Univariate statistical differences were observed among the ANOVA tests on the perceived knowledge Likert scores pertaining to knowledge of equipment,  $F(1, 18) = 5.88, p = .027$ ; plan development,  $F(1, 18) = 12.26, p = .001$ ; safety procedures,  $F(1, 18) = 9.02, p = .008$ ; and training progressions,  $F(1, 18) = 19.90, p = .000$ . Despite the univariate differences, multivariate differences were not statistically significant. Table 3 presents descriptive statistics for the perceived knowledge measures.

In the analysis of the Exercise Motive and Gains Inventory, a significant difference was observed between subjects for the Weight Management Motive factor,  $F(1, 18) = 6.35, p < .022$ . The factor for Appearance Motive was near statistical significance, but all other factors were not significant or near significance. In terms of adherence to a weight lifting program, the intervention group increased from 2.00 to 2.67 workouts/week, whereas the control group decreased from 2.60 to 2.40 workouts/week.

## Discussion

From the descriptive statistics of the fitness measures, the control group entered the course in stronger muscular condition, as indicated by higher pretest scores in Table 1, but the experimental group progressed at a significantly greater rate for the push-up, curl-up, and flexed-arm hang tests. The experimental group progressed in each measure, whereas the control group experienced no growth within the push-up test. At a casual glance of the data, the control group may appear to have achieved a higher fitness level, but the experimental group progressed at a significantly greater rate, surpassing the control group in the push-up test and to near the level of the control group in the other measures. Similar to the Pritchard et al. (2012) study, this study suggests that a strength training program with PSI-like instruction can yield significant gains in fitness measures.

The statistically significant differences witnessed in the perceived knowledge Likert scores were revealing. The control group yielded higher posttest scores for three of the five factors (Knowledge of Exercises, Workout Plan Development, and Safety Procedures). In

**Table 2**  
*Fitness Measures*

Group	N	Push-up* (reps)		Curl-up* (reps)		Wall sit (s)		Flexed-arm hang* (s)	
		Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
Control	10	21.9	21.9	53.6	69.8	84.01	89.8	35.21	37.85
Intervention	8	17.75	23.25	27.25	45.25	51.46	64.88	35.88	41.56

\* $p < .05$ .

**Table 3**  
*Perceived Knowledge Measures*

Knowledge of...	Control ( <i>n</i> = 10)		Intervention ( <i>n</i> = 9)	
	Pretest <i>M</i> ( <i>SD</i> )	Posttest <i>M</i> ( <i>SD</i> )	Pretest <i>M</i> ( <i>SD</i> )	Posttest <i>M</i> ( <i>SD</i> )
Exercises	3.5 (.97)	4.3 (.68)	4 (.71)	4.2 (.67)
Equipment*	3.8 (1.03)	4.5 (.71)	4.3 (.50)	4.6 (.53)
Plan development*	3.2 (1.14)	4.3 (.82)	3.4 (1.01)	4.2 (.83)
Safety procedures*	3.8 (1.03)	4.6 (.70)	4.1 (.78)	4.6 (.73)
Training progressions*	3.3 (1.34)	4.4 (.73)	3.4 (.88)	4.6 (.73)

\**p* < .05.

terms of instruction, the control group received minimal, if any, instruction in regard to developing a workout plan, yet their perceived knowledge was greater than that of the experimental group, who received extensive instruction on this content area. In each factor of the perceived knowledge measure, the experimental group received more detailed and thorough instruction, whereas the control group received the minimum amount of instruction necessary to safely participate in the course. Yet the control group perceived their knowledge to be greater, which could be attributed to ignorance or increased confidence due to increased exercise experience. The increased perceived knowledge that both groups exhibited indicates that both groups would likely increase their participation in strength training, yet the reduction in number of training sessions per week among the control group contradicts this notion. Bryan and Rocheleau (2002) found that a large number of participants in their study did not strength train due to lack of knowledge, yet the control group of this study increased their perceived knowledge while reducing their number of workouts per week. This inverse relationship points to a further possibility that the control group merely improved perceived knowledge because they believed to be learning a great deal of information.

Upon analysis of the motivation data, apparent differences emerged, although they were not statistically significant. Due to the low number of participants, differences of 0.5 points on a 5-point

Likert scale were not significant, yet they indicate a distinct gap between groups. In terms of general trends, the control group tended to lose motivation from pretest to posttest, whereas the experimental group gained motivation or lost it to a lesser degree than the control group. In fact, the only factor in which the control group averaged a higher posttest response score was the Competition Gains factor, which seems logical due to the individualized nature of instruction for the experimental group. Therefore, despite the virtually nonexistent significant statistical differences between groups in terms of exercise motivation, upon further analysis clear differences were observed. The size of the study was the limiting factor in terms of these observed differences.

The researcher notes revealed further evidence of the effects of the experimental group. Throughout the study, the type of questions that students asked advanced in terms of higher-order thinking and the number of questions decreased as students developed autonomy. For example, initially the questions primarily revolved around mastery of exercise form. Weeks later, questions transitioned to more complicated topics such as physiological responses imposed by rest or how to lose weight without compromising strength. The evolution of student interaction mirrors transitions between phases of exercise adoption. On the basis of observed actions, many of the individuals within the experimental group would be classified in either the maintenance phase or the training phase. The progression toward exercise adoption could be attributed to the reduction of barriers as evidenced by increased knowledge. This would follow the findings of Sullum et al. (2000), who found that decisional balance (pros vs. cons) affects exercise. The participants' movement through the phases of exercise adoption mirrored the progression of student independence consistent with Corbin's Stairway to Lifetime Fitness.

Future studies should investigate different populations to broaden the population affected by this information. This study looked at college-aged students, but additional studies should be conducted with high school student populations, adult populations, and other collegiate populations from different environments. If similar results are observed from replicated studies, then significant changes can be made to physical education instruction, as well as exercise instruction, to best benefit participants.

Although some demographic information was recorded within the questionnaire, the majority of this information was neglected in creating groups to compare results, for the sake of simplicity in this study. An interesting comparison would be the possible differences between inexperienced lifters and experienced lifters. The field notes show that both groups had a few highly motivated individuals who asked in-depth questions, displaying a high level of working knowledge in regard to strength training, whereas the more prevalent type of student was an exercise novice who occasionally sought additional knowledge other than the content provided and rarely asked to supplement a workout with further exercise. If differences present within various demographic comparisons, results could influence approaches to increase adherence among novice strength trainers.

Although attempting to adhere to a formal PSI instructional approach, this study did not employ every requisite feature for PSI instruction. The instructor focused on self-pacing and serving as a motivator, yet a stronger emphasis could have been placed upon instruction via written word and mastery-based learning. Written word instruction came in the form of materials available on the online classroom, materials distributed on paper in class, and additional information written on a whiteboard in class. In the future, instructors should utilize the ideal instruction technique of PSI by providing students with individualized binders that contain all of the necessary instructional information. As for mastery-based learning, only one skills test during the study could verify mastery of a specific exercise. Both groups completed the skills test, which allowed for grading consistency for the university course. In the future, multiple skills tests that verify mastery level of a variety of exercises and prove adequate knowledge of total body strength training should be conducted. Unlike the Pritchard et al. (2012) study, this study reduced PSI from the time-consuming module production to an individualized student approach centered on extensive feedback yet still yielded significant results. In the future, studies could investigate an approach along the PSI spectrum between those used in the two studies. Implementing the instructional adjustments outlined would provide an enhanced PSI model to verify significant relationships between instruction and strength training with the potential to still reduce the initial time consumption caused by module production.

This study provides evidence that a student-centered instructional approach can yield results that indicate significant positive changes in PA habits. Using PSI, or certain facets of the model, has great potential for teaching students about resistance training. Based on the existing low levels of PA, the findings from this study provide a template for strength training instructors to utilize in their classroom and potentially help reverse a negative trend. In addition, an increased understanding of exercise motivation may allow for future growth in PA research, which may in turn have macro effects on health care and daily living. Finally, future studies should be completed with a sizable sample size to determine if the observed differences are statistically significant within a larger research population.

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## YOU AND THE LAW

# Mandatory Drug Testing as a Deterrent for High School Athletes: Effective or a Waste of Money

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This article examines the deterrent effects of mandatory drug testing of high school athletes in relation to student use of both illicit drugs and performance-enhancing substances through a critical review of relevant literature on the topic. It explores student use of both illicit drugs and performance-enhancing substances, as well as how knowledge of mandatory drug testing affects adolescents' decisions related to drug usage. Furthermore, it discusses the ethical and legal debates related to mandatory drug testing.

## **Illicit Drug Use Among High School Students**

Abuse of tobacco, alcohol, and illicit drugs costs Americans more than \$740 billion annually in costs related to health care, crime, and lost work productivity (National Institute of Drug Abuse, 2013). Health care costs alone total \$168 billion for tobacco, \$27 billion for alcohol, \$26 billion for prescription opioids, and \$11 billion for illicit drugs. Overall costs are estimated at \$300 billion for tobacco, \$249 billion for alcohol, \$193 billion for illicit drugs, and \$78.5 billion for prescription opioids.

According to the 2016 National Survey on Drug Use and Health conducted by the Substance Abuse and Mental Health Services Administration (2017), illicit drug use in the United States is

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increasing. Approximately 68,000 people responded to the survey, which reports whether respondents have used specific substances ever in their lives, over the past year, and over the past month, which is defined as “current use.” According to the survey, an estimated 28.6 million Americans 12 years or older had used an illicit drug in the past month. That accounts for 10.6% of the population, which was an increase from 8.3% in 2002. The increase is attributed to the rise in the use of marijuana, which is the most commonly used illicit drug. In 2016, 24 million people (8.9%) were using marijuana, up from 14.5 million (5.8%) in 2007. The use of most drugs other than marijuana has stabilized or declined over the past decade. In 2016, 6.2 million Americans 12 years or older (2.3%) had used prescription drugs nonmedically over the past month, including pain relievers, tranquilizers, stimulants, and sedatives, while 1.4 million (0.5%) had used hallucinogens, including ecstasy and LSD, in the past month. In 2016, the number of cocaine users was 1.9 million, down slightly from the 2.0 million to 2.4 million users in 2002 to 2007. However, methamphetamine use was higher with 667,000 users in 2016 compared to 353,000 users in 2010.

### **Education as a Deterrent**

Many believe the key to decreasing drug use is education. Drug education in America began in 1983 with the D.A.R.E. program, which is a comprehensive K–12 educational program taught in schools across America and 50+ other countries (D.A.R.E., n.d.). The program addresses drugs, violence, bullying, internet safety, and other situations facing today’s youth.

According to the Monitoring the Future survey of students in eighth, 10th, and 12th grades (National Institute of Drug Abuse, 2016), the use of illicit drugs other than marijuana is continuing to decrease among adolescents in America. The most recent numbers from 2016—5.4% among eighth graders, 9.8% among 10th graders, and 14.3% among 12th graders—are down from peak rates of 12.6% of eighth graders in 1995, 18.4% of 10th graders in 1996, and 21.6% of 12th graders in 2001. The use of substances such as alcohol, cigarettes, heroin, cocaine, methamphetamine, inhalants, and sedatives are at the lowest levels since the inception of the survey. The use of marijuana is unchanged among 12th-grade students. However, the

use of marijuana by eighth and 10th graders is at its lowest level in more than 2 decades.

An argument in recent years is that the mandatory drug testing of high school athletes is too costly and also raises both legal concerns and ethical concerns. An often cited counterargument is that drug testing deters student-athletes from using illegal drugs and substances. Approximately 2.2 million students in Texas public schools participate in over 70 activities, including sports, governed by the University Interscholastic League (2015).

### **Ongoing Drug Issues With High School Student-Athletes**

Drug use, whether it is performance-enhancing drugs or illicit drugs, among high school student-athletes is not a new issue. However, it is an issue that does not seem to be going away. In the fall of 2017, at least three high school football teams made national news because of issues related to student-athlete drug use. These incidents are detailed below.

Croton-Harmon High School in Hudson, New York, had to forfeit its September 16, 2017, homecoming game after a bag of marijuana was found in the locker room (Reiner, 2017). Several players were suspended from football for one week. The suspensions, along with injuries, left the team too shorthanded to play in its game that week against Putnam Valley. The marijuana was found in the football area of the boys' locker room at the high school. State police used drugs dogs to search the high school after the incident, but no additional drugs were found.

A high school football team in Geneseo, New York, was forced to forfeit its last four games of the 2017 season after several members were removed from the team for taking the opioid OxyContin (Associated Press, 2017). Law enforcement officials believe seven players took the prescription painkillers prior to their 26-24 win over Bolivar-Richburg on September 22. The players received the OxyContin from a teammate and then reported what they had done to their coach because of some of their reactions to the drugs. The football team did not have enough players remaining to fill a roster for their remaining games of the season.

In October 2017, the District 13-4A District Executive Committee (DEC) voted to suspend six Gatesville, Texas, football players based on allegations that the student-athletes used performance-enhancing

drugs the previous summer, though the University Interscholastic League's State Executive Committee (SEC) overturned the suspension that same afternoon (Sparks, 2017). Gatesville junior high assistant football coach Aaron Mueller provided testosterone-boosting injections to his younger brother and five other varsity football players at his apartment over the summer, according to Dr. Rob Hart, Liberty Hill ISD superintendent and chair of the DEC, who disagreed with the DEC decision. Mueller resigned shortly after Gatesville administrators discovered the incident. The six football players were suspended by the school district for 28 days over the summer—missing some seven-on-seven games, a few weeks of practice, and two scrimmages—and later came back clean when drug tested by the school district. The vials used by the student-athletes were turned over to the Drug Enforcement Administration, which could not determine what they contained, according to Hart.

## Literature Review

### Historical Challenges With Studying Drug Use in High School Athletes

The Student Athlete Testing Using Random Notification (SATURN) study was the first of its kind to investigate the deterrent effect of mandatory, random student-athlete drug testing in a controlled manner (Goldberg et al., 2003). The pilot study assessed students at two Oregon high schools, one that had mandatory consent to drug testing for anyone participating in sports and a second that did not have mandatory drug testing (used as a control school). Student-athletes were subject to drug testing during the entire 1999–2000 school year, not just during their sport season, and each had an equal chance of being tested during the random 15 days of testing. A total of 30% of the athletes were tested during the school year. The study concluded that random drug testing “may have” significantly reduced the use of performance-enhancing substances and illicit drugs among student-athletes (Goldberg et al., 2003, p. 24). However, it cited reservations with the results because of the worsening of risk factors and the small sample size. It also suggested that a larger, long-term study was necessary to confirm these findings.

Shamoo and Moreno (2004) questioned the ethics of the recruitment, informed consent, and confidentiality involved with the

SATURN study, suggesting it violated the principles of both the Nuremberg Code and other federal human research protection regulations. The mandatory drug testing associated with the study was upheld by a state district court and affirmed by the U.S. Supreme Court. Shamoo and Moreno argued that when participants become involved in a study that might result in risks, they should be afforded an informed consent process “free of duress and coercion and with a reasonable guarantee of confidentiality” (p. 28). Informed consent documentation for SATURN failed to include a detailed description of the study, an explanation of randomization, a statement that parents would be informed if their child tested positive, and an indication to parents of whether the project included both drug testing and survey research. The Office of Human Research Protections found that the study failed to meet the requirements of informed consent with minimal coercion and undue influence, and lacked complete descriptions of randomization, parental notification of a positive test results, and the longitudinal nature of the study. Shamoo and Moreno also stated that the schools were “pushing” students to participate in the mandatory drug testing and that the involvement of school administrators and coaches in “corralling” student-athletes into special classroom settings appeared as recruitment for the study (p. 29).

The most coercive aspect of the program, according to Shamoo and Moreno (2004), was the threat of ineligibility to participate in sports if the students refused to participate in the research. Federal regulations regarding informed consent state, “Participation is voluntary, refusal to participate will involve no penalty or loss of benefits to which the subject may discontinue participation at any time without penalty or loss of benefits to which the subject is otherwise entitled” (General Requirements for Informed Consent, 2018). The authors also questioned the protection of confidentiality because it could be lost if a student-athlete was suspended, as well as the equitable selection of subjects because the program targeted athletes.

Koski (2004) addressed the ethical issues raised by Shamoo and Moreno (2004), the legal issues raised by the Office of Human Research Protections in regard to the SATURN study, and the alleged privacy rights that were violated with forced enrollment in the

project. He argued that if consent is not informed and freely given, then there is a duty to not allow participation in the research.

Koski (2004) offered suggestions on how this pilot study could have been conducted within the law and without violating ethical standards. First, he said that the study should have been separate from the mandatory drug testing program so that the issues of mandatory testing and coercion would fall on school officials and therefore would not involve the researcher. He then pointed out that certificates of confidentiality could be used to protect the research information from legal discovery. He also recommended the use of “anonymization” and the coding of information to address the issues of privacy and confidentiality of information.

### **Positions on the Ethics of Drug Testing in General**

Louria (2004) claimed that society’s inability to manage the use of drugs has led to the long-term incarceration of those involved with drugs, including those who use drugs and small-time sellers, which he referred to as “unjust, cruel, and immoral” (p. 35). A second counterproductive policy, he said, is the coercive drug testing policies of those who participate in sports and other extracurricular activities. The two primary reasons people use illegal drugs are boredom and peer pressure. Children are often encouraged to participate in extracurricular activities to lessen their boredom and to prevent possible interaction with peers who are involved in illegal or undesirable activities, such as drug use. Therefore, Louria said it makes “no sense at all” to drug test student-athletes (p. 35). He pointed out that the SATURN study showed that athletes used considerably fewer drugs and less alcohol, whereas students at the treatment school had a greater use of illicit drugs compared to those at the control school.

The Fourth Amendment protects American citizens from unreasonable searches and seizures, but Louria (2004) pointed out that a series of federal and state court decisions beginning in the 1960s subordinated those rights because of the perceived needs of society. First, the court ruled that obtaining warrants in some situations is impractical and sometimes not required. Second, the court declared that probable cause was too restrictive and not required. Finally, the court focused on the word “reasonable” instead of “unreasonable,” consequently deciding that probable cause was not needed.

The Fourth Amendment separates “unreasonable searches” from “probable cause,” and Louria argued that determining that a search is reasonable does not lessen the need for probable cause.

Two landmark Supreme Court cases, *National Treasury Employees Union v. Von Raab* (1989) and *Skinner v. Railway Labor Executives’ Association* (1989), gave way to invasive body searches, including the testing of body fluids, such as blood and urine (Louria, 2004). He argued that all of the legal decisions handed down by the Supreme Court are unethical. On the other hand, Louria said that ethical research evaluation of mandatory drug testing could be achieved simply by using anonymous questionnaires. Therefore, he said, even unethical policies can sometimes be ethically evaluated.

Although several argue that the SATURN study was unethical, Luna (2004) argued that it was not illegal nor was it unconstitutional. Like Louria, Luna (2004) also discussed the government’s use of the Fourth Amendment’s search and seizure provisions, but offered a different explanation of the evolution of the law. The first significant change in the law, he said, occurred when the notion emerged that “the Fourth Amendment protects people, rather than places” (*Katz v. United States*, 1967). From that point on, he argued, the courts turned a blind eye on drug agents who clearly ignored “no trespassing” signs and had no regard for privacy rights in search of illegal narcotics. Luna (1999) said the court then separated the Reasonableness Clause, which protects citizens from “unreasonable search and seizures,” from the Warrant Clause, which declares there must be “probable cause” for judicial warrants. The court ultimately concluded that no warrant was required to detain and frisk an individual as long as law enforcement officers had a “reasonable suspicion” of a crime (*Terry v. Ohio*, 1968). The “special needs” doctrine emerged in the 1980s, stating that a search without a warrant or suspicion may still be constitutional when “special needs, beyond the normal need for law enforcement, make the warrant and probable-cause requirement impracticable” (*Skinner v. Railway Labor Executives’ Association*, 1989).

Luna (2004) then addressed six cases related to drug testing that have been considered by the Supreme Court since 1989. The first two cases upheld drug testing for customs agents (*National Treasury Employees Union v. Von Raab*, 1989) and railroad employees (*Skinner*

*v. Railway Labor Executives' Association*, 1989). In both cases, the court found minimal intrusions on privacy and any compelling interests at stake were outweighed by "compelling" government interests. Two subsequent cases, however, ruled against drug testing programs for political candidates (*Chandler v. Miller*, 1997), deemed symbolic and mostly a form of propaganda, and for pregnant mothers (*Ferguson v. City of Charleston*, 2001), which included testing without consent and possible criminal prosecution. Regardless of these outcomes, Luna (2004) said the court has granted public schools "virtual carta blanche" with regard to drug testing students involved in extracurricular activities (p. 42). Whereas Louria (2004) suggested that the Supreme Court decisions were "unethical," Luna (2004) described the cases as "unprincipled" or "wrong-headed" (p. 43).

### **Random Drug Testing of Student-Athletes**

The U.S. Supreme Court set a national precedent by upholding a school district's right to use random drug testing of student-athletes in the case of *Vernonia School District v. Acton* (1995). In *Earls v. Tecumseh School District* (2002), the Court upheld schools' rights to drug test students who participated in extracurricular activities. According to the U.S. Department of Justice (1996), the Vernonia School District was justified because some teachers reported a decrease in drug use and improved student discipline after the implementation of drug testing. However, no scientific studies were conducted within the school district.

Bahrke (2015) argued that drug testing student-athletes in the United States for abusing performance-enhancing substances is a flawed process. He said that the low number of positive test results do not justify the high costs of the tests, especially for school districts that cannot afford the extra expense. New Jersey became the first state in America to begin drug testing student-athletes in 2007. Over a 4-year period, 2,000 student-athletes from New Jersey were tested at a cost of \$400,000, resulting in only one positive test for a 0.05% positive test rate (\$400,000/positive test result). New Jersey's program tests 500 student-athletes per year, but the only student-athletes eligible for the testing are those who participated in state tournaments. Bahrke argued the effectiveness of the program is compromised because it is limited and not random. Texas Governor Rick Perry signed into law the country's most extensive

testing program for anabolic steroids with a price tag of \$6 million in 2007. Of the 50,000 students who have been tested, there have been less than 25 positive tests (\$240,000/positive test result). The program is about one third of its original size because of budget restraints. Illinois tested 684 student-athletes at a cost of \$150,000 in 2008–2009 with no positive results. Florida terminated drug testing in 2009 after only one positive test out of 600 (\$100,000/positive test result). None of these tests yielded a positive rate of over 1% (all were below that). Bahrke gave several reasons for so few positive tests from drug testing American high school student-athletes: use of performance-enhancing drugs is very low, not all anabolic-androgenic steroids and performance-enhancing drugs are being tested for, and testing is infrequently conducted. He said that drug testing is invasive, violates privacy, and is expensive. He argued that money and other time-limited resources would be better spent on improving education and injury prevention.

### Research on Drug Testing of Student-Athletes

Buckley et al. (1988) surveyed 12th-grade male students (general student body) from 46 private and public schools. Of these students, 6.6% admitted to having used anabolic steroids. Stigler and Yesalis (1999) surveyed 873 high school football players in Indiana, 6.3% of whom reported either currently using or former use of anabolic-androgenic steroids. Naylor et al. (2001) surveyed 1,515 high school students in Massachusetts on their drug use. They found that athletes were “significantly less likely to use cocaine and psychedelics, and were less likely to smoke cigarettes, compared with non-athletes” (p. 627). Furthermore, there was no difference in the use of anabolic steroids between athletes and nonathletes. Only 2.5% of athletes reported using steroids. Perhaps most interesting in this study was that only 57% of the athletes reported that their coaches addressed substance use and abuse, and 13% reported having not been penalized after being caught violating the eligibility rule related to chemical use (Naylor et al., 2001).

Citing *Brooks v. E. Chambers Consolidated Independent Sch. Dist.* (1991), Shutler (1996) argued that there is no evidence that random drug testing prevents athletes from using drugs. Furthermore, Shutler argued that random drug testing has a negative effect on the relationship among coaches, student-athletes, and school officials

(see *University of Colorado v. Derdeyn*, 1994). A study by Yamaguchi et al. (2003) indicated that drug testing is not effective in reducing illicit drug use by students. The research used data obtained from the aforementioned Monitoring the Future study conducted by the National Institute on Drug Abuse. The study showed that drug testing was not a significant predictor of student use of marijuana or other illicit drugs. The study used only a single source for its data. It concluded that in addition to effectiveness, drug testing policies should consider the factors of cost-effectiveness, false positives through poor training and handling, and alienation and resistance from students.

A recent national survey of secondary school students by Sznitman and Romer (2014) showed that school climate, defined as the relationship between students and school staff, has a greater impact on deterring drug use than does drug testing. Their research showed that random drug testing did not reduce students' substance abuse and that positive school climates were associated with reduced use of cigarettes and marijuana, but not with alcohol use.

## Discussion

A conflicting situation is at hand. Athletic governing bodies rightly want an equal playing field. The champion should win on skill and ability, rather than artificial enhancement. Teachers, coaches, principals, and school districts desire drug-free environments where the students can flourish and become productive members of society. The challenge becomes how best to create this without infringing on the rights of adolescents and violating the intent of the law. It is apparent that the use of drug testing is an expensive strategy.

Perhaps monies should be spent on education rather than random testing. Evidence suggests that educational programs can help. Goldberg and colleagues have conducted several studies evaluating the effectiveness of drug education and prevention programs. Goldberg et al. (1996) held an intervention program with high school football players in which educational material was presented on anabolic steroids. Results were positive, indicating that participants in the training group improved drug refusal skills and reduced intention to use steroids. Continuing this line of research, Goldberg et al. (2000) examined the usefulness of a training program geared toward avoiding steroid use in 31 high school football teams. As a result

of their program, intention to use anabolic steroids and actual use were significantly lower among program participants. Furthermore, Goldberg et al. (2000) stated that an athletic team environment provides an “optimal environment” for drug prevention and health education (p. 332). Elliot et al. (2004) focused on female high school athletes in their educational program. Overall, 928 female athletes participated in the 8-week program. Results demonstrate the positive impact of educational programs; of particular interest to the topic at hand, experimental athletes reported significantly less ongoing and new use of enhancing substances (e.g., anabolic steroids) and reductions in health-harming behaviors (e.g., alcohol and tobacco use). Evidence also points to retention of the positive outcomes of these training programs. In a follow-up study, Elliot et al. (2008) revisited their 2004 study and found that the intervention participants reported significantly less use of cigarettes, marijuana, and alcohol.

In conclusion, evidence suggests that drug testing results in few positive results. The cost per positive test is large and the effectiveness of the strategy is questionable at best. Evidence that training and prevention programs have a positive impact on this population exists, and a focus on educating rather penalizing appears to be a viable strategy. It is up to the governing bodies to determine whether to continue spending funds on testing at the high school level.

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